HUMANITIES&SCIENCES

ISSUE NO. 01

THE BYTE

IS WHERE WE START

HADOOP: THE NEXT BIG THING

With the booming volumes of data, hadoop is the new hope before we drown into the data tsunami

THE INTERVIEW

an exclusive one on one with the CEO of writers , Mr Satyamohan Yanambaka

THE YELLOW FUEL

here's the underdog in the fuel empire making a diffrence

PHOTOGRAPHED BY IAN CASTANEDA

H&S DEPARTMENT

The aim of the F.E. course is to provide the students with a strong platform and make them competent individuals for higher semesters. This course comes under the Department of Humanities and Sciences and is common to all the branches of engineering. The department focuses on effective functioning of the academics and also the overall development of FE students, with the focus on building the communication skills and the aptitude with the perspective of engineering graduate.

DEPARTMENT VISION

"The department of Humanities and Sciences shall strive to provide powerful educational effectiveness by linking facts, theory, inquiry, discovery and solutions to real world problems thereby providing a sound foundation to the undergraduate students."

DEPARTMENT MISSION

To endeavour to provide a strong base in Engineering and Technology, where students, faculty and staff work collaboratively to expand knowledge in the basic disciplines of providing a foundation that is appropriate to their career goals, equipping well with knowledge and skills that will allow them to function as responsible and contributing members of society.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1

To provide students with a strong foundation in mathematical, scientific and engineering fundamentals necessary to identify, analyze and solve real life problems and to prepare them for graduate studies in their specific domain.

PEO2

To prepare students for successful career in Indian and multinational organizations, by assessing current and emerging technologies.

PEO3

To develop the ability amongst students to synthesize data and technical concepts from applications to product design.

PEO4

To encourage students to identify and bridge gaps between the curriculum and industry requirements.

PEO5

To provide opportunities for students to collaborate and work in teams on multidisciplinary projects for accomplishing common goals.

PEO6

To motivate and prepare students for higher studies and specializations.

PEO7

To develop excellent written and oral communication skills, including presentation skills and technical writing for effectively interacting with clients, customers, co-workers and managers.

PEO8

To promote awareness amongst students for life-long learning and to inculcate in them professional and ethical attitude, good leadership qualities and commitment to social responsibilities.

PROGRAMME OUTCOMES

PO1

Ability to apply knowledge of mathematics (differential equations, vector calculus, complex variables, matrix theory, probability theory), science (physics, chemistry, EVS etc.), and engineering (electrical, electronics, mechanical etc.)

PO2

Ability to design and perform experiments as well as analyze and interpret data.

PO3

Ability to design, simulate and test a system to meet desired specification.

PO4

Ability to apply the knowledge of current techniques, concepts, skills, and modern tools for the solution of engineering problems.

PO5

Ability to function in teams on multidisciplinary projects.

PO6

Ability to communicate effectively in both oral and written form.

PO7

Ability to understand the impact of engineering solutions in a global/societal context.

PO8

Ability to recognize the need for and ability to engage in lifelong learning and understanding of professional and ethical responsibilities.

PO9

Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

P10

Ability to participate and succeed in competitive examinations like GATE, GRE etc. and also other professional examinations at various levels.

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H&S MENTOR
PROFESSOR'S MESSAGE

I am gratified to know that the department of "Humanities and Sciences" is bringing out the first edition of technical magazine "THE BYTE". It is a great moment for First Year students and faculties as well to release first edition of the technical magazine. The magazine is an appropriate medium for attracting every individual interested in technical topics.

This technical magazine will create a platform to enhance background knowledge through non-fiction and practical informational reading. Normally Technical Magazines are for the department and contribution from students of that department; i.e., department magazines are more inclined towards their own domains, whereas First Year Magazine is to promote culture and interview department ideas at first year itself. This will provide a platform for inter discipline project ideas and will help to nurture students minds for inter-disciplinary things. Also, students will realise importance of all subjects as FE students always have a doubt of learning subjects not relating to their field. I would like to congratulate all students, teachers and everyone involved in bringing out the first edition of "THE BYTE". I wish all the students a great success in their endeavours!

-Dr Deven Shah

F.E. INCHARGE'S MESSAGE

The H&S department, keeping the betterment and growth of First Year students in mind, has successfully been organizing various technical as well as non-technical events in the form of projects, workshops and paper presentations. This initiative of technical magazine ‘THE BYTE’ will create one more platform for first year students to participate and put forward their technical and creative skills in the form of articles and new endeavours in their technical journey. It is a great opportunity for first year students to showcase their talent and enhance their aptitude and analytical skills. I congratulate the editorial team that has proven its worth by giving the magazine a fresh and grand look. I wish all students all the very best and hope the future is brighter with each day.

-Dr Vivek Mishra

ACTIVITY IN-CHARGE'S MESSAGE

I am really happy to see that First Year faculty and students have come out with the first edition of technical magazine, THE BYTE beautifully!

TCET has always given an opportunity to students by conducting different programmes to present their knowledge and skills in curricular, co-curricular and extra-curricular activities. The Department of Humanities and Sciences has the youngest minds and they come up with these bright ideas of releasing the technical magazine. This technical magazine has given an opportunity for students and faculty alike for expressing their talent in the form of articles.

I hope that this will create a great and creative platform for students to explore new ideas and present it in the best possible way. This will definitely act as a stepping stone to build the confidence and steer self assurance of our budding engineers and inspire us in ways that we are going to be grateful for in the future.

I sincerely wish that all my students will contribute to the nation's wealth and excel in their life!

Dr. Rajni Bahuguna

FACULTY IN-CHARGE'S MESSAGE

It gives us an immense pleasure to pen a few words for the first edition of Humanities and Sciences departmental magazine “THE BYTE”. This technical magazine is a platform created for all first year students to encourage and give an impetus to the spirit of research. This will create a productive technical material and subsidiary skill developing tool for the students.

The most important aspect we could derive from this stupendous effort is that it brings out the various technical and analytical skills of the budding engineers. In such competitive world, it is necessary for students to take part in co- and extra-curricular activities for enhancing their knowledge and attitude skills. Therefore, first year students have been given an opportunity through this magazine to create more interest in bringing technical articles with more bright concepts and innovative ideas.

we congratulate and applaud the coordination and efforts of the editorial team for coming up with this first-ever issue which fuels innovativeness amongst the contributors!

Amol Dapkekar & Bhim Kunte

From The Editor

This is the first of our department's innumerable magazines and we couldn't be more proud. 'The Byte' is not just a magazine. For us, it is a visual demonstration of all the hard work each one of us has put in and the representation of the magnificent memories and experience we shared while working on it.

Our soul motive with the publication of this magazine is to give life to the unheard enthusiasm, unabating passion and uncelebrated talent of our dear FE students. 'The Byte' is an opportunity for the students to come out of their nutshell and share their ideas pertaining to technology whilst not having to compromise on their time devoted to academics even one bit. Alongside the articles, we have also listed various achievements of the H&S and a quick overview of the prestigious events that have taken place this year giving their winners an honourable and noteworthy mention.

We hope for our efforts to be appreciated and cherished by all and we promise to keep delivering content that each one of you will have a joyous time reading.

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Discovering The New Dimensions

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Abstract

In this innovative work entitled "Discovering the New Dimensions" we first talk about measurements and explain how space comes into being. It is then related to dimensions. Physical meaning of linear equations (one-dimension) and equations of second and higher degrees is explained. Every dimension comes with special insight to understand the Universe. Every dimension boasts that it shows the reality, but the claim ultimately turns out to be that it does not show the reality but the shadow of the reality. This raises a question: Will it be possible for us to see the reality? We understand the world of three dimensions – length, breadth and height. What is that fourth dimension of Minkowski and Einstein? That is time. But the time is measured in seconds and the length is measured in meters. How to convert time into length? Einstein very ingeniously did it by multiplying the time 't' by a universal constant 'c', the velocity of light. So Einstein's time is not 't' but 'ct'. Is it that four-dimensional world final? We discuss here this question to find its answer.

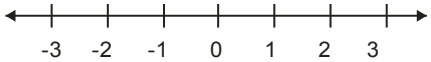
Key-words: Linear dimension - Higher dimensions – Understanding the Universe through higher dimensions. Shadow of the reality.

I. Introduction

In this world, there are measurements and measurements. We have to measure length, mass, time, area, volume, speed, acceleration, temperature, force and so on. Fundamental quantities are length, mass, time, temperature and some other quantities. All other quantities are derived quantities such as speed etc.

The question is what is space…? How is space generated…? How is space defined…? Is space just void…?

Mathematicians tell us that a point cannot be defined. It can be as large as the universe or as small as we can think of. We don't know the depth of a point or its largeness. A blunt pencil can generate a point and a sharp pencil can also generate a point. Both are points. No matter, which one is bigger or smaller. A point is, indeed, a very interesting geometrical entity, much more complex than it looks. It is a great mystery of the Universe. Ultimately, everything consists of points. For example, Number Line. Number line itself is infinite. Between any two real numbers, there lie innumerable infinite numbers. In this sense, a real line is much more complex than it looks.

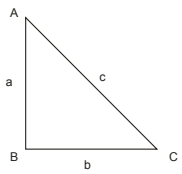


Number line represents all Real Numbers

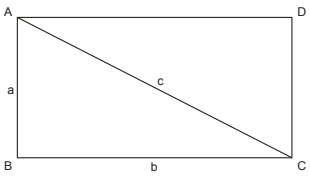
A point cannot generate space. A black hole cannot generate space, as there is no connectivity. Connectivity is a relation. There is no relation; there is no world, no space.

Two points generate space. When a second point comes into being, the space comes into being; we can then define the distance between two points. This is connectivity, this is relation.

Who was the first to give formula for distance between two points? It was not Pythagoras, but it was Indian mathematician Baudhayan from Kerala, way back in 600 BC, 200 years before Pythagoras. According to Pythagoras theorem, in a right angled triangle the sum of the squares of sides making right angle equals the square of hypotenuse. If a, b are lengths of sides making right angle and c is the length of hypotenuse then $c^2=a^2+b^2$.



Pythagoras View



Baudhayan View

200 years before Pythagoras, Baudhayan proved that in a rectangle the square of its diagonal equals the sum of the squares of two sides of the rectangle which covers the diagonal.

If a, b are the lengths of two sides of a rectangle and c is the length of its diagonal covering the two sides then $c^2=a^2+b^2$.

Therefore Pythagoras Theorem should be called Baudhayan theorem or at least Baudhayan-Pythagoras Theorem.

What is the significance of Baudhayan-Pythagoras Theorem? It is the measuring tape for measuring distance between any two points in the universe. Every measurement in the universe ultimately reduces to Baudhayan-Pythagoras Theorem. It also gives rise to numbers like $\sqrt{2}$, $\sqrt{3}$, etc. surds-real numbers. It extends the number system, and generates the real line. We should be proud that the formula of the distance between two points was discovered by an Indian, as a result we also got real line. This is a fundamental discovery to understand the universe. This was the first step forward.

Another fundamental discovery to understand this whole macroscopic and microscopic universe is the Indian number system 0, 1, 2,…..9, 10, 10^2, 10^3,…..10^{57},….10^{-1}, 10^{-2}, 10^{-3}, 10^{-4},….10^{-34}, 10^{-44}. Without this, we could not have understood this vast universe outward and inward. We Indians should also be proud of this another discovery. Both these discoveries are fundamental and at the base of understanding the Universe. Einstein once said, "We owe a lot to Indians who have taught us how to count; otherwise science would not have progressed at all." 0, is taken as the origin of any measurement. We are proud that we Indians are at the origin of any measurement or understanding the universe.

II. Generation Of Dimensions

What is the significance of measuring distance between two points? It gives rise to linear dimension-one dimensional space. Taking help of this, Rene Descartes (1644) generated Cartesian frame of reference to depict everything pictorially with proper dimensions and shapes of the objects in the universe. It is very interesting to know that the Indian mathematician Aryabhata of 5th and 6th century AD for the first time used half chord and set the base for Trigonometry, sinθ. The idea of cosθ was of Bhaskaracharya, another Indian mathematician of 12th century AD. Look, how India is related with the process of measurements in the Universe and thus understanding the Universe.

Suppose there is a one dimensional creature. It will understand only one dimension. If there is an object on its path, or somewhat away from its path, it will not be able to grasp it. If there is a pencil lying along its path, it will take it as a dense dark line on its way. It will climb it also, but will not be able to realize it as a three dimensional object- a cylindrical object, as it has no idea of three dimensions.

If a creature has knowledge of two-dimensions, it appreciates all two-dimensional surfaces. If a person stands on it, the two-dimensional creature will sense only the impression of his/her feet. It cannot realize the whole shape of a person. As the knowledge of dimensions of a creature increases, its horizon of knowledge increases by many-fold.

If a creature has knowledge of three-dimensions, it can visualize three-dimensional world. It can see the whole man standing nearby, stones, trees, mountains, sky, flying birds and so on.

In a one-dimensional world, there is only one coordinate that of x in Cartesian coordinate system. In two-dimensional world (surface area) there are two coordinates x and y. In this system with the help of Baudhayan-Pythagoras Theorem, we write square of the distance r of a point(x,y) from the origin as

$$r^2 = x^2 + y^2 \qquad (1)$$

or in general, the square of the distance r between two points (x_1, y_1) and $x_2, y_2)$ is

$$r^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2. \qquad (2)$$

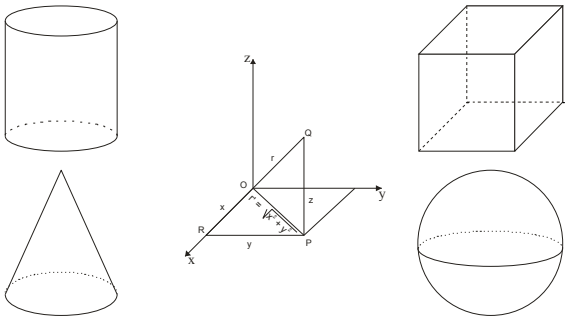
In three-dimensional world, there are three coordinates x, y and z. In this system, with double application of Baudhayan-Pythagoras Theorem, we write the square of the distance r of a point(x,y,z) from the origin as

$$r^2 = x^2 + y^2 + z^2 \qquad (3)$$

or in general, the square of the distance between two points (x_1, y_1, z_1) and (x_2, y_2, z_2) is

$$r^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2. \quad (4)$$

If our world would not have three-dimensions, we would not have our body, no stomach, no head, no ears, no fingers, no hands or anything like that. Thanks to nature that our world is three-dimensional, so that we have cubes, cuboids, spheres, cylinders, cones and so on. As a matter of fact every object in our three-dimensional world has three-dimensions-length, breath and height, and takes different shapes and sizes.



$r'^2 = OP^2 = OR^2 + RP^2$
$r'^2 = OP^2 = x^2 + y^2$
$r' = OP = \sqrt{x^2 + y^2}$
$r^2 = OQ^2 = OP^2 + PQ^2 = r'^2 + PQ^2$
$= (x^2+y^2) + PQ^2$
$= (x^2 + y^2) + z^2$
$= x^2 + y^2 + z^2$
$= x^2 + y^2 + z^2$

III. Physical Interpretation of Linear Dimension, Linear and Second Degree Equation

In fact, algebra is geometry. The equation x-2=0 or in general ax + b = 0 is a linear equation in one variable. 2x + 3y – 2 = 0 or ax + by + c=0 is a linear equation in two variables. All these linear equations represent straight lines. Geometrically these algebraic linear equations represent straight line. What is their physical interpretation? A physical meaning of a linear equation (a straight line) is that it is the path of a particle which is moving in force-free region. This is the first law of motion of Newton. So a linear equation (a straight line) represents the Newton's first law of motion, which states that a particle moving along a straight line will continue to move along a straight line unless an external unbalanced force acts on it. This is also called law of Inertia. This was first formulated by Galileo, a sixteenth-seventeenth century celebrated scientist.

If an equation is not linear, then? Then, it must be a quadratic or a cubic equation or with degree more than that. What is the physical interpretation of an equation of a second degree or higher? It represents a curve other than straight line. A path of a particle moving in some force-field. When a force is acting on a particle, it deviates from its straight line path. It becomes curve other than straight line. What is the path of a planet or a comet? It is not straight line path, but curved path, that of a circle ($x^2 + y^2 = a^2$), ellipse ($x^2/a^2+y^2/ b^2=1$) parabola ($y^2 = \pm 4ax$, $x^2 = \pm 4by$) or a hyperbola ($x^2/a^2-y^2/ b^2$) = 1 and so on. This shows that some visible or invisible force is acting on it. In this case it is the force of gravity.

There are four kinds of force fields: gravity, electromagnetic, electroweak and nuclear.

IV. Time as The Fourth Dimension

Any event taking place in the universe has invariably relation with time. Newton used it as an external physical quantity (as an external parameter) to describe speed, velocity, acceleration and so on, and generated his dynamics. But his dynamics does not give correct answer, when the velocities are very high. It has some other problems also. This has put physics in problem at the end of the 19^{th} century and in the beginning of the 20^{th} century.

So, Einstein**{Einstein,(1916),Ray.M(1960),Rawal JJ(2005)}** took time as the fourth dimension of the universe, and generated new dynamics. Note that a physical quantity can become dimension, if it is independent and is present throughout the Universe. Physical quantities such as speed, acceleration with derived units cannot become dimensions. This Einstein's dynamics resolved the problems of Newtonian dynamics and in addition to that gave altogether new results. It showed that (i) mass and energy are equivalent $E=mc^2$; (ii) space and time are interlinked and (iii) electric field and magnetic field are also interlinked and so on.

When one takes time as fourth dimension of the universe, it has to be converted into length dimension. This is done by multiplying time 't' with the universal constant *c*, the velocity of light. So Einstein's time is not 't' but '*ct'*. *ct* has dimensions of length. Therefore Baudhayan Pythagoras square of distance of a point(x,y,z,ct) from the origin becomes

$$r^2=x^2+y^2+z^2-(ct)^2 \qquad (5)$$

Before $(ct)^2$, negative sign is taken so that when distance becomes zero, square cannot become negative.

V. Is the Universe Only Four Dimensional?

A million rupee question is: Is it that the universe only four-dimensional? Can't universe have fifth dimension? If at all it has fifth dimension. What should be the probable candidate to become the fifth dimension of the Universe?

In meter-kilogram-second system of measurements, meter and second have been utilized by Newton and Einstein. Newton used time as external physical quantity, but Einstein utilized it by taking it as the fourth dimension. But the middle quantity mass has been overlooked/ignored. It is again taken as an external parameter. This guides us to take mass as the fifth dimension of the universe. According to Einstein's formula $E=mc^2$, mass is the same as energy. So we may take mass as the fifth dimension of the universe and extends the fourth-dimensional Universe to fifth-dimensional Universe. Why not? But the problem is how to convert mass into length? Einstein took help of a universal constant c (velocity of light) to convert time into length. Similarly we should discover a universal constant which can convert mass into length. We discover that such a constant is G/c^2 , where G is the Newtonian constant of universal gravitation and *c* is the universal constant of velocity of light. This converts mass into length. Thus, we have Baudhayan Pythagoras square of the distance of a point $(x,y,z,ct,Gm/c^2)$ from the origin as

$$r^2 = x^2 + y^2 + z^2 - (ct)^2 + (Gm/c^2)^2 \qquad (6)$$

One should note here that the value of G/c^2 is of the order 10^{-26} and therefore, the mass dimension is very much suppressed and hence cannot be seen in ordinary condition of the universe. If the mass is very high, it can be appreciably seen. This is the reason, why we can't appreciate the mass dimension. If all this be worked out, it may have profound effect on current understanding of the universe.

VI. Future Scope

Have we to stop here? Can there be no sixth dimension of the Universe? Which is the probable candidate to be the sixth dimension of the Universe?

Will it be temperature, will it be a charge? May be. How to convert temperature into length and how to convert charge into length. To do this, we have to find a universal constant which can convert temperature into length or charge into length. That conversion factor should have resultant dimensions of length/temperature (meter/°C or meter/K) length/charge or (meter/coulomb) respectively. This is the exercise which I take as homework.

Conclusion: According to Einstein's theory of general relativity, space-time, mass energy, gravitational field all are one and the same. The Universe is nothing but the bubble of energy and gravitation is described in terms of curvature of space-time. This means everything is emerged from dimensions. Dimensions are the origin of the Universe. In Chandogya Upanishad, it is clearly written that everything comes from space and into space it returns. Space is beginning and end of everything. Similarly dimensions are themselves space, so everything comes from dimensions and into dimensions it returns. Dimensions are beginning and end of everything.

Acknowledge

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Autonomous Obstacle Avoiding Robot with Smart 360° Sensing Based on MSI System

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Abstract*: This paper focuses and presents a new technique and methodology for real time immediate obstacle avoiding autonomous robot based on MSI system, that has been proposed and is under development. The proposed 360° composite sensor allows the robot to search for obstacles and simultaneously steer the robot to prevent collision and approach the target. The innovation in this proposed model, lies in the collaboration of the following concepts: VFH (Vector Field Histogram) and VFF(Virtual Force Field) to enhance the current close-distance obstacle avoidance mechanism. The existing Potential Fields for navigation and Certainty Grids for obstacle denotation is also included. This model is suitable for the inclusion of low-cost inaccurate sensors (such as Ultrasonic/Infrared sensors) as well as for including the motion sensor, and aides in the constant movement of the autonomous robot without stalling before any obstacles. We have proposed and implemented a new algorithm based on the MSI (Multiple Sensors Integration) technology and taken into account the constant moving behavior of an autonomous robot that also solves the "local trap" problems faced by existing models.

Keywords: autonomous robot, 360° sensing, obstacle avoidance, MSI.

1.Introduction

At present, robotics has become one of the vital areas of research in technology for the development, operation and usage of robots. Processing of information, sensory evaluation can be managed with the help of robotics sector. Till the 19th century, this sector was underdeveloped and merely a vague idea. Today the world is moving towards the latest research and design of autonomous robots that can be used in various commercial, private, military defense spheres day by day. Almost all the autonomous robots comprise of some computer processing and programming, mechanical structure, electrical peripherals, by use of potential and control mechanism. Also autonomous robots have become much popular for its easily adaptable behavior. It is durable, responsive and brisk in movement. Moreover, with astounding amount of potential for practical usage, it would have a lot more applications in coming future. For benefiting the same, we also have tested and validated our project work as an autonomous bot with the new proposed 360°sensing model. Our project work has been built based on integrating technologies such as: obstacle avoidance [1,2] and smart movement [3]. We can use the robot in such places where human activities are difficult and impractical, where by using only light travel can take place from user's chosen root. Along with, the autonomous robot can identify obstacle by using MSI (Multiple Sensor Integration) system, and proceed to move anticlockwise or clockwise depending on the position of obstacle present there, which would enable the robot to get a proper platform for itself to reach its target.

A. Our Contribution

We have proposed and implemented a new methodology using multiple sensors (ultrasonic/infrared and motion sensors) in sync with RF module for communication. We have used Philips P89V51RD2 microcontroller along with L239D motor drivers for the control of the robot. We have enabled swarm robotics which is another future application of our proposed model.

2.Previous Works

Najia Manjur et al. claimed in [1] that their robot controls movement by obstacle avoidance and also line following mechanism which can be controlled by an android device. Johann et al. used vector field histogram for the same and they developed and implemented the same in the robot CARMEL. Boreinstein et al. claimed a new methodology for the same to simultaneously avoid objects and keep moving in a fixed trajectory [5].

Elmenreich et Al proposed app building using sensor data. These maps are topological in nature and uses certainty grid matrix [2].

Rongxin et al. proposed motion prediction method using Constant Velocity(CV) model and Current Statistical(CS)

model validated using a Pioneer 3 robot.[4]

3.Proposed Model

Our model is a multiple sensor integration(MSI) based autonomous robot that is capable of 360° obstacle sensing and avoiding moving as well as stationary objects. This model improves the sensing accuracy by 80% with respect to the area coverage and also is capable of sensing moving objects which is absent from the other existing models, we also have the RF module which enables the robot to communicate with 255 similar robots having the same frequency channel of 2.4GHz. This makes the 255 robots independent of having local sensor modules and hence creates a master slave network capable of performing the same functions without additional costs.

A. Equipment Analysis

The microcontroller Philips PV89V51RD2 is the core of our robot to which six ultrasonic/infrared sensors, RF module, motion sensors are connected. It is based on ISP programmable development board and is programmed in the keil µvision and uploaded via Intel Flash Magic.

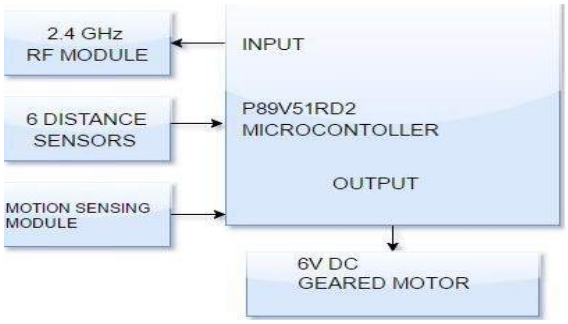

Fig 3.1 System Architecture

B. Working

The robot operates on the following principles:

1. MSI (Multiple Sensors Integration): When multiple sensors are used for a single similar input, the error coefficient decreases considerably. Here we have used different multiple sensors (ultrasonic/infrared, motion)[1].

a. Ultrasonic sensor: The module can measure distance precisely which can provide 0cm – 15cm no-contact function, the accuracy of range can reach to 4mm [1,4].

b. Motion Sensor: The PIR is also called as Passive Infra-Red Sensor, which is fundamentally a pyro electric device that is used to detect any movement by evaluating changes in the levels of infrared rays emitted by objects in the surrounding [2]. Thus motion detection is possible by merely checking for a 1, i.e high signal on a single pin. It is cheap and simpler to use.

c. RF Module: This is a High Speed C250 based wireless USB module acting as plug and play replacement for wired Serial Port (IUART) supporting baud rates upto 3840. This C250 Wireless module allows to quickly and cheaply add wireless capability to any of the products virtually.

P1.4 (enA)	P1.0 (input1)	P1.1 (input2)	ENA	Input 1	Input 2	<< R Motor
P1.5 (enB)	P1.2 (input3)	P1.3 (input4)	ENB	Input 3	Input 4	<< L Motor
0	0	0	1	1	1	Lock Stop
0	0	1	1	1	0	Anticlock-wise
0	1	0	1	0	1	Clockwise
0	1	1	1	0	0	Free Stop
1	X	X	0	X	X	Stop

4.Working Model

A. Model Details:

The proposed working model comprises of acrylic chassis, two rubber wheels driven by two 6V geared DC Motors. As shown in the fig 4.1, there are total six distance sensors (ultrasonic/infrared, motion) and a motion sensor on the top. This gives the robot a sensing range of 180° semicircles around the robot which can be represented by the VHF and VFF. Two additional sensors can be mounted on the lower edge of the robot, thereby giving 360° sensing range.

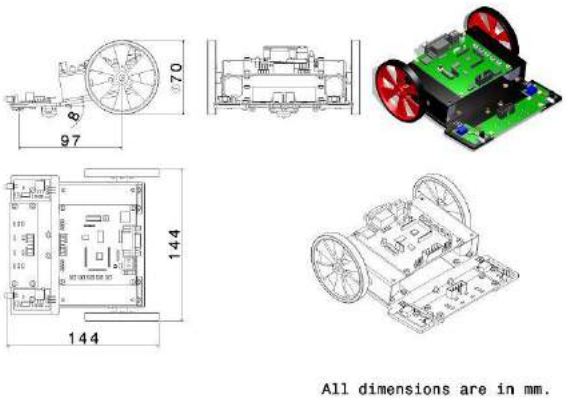

Fig 4.1 The Orthogonal Representation of Working Model

B. Obstacle Detection:

The flowchart for the algorithm is represented below

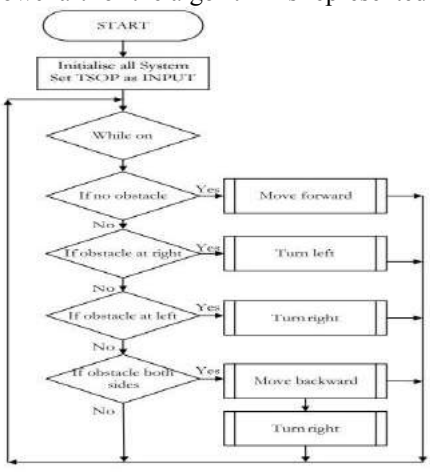

Fig 4.2 Flowchart of the working autonomous robot

C. Neural Network Algorithm:

Initializing each W1 to some small random value

While condition of termination not met

Do

For every training iteration $\langle(X1,...,Xn), t\rangle$ Do

Inputting the instance value (X1,...,Xn) to the bot network and computing the
Bot network outputs Yk

For every output unit k

$\delta\ k$=Y k(1−Y k) ($t\ k$−Y k) (a)

For every hidden unit h
δ H=y H(1−$y\ h$) $\sum kw$ H,$k\delta\ k$ (b)

For every network weight wi,j Do
W i,j=$w\ i,j$+ ΔW i,j, where Δ$Wi,j = \eta\delta\ jx\ i,j$ (c)

End Do loop

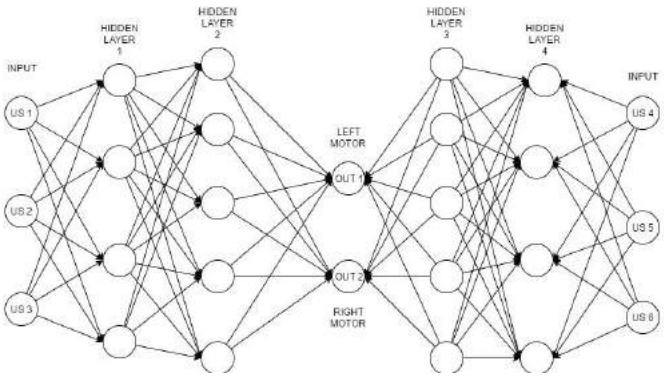

Fig 4.3 Neural Network training algorithm

5.Result

We have implemented the algorithm described in the above sections in our system using embedded C with Philips Microcontroller and following enhancements can be seen:

I. Efficiency: Our project model is more efficient than the earlier works and has efficiency greater than 80%. It can detect static as well as dynamic obstacles and also prevent itself from moving into blind spots such as falling off the surface and for moving obstacles from any direction.

II. Deadlock Situation: Our project overcomes the deadlock situation which is faced in the conventional methods and other papers. The deadlock situation happens when a big object obstructs the path of the robot and the robot halts. Our robot instead scans the whole area and will always find any opening available for its movement.[3,4]

6.Conclusion

The model not only overcomes the biggest challenge of deadlock situation but also increases the total efficiency of the whole object detection and obstacle avoiding system. Now assessing the Range of Application: The proposed model is capable of operating in military zones and areas where human presence is impractical, such as deep manholes for cleaning purposes, narrow places where movement is impossible for human. It can be an important asset to the government rescue programs and also oil industry.

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PROSTHETIC LEGS – A GIFT TO MANKIND

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Abstract **- The loss of a limb is extremely painful which reduces one's self esteem. The ability to restore limb is challenging but rewarding pursuit. This paper discusses about the experiences of the prosthetics and the technologies that are related to it. It will then explain the development of the electromyography technology and its potential application for prosthesis control. Further we can examine its contribution in the field of sports and to the society. It also explains how prosthetic legs have encouraged the handicap people to again live a normal life. Then it will look at the effects improving technology can have on society its uses and its side effects.**

Keywords **– prosthesis, amputee, prosthetic, evolution, limbs.**

I. INTRODUCTION

Prosthesis is a word which originated from Ancient Greek language meaning attachment or addition [1]. It can be simply defined as a tool or replacement for a missing limb. It can be due to reasons including congenital defect (birth defect), accident, wartime injury or illness such as diabetes. People who lose limb or part of limb can be easily replaced by these prosthetics. Although due to advancements in technology prostheses work efficiently with almost no pain to the amputee. A Trans Femoral prosthesis is an artificial limb that can be used as a replacement for leg missing above the knee, which transects the tibia bone. In this condition, the amputee has to use 80% more energy to walk than a person with two legs [2]. A transtibial prostheses provides replacement for leg missing below the knee, which transects the femur bone. The amputee usually regains the normal movement, making it easier for the person to walk without exerting oneself.

Fig.1. Prosthesis

Born again on the mountain, the story of Arunima Sinha – a twenty nine year old woman whose life tragedy turned her into a world champion. In 2011, Arunima was thrown off a moving train on the opposite tracks by thugs when she refused to give the gold chain that her mother had gifted her. Before she could move her left leg from the track, a train went over it.

Later that night it was discovered that forty nine trains had passed over her as she lied bleeding and in agony the whole night. She kept screaming in pain all night but unfortunately no one was present there to help her. Soon after when she was admitted in the hospital in Bareilly but this was not it, the hospital was out of anesthesia. So they had to saw off her leg when she was fully conscious. The condition of hospital was so shoddier that when she was still in the operation theater after amputation, a street dog entered the room

and started feasting on the leg that had just been removed from her body.

Lying in a pathetic and awful condition in the hospital room, she had decided to climb The Everest. Soon she was gifted a new hope of life by attaching a prosthetic leg, which was followed by eighteen months of rigorous training. The journey of struggle of Arunima had finally paid off when she became the first female amputee to climb The Mount Everest.

II. HISTORY OF PROSTHETIC LEG

The evolution of prosthetics is from ancient times it is said that the Egyptians were the first to invent [3].

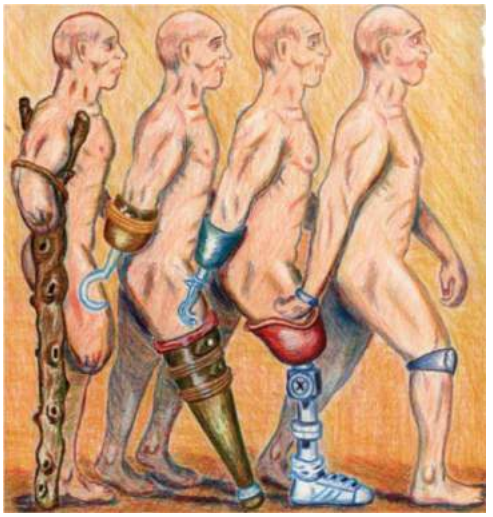

Fig.2. Prosthetics in Egyptians

As it is said from every unwanted situation man seeks a solution the earliest legs made by the Egyptians were made up of fiber or wood. It is considered that they were only made for "wholeness" but now the scientist recently discovered that these first that the first prosthetic toe discovered from Egyptian remains that the prosthetic toe was functional

Fig.3. Prosthetic legs were made up of wooden core coated with metal plates

It was found out even the ancient romans made use of prosthetic legs in ancient Rome this prosthetic legs were made up of wooden core coated with metal plates. These prosthetic legs in ancient Rome were made by blacksmith, metalworkers and people with enough knowledge of wooden and metal designing. According to evidences found that prosthetic legs produced by the ancients Egyptians were much more sophisticated than the ancient romans.

The use of prosthetics was only for people with disability to lead a normal life and its main motive was to support people with disabilities to lead a normal standard life in short the history of prosthetics state man has that level of intelligence that he even can function that part of his body that is not working.

III. TYPES OF PROSTHETIC LEGS

Partial foot prosthetic type of foot amputation includes levels like toe, foot etc. Above knee limb prosthetic type of prosthetic is a combination of knee unit pylon, socket and supportive frame. Below knee limb prosthetic type of prosthetic consists of custom made socket, foot and a pylon. Prosthetic feet types of prosthetic feet available are microprocessor and prosthetic feet.

Hip disarticulation type of prosthetic users faces many challenges as compared to other prosthetic users [4].

IV. PRODUCTION OF PROSTHETIC LEGS

One of the most exciting technologies of twentieth century is the development of myoelectric prosthetic limbs. It involves using electrical signals from the amputee's [5] arm muscles to move the limb. A CAD/CAM model is used to design a prosthetic leg or arm. The raw materials required consists of custom fitted socket, an internal structure , knee cuffs and belts that attach to the body, prosthetic sockets, its socks that cushion the area of contact. This device should be light weight therefore most of it is made of plastic. The socket is made from polypropylene. Light weight metals like titanium and aluminum have replaced steel in pylon. A new material carbon fibre is used to form a lightweight pylon. Other commonly used plastics are polypropylene, polyethylene, acrylics and polyurethanes. Prosthetic socks are made from a number if soft but strong fabrics .The physical appearance of the prosthetic limbs is important to amputee. The majority of pylons are covered with soft polyurethane foam a cover that has been designed to match the shape of patient's sound limb which is then painted to match the skin color.

V. MANUFACTURING OF PROSTHETIC LEGS

Prosthetic legs are manufactured when a doctor prescribes it after the consultation of the amputee, the prosthetist and the physical therapist. Accuracy and attention is very important in manufacture of prosthetic limbs so as to have a limb that comes as far as possible to be operated as comfortable and useful to natural one. Before its fabrication, the amputee's impression or digital reading of residual limb is taken [6]. The length and location of the bones and tendons in the remaining part of the limb is recorded. A sheet of clear thermoplastic is heated in a large oven and vacuum formed around the positive mould. The air between the moulds is sucked out of the chamber. The thermoplastic sheet is transparent so that prosthetist can check the fitting. Before the permanent socket is made, the test socket is being worked upon by the prosthetist with patient. It then studies the gait. The patient explains that how it feels the fit and discuss its comfort level. The thermoplastic material can be reheated to make minor adjustments.The entire limb is assembled by prosthetist's technician using torque wrench and screw driver. A permanent socket is then fitted with complete cushion made limb. To test the prosthetic leg a load is applied until the limb breaks determining its strength.

VI. ADVANTAGES & DISADVANTAGES

With the help of prosthetics legs and by mastering the way to use it one can get a better psychological look. People feel comfortable when they can mix up with the other people with the use of prosthetics legs. With the help of it people can do basic things like climbing stairs, etc., which one who opts for wheelchair can't do. With the use of such legs people gain confidence and feel independent. The people with prosthetics legs need less energy than the once with crutches .As a result there are many advantages of using it.

With advantages prosthetics legs have disadvantages as well. The first and the biggest disadvantage is the cost of prosthetics legs .Many people cannot afford it due to its very expensive cost. The process of prosthetics is time consuming which again is a disadvantage. One needs time to adjust with the new parts as well. Problems related to skin such as irritation are caused which acts as a matter of huge discomfort for the patient.

VIII. CONCLUSION

Prosthetic legs are a gift to mankind as it gives amputees another chance to live their life in a normal way. But the technologies nowadays has made it possible to not only let the amputees walk but also run, swim, Climb Mountains, etc. These manmade prostheses are not less than original legs but technological advancements will make it easier for amputees to use them, almost nullifying the disadvantages.

ACKNOWLEDGEMENT

We wish to express our sincere thanks to Dr. Vivek Mishra and Mr. Rohit Kumar Singh, Department of Humanities and Sciences, Thakur College of

Engineering and Technology, Mumbai for the encouragement and support that he has extended towards this research work.

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Smart Highways

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Abstract:
In today's globalized world, highway is the means to join countries, cities, towns, etc. In recent years all the old technologies changed into new technology equipped smart devices. All the things progressed except Highways. The "Smart Highway" is the concept to make highway roads smarter, safer, and more energy efficient for generating electricity using solar energy, wind energy, for charging the vehicles using these energies, for lighting, and for monitoring the condition of the road. The vehicles moving on roads generate large amount of energy in form of vibration that is completely wasted. By creating ubiquitous roads the next generation advanced intelligent Smart highways will offer real time two way communication, optimal driving conditions with seamless traffic flow in all weather conditions without traffic congestion creating a harmony of people, nature and technologies. A more abundant future begins with Smart highways.

Keywords: smart enforcement, piezoelectric devices, natural light convergence.

1.0. Introduction:

Smart Highway is a safer, more convenient, driver oriented highway. Indian road network of 33lakh kilometers is second largest in world and consist of

Table 1: Indian Road Network

INDIAN ROAD NETWROK	
	Length (in Kms)
Expressways	200
National Highways	96,260.72
State Highways	1,31,899
Major District Roads	4,67,763
Rural and Other Roads	26,50,000
TOTAL LENGTH	33,00,000 (Approximately)

About 65% of freight and 80% passenger traffic is carried by roads. National highway constitute only about 1.7% of the road network but carry about 40% of total road traffic. Number of vehicles has been growing at an average of 10.16% per annum over the last five years[1]. As the number of vehicles is increasing, simultaneously fuel consumption by them is also increasing. Fuels used in vehicles produce harmful gases. Hence, there is a need to evolve our Highways. In this paper we are trying to emphasize on techniques of advanced Intelligence on Indian highway. We will try to put forth various methods which will ultimately give us highways with brains. Smart highways provide real time customized services with reliable connections with a high speed environment.

2.0. SMART TECHNOLOGY USED ON HIGHWAY

Solar energy, vibration energy, wind energy can be converted into electricity and then we can use this electricity in many applications on highways such as for charging the vehicles using these energies, for lighting, and for monitoring the condition of the road etc. There is abundant amount of free space available between lanes and in both right and left side of lanes, which can be utilized by placing windmills and solar plates. Solar plates can also be mounted on the top surface of cars and electricity generated by them can be utilized for operating music system, air conditioner, or for any other purpose in cars. It can also be stored in any charge storing device for future use. There are streets having very less traffic in night at times and street lights lighten these empty roads resulting in wastage of energy. By using sensors and led, lights can be turned on only when any vehicle or passenger passes by road otherwise turned off. Fuels consumed by vehicles like petrol, diesel etc. produces harmful gases so its substitute like hydrogen cars, electric cars, or any other source of green energy must be used.

In this paper we are going to discuss numerous technique to convert an ordinary highway into smart highway based on green energy concept.

2.1. SOLAR ENERGY

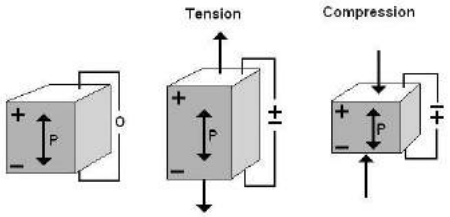
The solar energy is an uninterrupted renewable and clean source available for the entire nation at least for a few hours. We can use this energy on highways. There is none street lights placed in a shady area, but only in the middle.

Though the solar panel is in middle there will no fluctuation in the power generated by panel it will remain as a default output. Solar energy can be utilized. By converting it into thermal energy. Sun can be used to produce thermal energy using a solar collector. In solar photovoltaic system, electricity is directly generated from solar energy. Solar vehicles can accomplish this through photovoltaic cells (PVC). PVCs are the components in solar paneling that convert the sun's energy into electricity. They are made up of semiconductors, usually made up of silicon, that absorb the light. The sunlight's energy then frees electrons in the semiconductors, creating a flow of electrons. That flow generates the electricity that powers the battery or the specialized car motor in solar vehicles. Solar vehicles can also made by mounting solar panel on the roof of vehicles.

2.2. VIBRATIONAL ENERGY

Basically vibration energy means the energy generated from vibration of molecules. Everything in the world vibrates at some speed. Movement of vehicles leads to large scale vibrations. Hence, we can utilize this vibrational energy for various applications over highways. There are basically two methods to convert vibration energy into electric energy-

2.2.1. By using piezoelectric crystals: Piezoelectric crystals can produce the required voltage which can be used for giving power to many devices. [2]



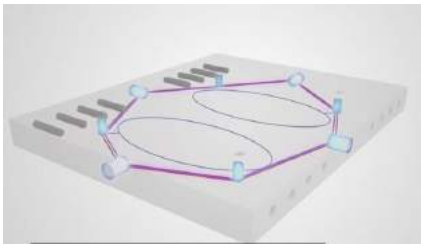
When pressure is applied on piezoelectric crystals then shaft connected to generator rotates, therefore according to principle of generator electricity is generated. We can store this electric energy in energy storing devices. In today's existence, electric vehicles have a great demand. These vehicles use electricity to charge up their batteries. We can charge these vehicles via vibration energy. The electric vehicles charged by the vibration energy rely on piezoelectric devices to charge the vehicle's battery as it moves.

2.2.2. By using magnetic induction: Vibration energy can be converted into electrical energy by using magnetic induction. For this purpose we can make some specific lanes. These specific lanes are made which charge electric cars through magnetic field using induction coils inserted under the tarmac. These induction priority lanes are embedded with magnetic coils under the road surface and charge the electric vehicle when it runs on it. These highways can be treated as enormous electric car charger.

3.0. OTHER TECHNOLOGIES:

3.1 Wireless Base Evolution:

Considering the fast development in IT and Computer sector, going wireless is yet another option for our highways.



Such tiles could be used in the making of highways where underneath each, would be integrated circuits that will help communicate with the vehicles in real time. It is not just the vehicle that needs to connect to the internet but it's also the things inside the vehicle, maybe your ABS systems, your tire pressure monitoring; The manufacturers of various components of the vehicles – to help them check and update themselves with their component functionality. The gas stations – whenever the need arises, the cars electrical system will communicate with these circuits to help them know the fuel need, thereby updating the drivers well in advance to refuel. Amongst the surrounding vehicles – risk of accidents could be reduced to a great extent by letting the circuits underneath perform inter vehicular communication. May it be passing or slowing down, it always is going to be beneficial.

3.2. SMART INDICATORS:

3.2.1. Glowing Highways: Photo-luminescent paint is used to paint markings on highway. This paint charges during the day through sun light and then illuminates tarmac for up to 10 hours overnight. Photo-luminescent paint is the best substitute for street lights and can save a huge amount of electricity.

3.2.2. Dynamic Paint: When temperature falls down below zero degree Celsius, temperature responsive dynamic paint shows ice crystal pattern to drivers. Whenever snow fall takes place roads become slippery and may lead to accidents. Paint is temperature responsive so as soon as it

senses that temperature falls down its pattern starts illuminating showing correct path to travelers.

3.3. TUNNEL ILLUMINATION SYSTEM

Using Natural light convergence technology (with the use of simple apparatus for converging light)

We can reduce the state of confusion of drivers riding in dark tunnels thereby also saving electricity.

3.4. NON-STOPPING MULTI-LANE BASED SMART TOLLING SYSTEM

New technology capable of toll free processing by using wireless communication and smart phones during high speed driving could be used. These tolls will be well situated over straight for the drivers to be secured while they establish the part for tolling.

3.5. BEST CURVED LANES FOR BIKE ENTHUSIASTS

Bikes are always under rated or less talked of when it comes to riding on highways. Whether or not a biker's fault, he or she will be held guilty for accidents (generally). Great machines though not too eco-friendly have been designed for thrill. Bike tracks are great, but why should the bikers be restrained from leaning into turns when that is how you actually make a bike to cut through corners. Special Curved roads distinguished but being a part of highways could be built. However speed limits and law enforcements would not be neglected in the scene. In the love of MV Agustas, Ducatis, Yamahas, Kawasakis, Suzukis, Hondas, and many more, we placed this as an idea for smart highways. Traction control through roads with sufficient co-efficient of friction would be designed and built to avoid chain accidents, the integrated circuits beneath the roads would communicate between the bikes and let them know the safest distance to maintain from one another.

3.6. DEU (DRONE ENFORCEMENT UNIT)

Living in Smart Technology oriented era, it is also a prerequisite to use it in as many ways as possible. Drones, though may have seen a lot of designing and working , still find application in mostly VIP rated fests, or in military. Drivers may find holes in the present still-rotation type surveillance cameras and hence here, drones could be useful. Drone inception would possibly be the smart way to keep an eye over the criminal throughout. If charging of the drone was an issue, we could simply use advanced physics. Charging Booths having a certain radius of coverage spaced at regular required intervals could help maintain the drones from draining. Note that we are talking of advanced without contact wireless charging that is under development by many IT based industries. So, Smart Highways meet the Smart Enforcement Units, too.

4.0. CONCLUSION

Mankind has started its journey to cover long distance by foot, slowly they invented wheel and that gives mankind the speed and power to shorten the long distances. The travel time was cut down to days and month from months to year. After the invention of wheel, the second best idea was to develop roads on which the vehicles can travel easily. With Advancement in technologies we have fast moving vehicles all over the world and world class highways to ride on it. Now, there is a need to make the highways Smart. We can use Cloud computing for faster data communication and rapid action taking as and when demanded. Altogether there is a lot of scope of improvement on Indian highways, converting them into Smart Highways. Population can also be used as a source of power generation like the vibration energy mentioned above.

5.0. References:

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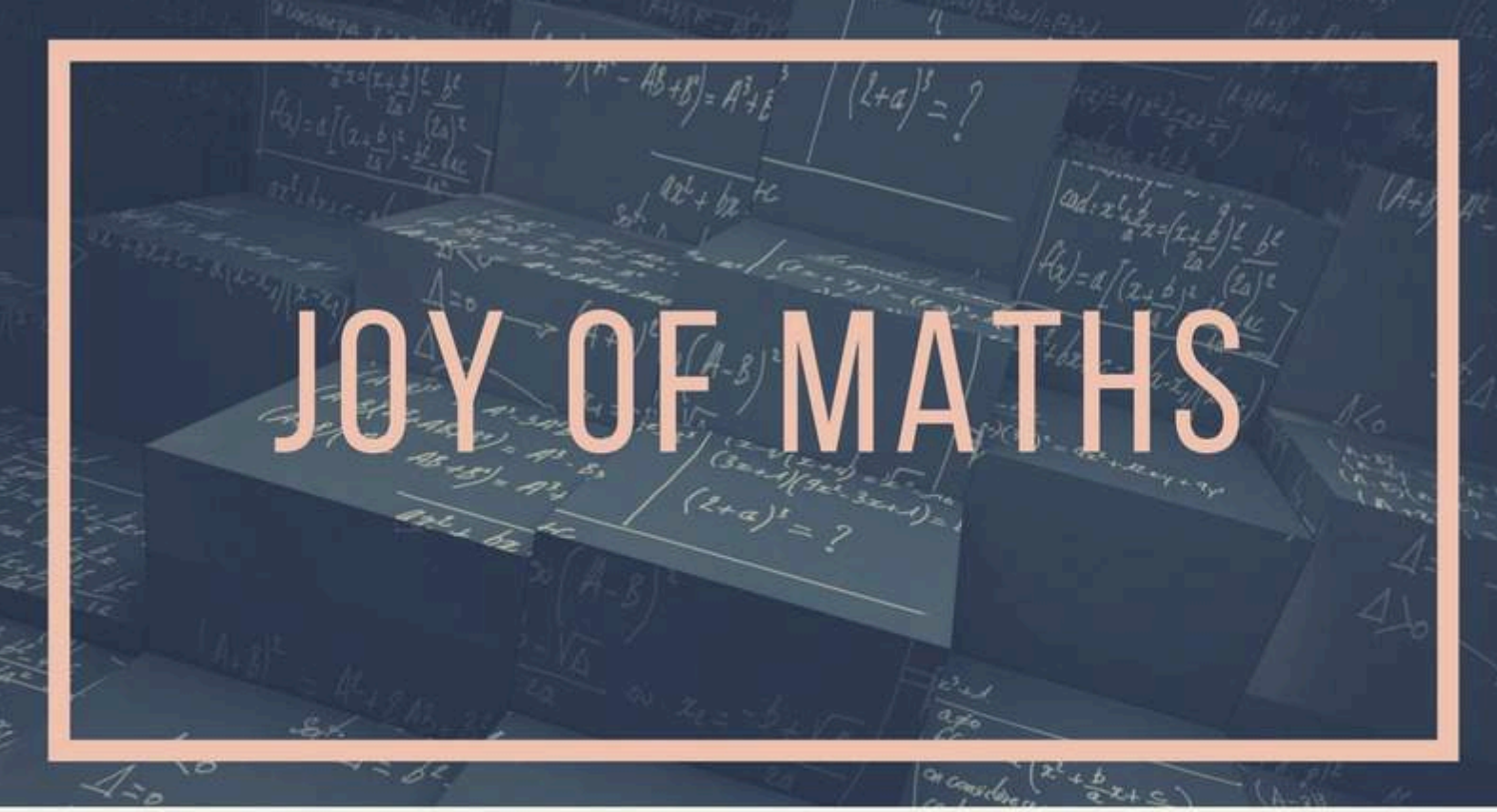


JOY OF MATHS

By: Dr.Vivek Mishra

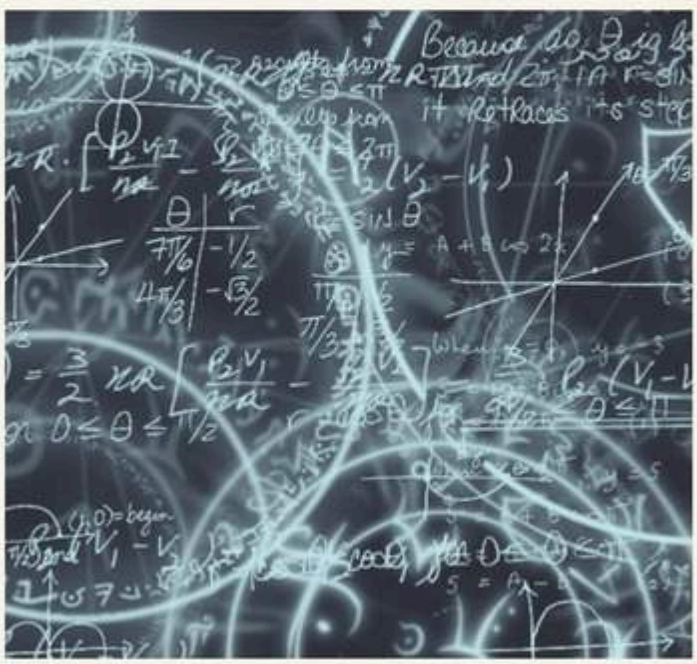
Over the centuries, the efforts of the mathematicians have helped the human race to achieve great insight into nature such as realization that earth is round that the same force that causes an apple to fall here on earth is also responsible for the motion of heavenly bodies, that space is finite and not eternal, that time and space are intertwined and wrapped by matter and energy and that future can only be determined by probability.

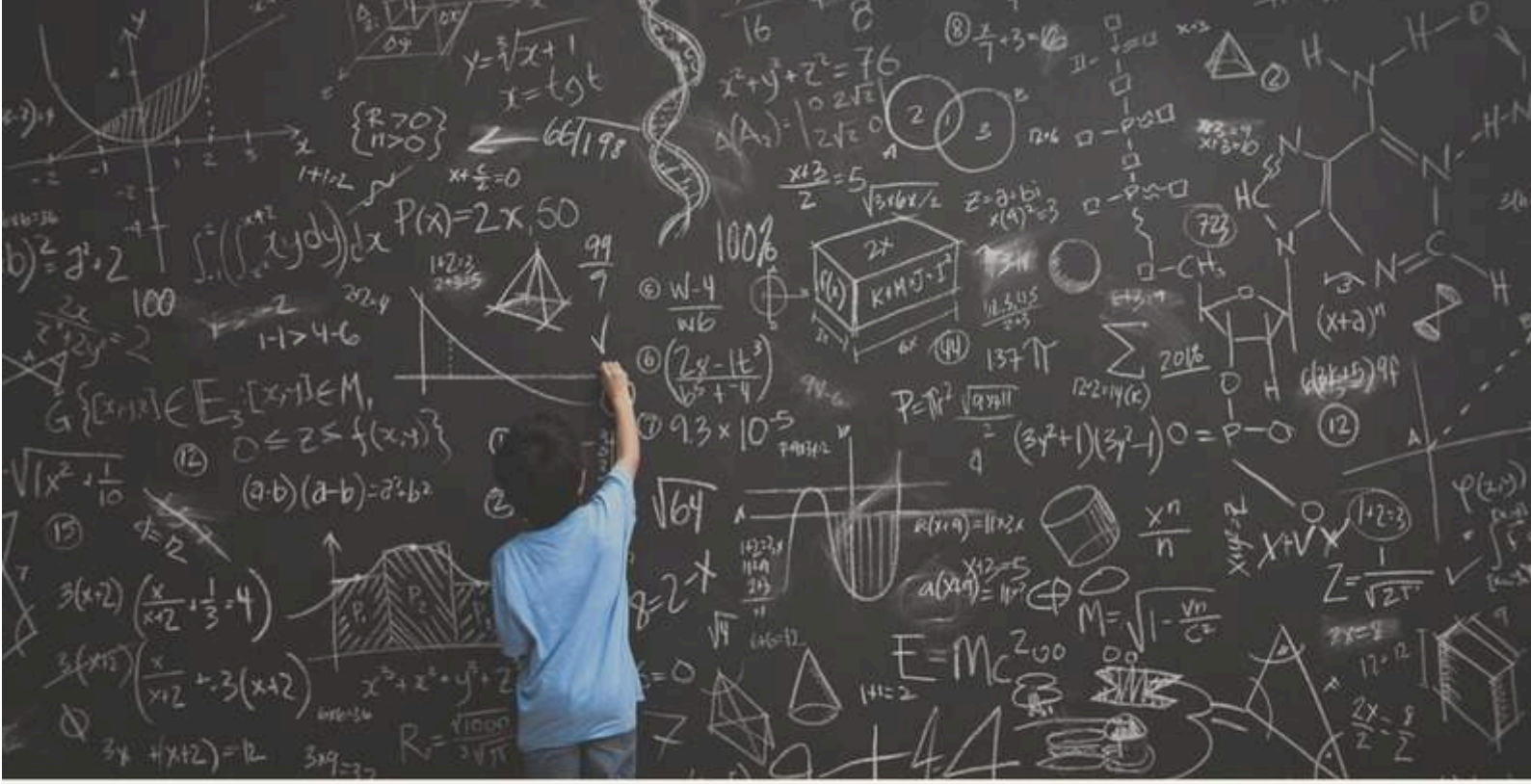
Mathematics is more than a tool and language for science. It is also an end and as such, it has over the centuries, affected our worldview in its own right. Karl Weierstrass provided a new idea of what it means for a function to be continuous, George Cantor's work revolutionized people's idea of infinity. George Boole's Law of thoughts reveled logic as a system of processes and eventually enabling to some degree its mechanization, that is modern digital computing.

Paradoxes are interesting and important part of mathematics. They generally emphasize how important it is to state and prove ides carefully so there are no loopholes. In mathematics, we try to make mathematical ideas cover as many facets as possible, i.e. we try to generalize a concept and thereby make it apply to more objects. It is important to generalize but it can be dangerous.one must proceed cautiously

Zeno's Paradox

In the 5th century B.C., Zeno, using his knowledge of infinity, sequence and partial sums. He developed this famous paradox. He proposed that in a race with Achilles, tortoise be given a head start of 1000 meters. Assume that





Achilles could run 10 times faster than a tortoise. When the race started, Achilles had gone 1000 meters, the tortoise would still be 100 meters ahead. When Achilles had gone the next 100 meters the tortoise would be 10 meters ahead.
Zeno argued that Achilles would continually gain on the tortoise but he would never reach him. Was his reasoning correct? If Achilles were to pass the tortoise, at what point of the race would it be
Solution:
Achilles would reach the tortoise at one thousand one hundred and eleven and one-ninth meters. if the race track is shorter then this tortoise would win. If it were exactly this size it would be a tie otherwise Achilles would pass the tortoise.

SOME INTERESTING FACTS

1.Scientists in Germany switch on world's largest artificial sun which is honeycomb-like setup comprising 149 xenon short arc lamp spotlights which are normally found in cinemas stimulates natural sunlight in a bid to find new ways of making climate-friendly fuel. The goal is eventually use actual sunlight rather than artificial light produced at the Juliech experiment, which requires as much electricity in four hours as a four-person household would use in a year.

2.Nasa will send its next-generation atomic clock into space for safely navigating future human exploration of the solar system. The Deep Space Atomic Clock would also improve the precision and quantity of the radio data used by scientists for determining the planet's gravity field and probing its atmosphere.

3.Research chemists at the National Research Laboratory have developed a transparent thermoplastic elastomer armour to reduce weight, inherent in most bullet assistant glass while maintaining superior ballistic properties.

4.Scientists have discovered the world's first fluorescent frog in Argentina that sports muted palette of green, yellow and red under normal light, but gives off a bright blue and green glow in the dark. Researchers found that the South American polka dot tree frog uses fluorescent molecules totally unlike those found in other animals.

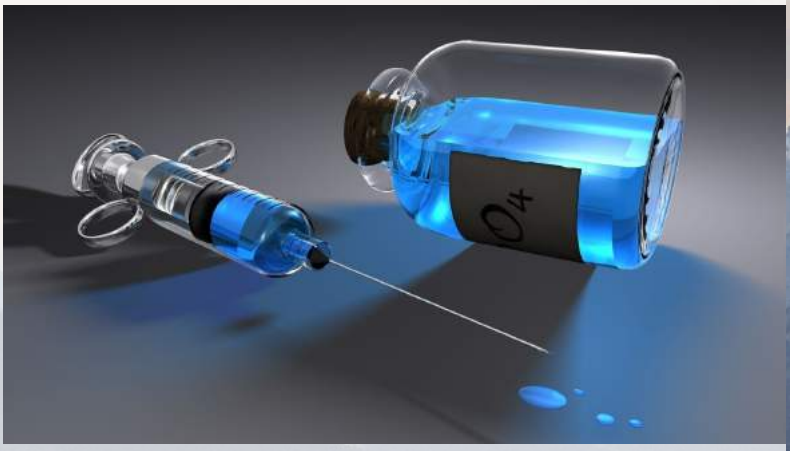
5. Scientists have discovered 1.6 billion-year-old fossils of red algae in central India, which may be the oldest evidence of plant like found on the earth. The scientists found two kinds of fossils resembling red algae in uniquely well preserved sedimentary rocks at Chitrakoot.One type is thread-like, the other one consists of fleshy colonies.

6.Scientists have developed a new eye implant ,using arrays of silicon nanowires that sense light and electrically stimulate the retina,which may help restore vision in millions of people worldwide.The nanowires give the prosthesis higher resolution than anything achieved by other devices closet to the dense spacing of photoreceptors in the human retina.

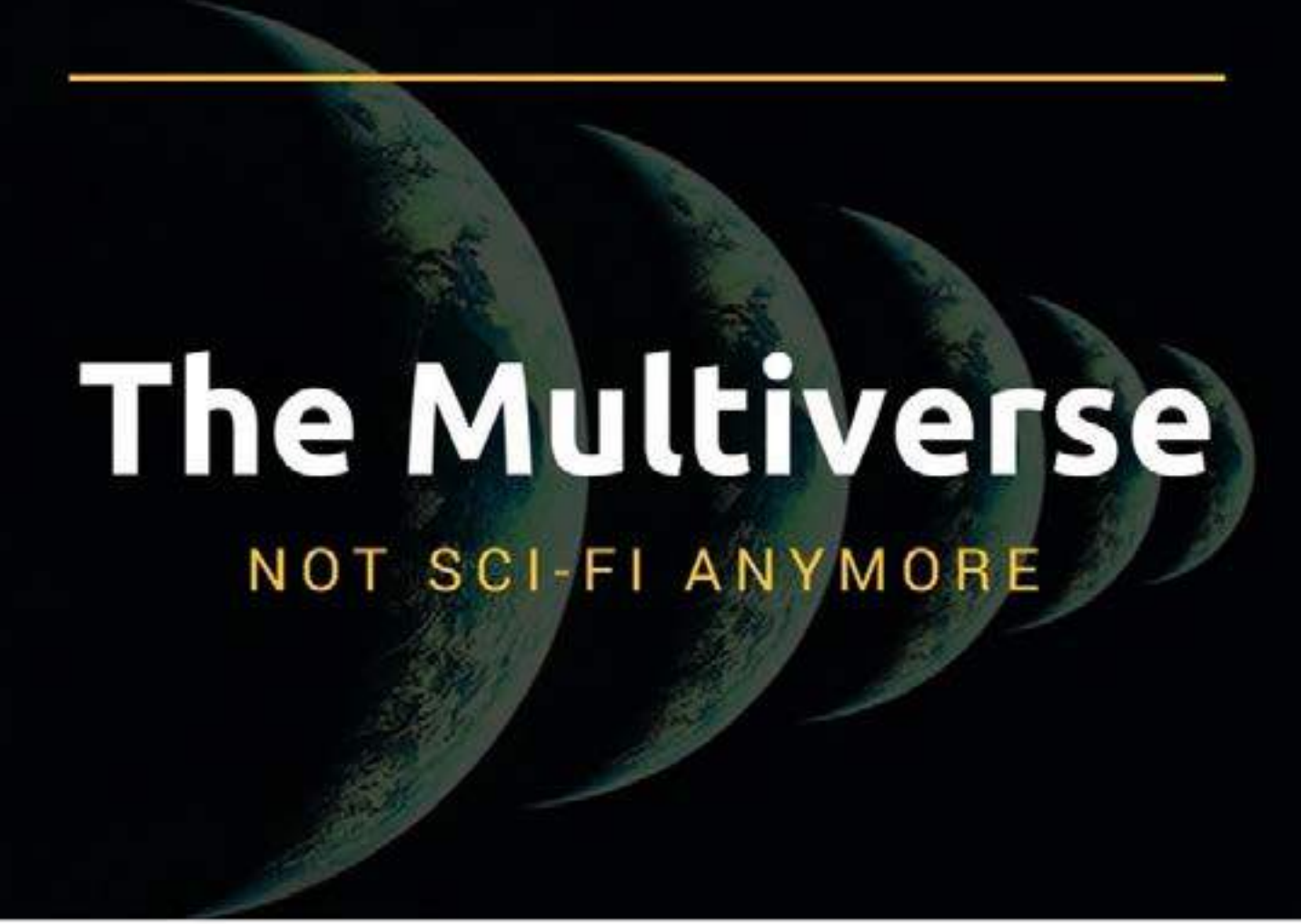
7. Pollution kills 1.7 million kids each year.Each year environmental risks such as indoor and outdoor pollution ,secondhand smoke, unsafe water and poor sanitation kills 1.7 million children between the ages of one month and five years.A range of new environmental hazards are emerging ,like the ballooning piles of discarded mobiles and other electronic and electrical waste, which is expected to hit 50 million metric tonnes globally next year. When not properly recycled such waste can expose children to toxins that can lead to reducing intelligence,attention disorder, lung damage and cancer.

8. Researchers have developed a smartphone controlled ,battery operated diagnostic device that costs just 100$ can detect Zika, dengue and chikungunya within 30 minutes.The device is based on the loop-mediated isothermal amplification (LAMP) diagnostic method,which eliminates the need to process a biological sample, such as blood or urine ,before testing.The test requires a smartphone and instruments that are roughly the size of the microwave oven. The app uses the phone's camera to detect diseases with greater accuracy than a lab technician's naked eye.

9.Norway displaced Denmark as the world's happiest country,according to the World Happiness Report 2017 produced by the Sustainable Development Solutions Network(SDAN),a global initiative launched by the United Nation in 2012."Happy countries are the ones that have a healthy balance of prosperity, as conventionally measured and social capital,meaning high degree of trust in society,low inequality and confidence in government." The ranking is based on six factors a)per capita gross domestic product, healthy life expectancy, freedom, generosity social support and absence of corruption in government and business.The position of India is 122



10.Potatoes can be grown in the extreme environment of Mars, according to a new study that has implications for future manned missions to the red planet as well as helping people survive in harsh climates on Earth.



The Multiverse

NOT SCI-FI ANYMORE

Let's all take a second to imagine that the thing you regretted about yesterday what if you actually did that then what would have happened? The immediate set of future events would change drastically right, it wouldn't have happened the way they happened, then what do you call that? What do you call something that might have happened but did not?

INTRODUCTION

It's called the MULTIVERSE the hypothetical existence of multiple possible set of universes, including the one which we live in.

If you ever thought that you hated newton for all his laws then the only shot you got for revenge is the multiverse it is the single and only concept that defies all kinds of laws of physics ever discovered. For example, in Dublin in 1952, Erwin Schrödinger gave a lecture in which he casually warned his students that what he was about to say might "seem lunatic". He said that, when his Nobel equations could describe several different time frames, these were "not alternatives, but all really happen simultaneously". This is the earliest reference to the multiverse. Now amidst all these theories and hypothesis a few brave souls tried to find some evidence, around 2010, scientists such as Stephen M. Feeney analysed Wilkinson Microwave Anisotropy Probe (WMAP) data and put out a statement suggesting that our universe could've collided with a parallel universe

long-long ago. Then a recent study through the Planck satellite that has 3 times more resolution showed no such evidence. .

SUGGESTIVE THEORIES

Infinite universes: - No scientist is sure about the shape the space-time fabric can take but if the assumed shape, i.e., the space is a flat everlasting infinite sheet then at a certain point in the fabric of reality we should be able to find our twins, more like clones infinitely many of us because there is only a finite number of ways you can arrange particles in space so at some part of space we are living as part of the multiverse

. Bubble Universes: - In addition to the previous theory there is another theory called the "eternal inflation" theory where other universes could arise into space-time. The theory basically suggests that the universe expanded rapidly like an inflating bubble and the same goes for a lot more other universes that that could be expanding right now like a huge bubble very similar to us.

Parallel Universe: - this is another theory that arises from the very famous string theory. It is the notion of "braneworlds"- parallel universes that exist right next to us but are just not accessible. The idea comes from the possibility of existence of many dimensions than just a 3-D space that we live in.

Daughter Universes: - this is the theory I talked about earlier during the intro where I asked if you perform an action differently the following set of events are completely different so at that point there is a copy of you performing those actions in a different way so in actuality there is no one single reality until it occurs this idea is called as the "hidden reality".

Mathematical universes: - Frankly maths has never been my strong suit and I often end up with the wrong result but what if just one questions had multiple results then entire mathematical structure that we know can be of a different universe so technically I'm not wrong I'm just from a different universe. "A mathematical structure is something you can describe that's completely independent of human baggage", said Max Tegmark of MIT. At the end of the day it's just a possibility so there is a slight chance of the multiverse

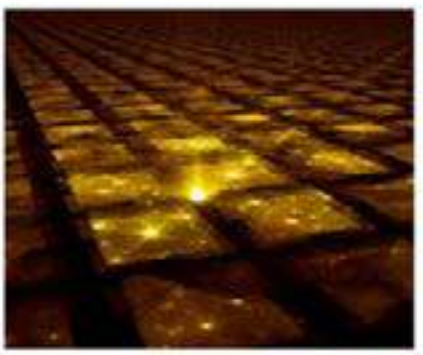
existing mathematically.

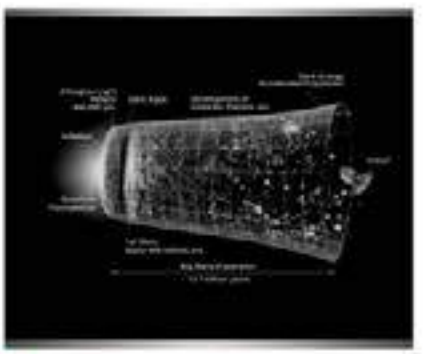
BUTTERFLY EFFECT

It is a commonly known and popular theory that relates itself to the multiverse by saying that a small change in the flow of time can result to drastic changes in the later period this theory is one that strongly backs up the multiverse theory as a change in one specific action can result in a completely different parallel universe. There might be drastic changes in the flow of time and hence messing around with it is feared by most scientists.

CONCLUSION

In conclusion, we have travelled through the possibility of existence of the multiverse and the theories to back it up now if it was possible to travel through these dimensions and pursue further aspects of the quantum realm redo the actions we sought to change "get time back" then I believe it's only possible through cracking the frequencies of the other realms i.e., I believe that the parallel but in a different set of frequencies so if we were to of frequencies so if we were to latch onto that frequency there might be a universe in which I'm not ugly. In hindsight, there are different possible universes and there is a possibility to travel to them exciting isn't it. This is the world we live in.





BY: ANIRUDH YANAMBAKA FE CMPN

THE YELLOW FUELS

Urine is considered to be one of the most abundant waste material generated by animals. Speaking of humans, the total population of the earth generates around 9 billion litres of urine daily
If we add the animals to the count, then this figure is multiplied several times.
Processed pig urine can be used as diesel exhaust cleaning product.Urine is composed of 95% of water and 5% of solutes including urea.2-2.5 litres of urine is generated by an individual daily.If converted into energy, each person could make enough urea each year to power a car for 2700 km.

By weight, urine contains approximately 2 % urea, and each urea molecule contains four hydrogen atoms that crucially are less tightly bound to the molecule as compared to hydrogen in water. In order to split these bonds less energy would be required, making hydrogen production much more efficient. . In the United States waste water treatment plants consume 1.5 % of all the electricity the country generates Urea, an important constituent of urine, is the key to many modern applications. But humans produce it, efficiently and sustainably, in the liver, where it helps to mop up the toxic ammonia generated from protein metabolism and keeps it safely locked up until it is excreted in urine. The ammonia is only released when urine comes into contact with micro-organisms in the environment - which is why urine starts out sterile and gradually acquires its unmistakable smell after it has been lying around for a while. In Denmark, where ammonia around pig farms is a serious pollutant, the company Waste2Green has started collecting pig urine before ammonia is released.It then uses the urea in a diesel exhaust cleaning product.
Earl Braxton who runs an American portable toilet company claims to have discovered how to extract proteins from urine and turn them into medicines like Prozac.He said: "If we have four million toilets in the US and there's 10 gallons of urine per service and you service it four times a month, you get 40 gallons per portable toilet.
The best bet yet to proliferate this concept has

been through the use of fuel cells. A fuel cell is an electrochemical cell that converts chemical energy from a fuel (in this case hydrogen) into electrical energy. The well-known principle of electrolysis is used to dissociate urine (H_2NCONH_2) into its constituent hydrogen and nitrogen. The presence of nitrogen in urine helps to make the hydrogen generated more stable. Latest research shows that urine could be the third generation energy source. First was the problem of storage of hydrogen. It is not possible to store Hydrogen under normal atmospheric conditions but under standardized temperatures and pressures are required. Secondly, hydrogen fuel cells make use of platinum catalysts to oxidize hydrogen and turn it into positively charged ions and negatively charged electrons. Platinum is quite expensive and may not be commercially sensible to be included in the final product. Molybdenum-oxo ($PY5Me_2$) is about 70 times cheaper than platinum and it has efficiency 4%less than that of platinum. (Research by Berkeley Lab team) Dempsey's mechanism is the predominant pathway that these cobalt catalysts use to generate hydrogen. It involves a key reactive intermediate gaining an extra electron, forming a compound called cobalt (II)hydride,that turns out to be the mechanism's active species.

The electrolysis of urine is a simple method of producing hydrogen. A low voltage current is run through the urine, and gaseous oxygen forms at the anode while gaseous hydrogen forms at the cathode. Typically the cathode is made from platinum or another inert metal when producing hydrogen for storage. This prototype is much more stable and makes use of cheaper catalysts. This fuel cell called the 'Carbamide Power System' can transform urine into water, carbon dioxide and most importantly electricity. The technology when fully developed can be applied in submarines, and in power generation within arid or desert regions where water isn't actually an abundant commodity.

Anode batteries of Zinc can offer an environmentally friendlier and less costly alternative to ni-cad batteries.In the longer term, they also could replace lead-acid batteries at the lower cost end of the market.

However, the challenge of dendrites formation associated with zinc had to be addressed.

By: Adit Rathi FE CMPN

Prepared by Nitin A Kapri
FE ETRX

MOBILE PAYMENTS

The Evolving Dynamics of Retail Market

With new payment gateways and the steep increase in the number of consumers using mobile phones for shopping and the alternative of mobile shopping is growing to become the latest buzz word in the e-commerce and retail. The space for electronic retailing has been grown up by leaps and bounds and has witnessed dramatic changes in the last decade. The mobile payment being the next big thing and paving way for future retail transactions is going to modify the relationship between customers and retailers.

The concept of the mobile wallet is growing and gaining traction in the retail market. The mobile wallet is generally an alternative way of making payments which otherwise is done by giving cash, check, or by debit/credit cards. The smartphone using generation of consumers can make payments either by accessing accounts from which funds can be transferred or by holding payment credentials. There are many new existing models being used in the segment of mobile wallets in the apparel and garment retailing industry. However, such a service was more popular than digital goods like ringtones, avatars, and games. There was no security or encryption and no inherent evidence or confirmation of receipt, payment, or delivery.

This was followed by the Unstructured Supplementary Data Services (USSD) technology, an information transmitting mechanism using a GSM network. Since it used real time connections

It was mainly used to carry out bill payment and remittances. But for the apparel retail context the mobile wallet model to be used is the contactless mode of payment. Payment for garments can be made in-store by using a contactless technology by holding the smartphone in near proximity to the retailer's Point of Sale terminal. The credentials of customer accounts or tokens are saved in the smartphone.

Shopping for the latest clothes using mobiles and making payments has increased and the number of consumers switching to this medium is multiplying with time. Another mobile payment model is using an online platform or a cloud system for making purchases. When consumers arrive at the stage of payment, a branded check out screen, which consists of their credit/debit details and shipping information without having to enter data each time a transaction is made.

The latest noise created in this arena is by the Apple Pay which has been launched ahead of the much awaited iphone 6 for mobile payment. A facility like this ensures that consumers having access to such technology can now buy desired products and services using a particular smartphone. Similarly for the Android users there is Google wallet providing users a facility to store everything that one normally does in an actual wallet like coupons, vouchers, airline boarding passes, loyalty cards, and credit/debit cards.

Integrating with such platforms, apparel retailers can provide better facilities to smartphone users, drive sales, and boost customer loyalty.

There are a lot of innovations happening in the lap of mobile payment. A unique method for making mobile payment tad easier is the use of biometric identity systems. Using the fingerprint, a consumer's payment details can be obtained to conclude transactions. A smartphone which has an inbuilt fingerprint scanner can be enabled to make payments. Services like these are changing the world of mobile payments drastically. Such technologies make the scanning of QR codes for selecting and making payments using a mobile Point of Sale service sound so pass.

In the recent times, mobile Point of Sale systems have become more than just a medium for payment. They offer software, services, and enterprise suitable features for the larger benefit of apparel retailers. These systems are very handy while managing an omni-channel retail setup. With a mobile Point of Sale option apparel retailers can achieve integration of forward and backward systems leading to appropriate management of inventories and shipping of stocks.

Hence mobile payments today encompass a wide range of technologies for apparel and garment retailers. With all commerce progressing towards mobile in retailing across all channels, consequently payments are, and in future will become an important part in enabling mobile.

virtual reality

not a dream anymore

Prashant D Kapri
CMPN A

In the recent years there had been many research and experiments done to create a user friendly environment, an area having one's own reality which is nothing but Virtual reality.
Imagine that there is a reality in virtual, where you can do everything in it, you can live in it; spend your whole life in it, etc.....all the above mentioned things can be done efficiently with the help of Virtual Reality technique.
"Virtual reality is about an artificial reality which is created with the help of various software's and computer technologies". It is displayed to user in such a way that it eliminates the user belief of reality and arise a situation of ambiguity between virtuality and reality.
The idea of VR technology came from dreams. When someone saw a dream, everything appears real to your brain, sometimes you are trying to save yourself and you are moving your hands and legs your body got sweat and you are even talking but that world of dream only exists in your brain. Nothing real is there. But the fact is that your brain misunderstood it and dream deceives your brain by giving it illusion that everything is real. VR sometimes also known as virtual environment permit us to watch the surrounding world in multi dimensions since it has no limits it can be upgraded to any dimension as per user's requirement.

In virtual reality, we can immerse the user in the VR world, and place them in practically any scenario that we imagine. We can accomplish this reality by using virtual technologies such as HMD device, CAVE, BOOM and other sensual technologies etc.

1. Head Mounted Display: A HMD device is just like a projector (used for displaying) device, integrated into eyeglasses or mounted on a helmet comprising of two miniature display and an optical system that links to the monitor or displaying device. This optical system acts a medium between the screen and eyes. It channels the images from screen to eyes and thus displaying a view of virtual world. Various input devices and sensual technologies like motion tracker, gloves, and joysticks are used to track the position of the

user and adjust the scenes according to the scenario. As a result with the help of all this technologies working simultaneously the user can experience the virtual world.
To curb the often un- comfortableness arising due to the helmets or eyeglasses of HMD devices, alternative concepts like CAVE, BOOM and other sensual technologies were developed for experiencing the virtual world.
2. Binocular Omni-Orientation Monitor: It is one of the oldest technologies in the field of VR. It is a stereoscopic display device. All the gadgets or technologies such as optical systems and screens are housed into a box which is further connected to multiple arms. In this device tracking is done with the help of potentiometers on arms. The user can look into the box and perceive the virtual world also the user can guide it to any position with the help of multilink arms.
3: Cave Automatic Virtual environment: The CAVE produces the hallucination of immersion by forecasting stereo images in a cube sized room (generally the ceilings, walls and floors of room).In this technology the tracking is generally done with the help of head tracking systems.

The main advantages of Virtual reality are:
You can teleport yourself just about anywhere in the world and perceive as if you're really there. For example you can go to your favorite place in the (virtual)world just in a minute and take a feel or your experience out there.
You can interact with people in an entirely new social network. For example Altspace-VR using this you can share your views and really interact with other people in your virtual reality spaces.
You can use it as a simulation device for training, military defense etc. You can also use it in telemedicine, teaching etc.
You can be in a game(with the help of augmented reality) instead of just looking at it so that you can experience it better. For example an anime name Sword Art Online, in this anime the story plot is like you're playing a virtual game and suddenly you got confined in it .so you have to clear all the levels to get out of the game.
You can do anything you want irrespective of your inability. For ex a girl who is suffering with very dangerous diseases and she has only few days left, in that case she can use virtual reality to fulfill her dreams of living life,etc.

Thus, Virtual Reality could be the next big thing that has the power to revolutionize the human world and bring some good changes to the existing world.

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A New Era Of

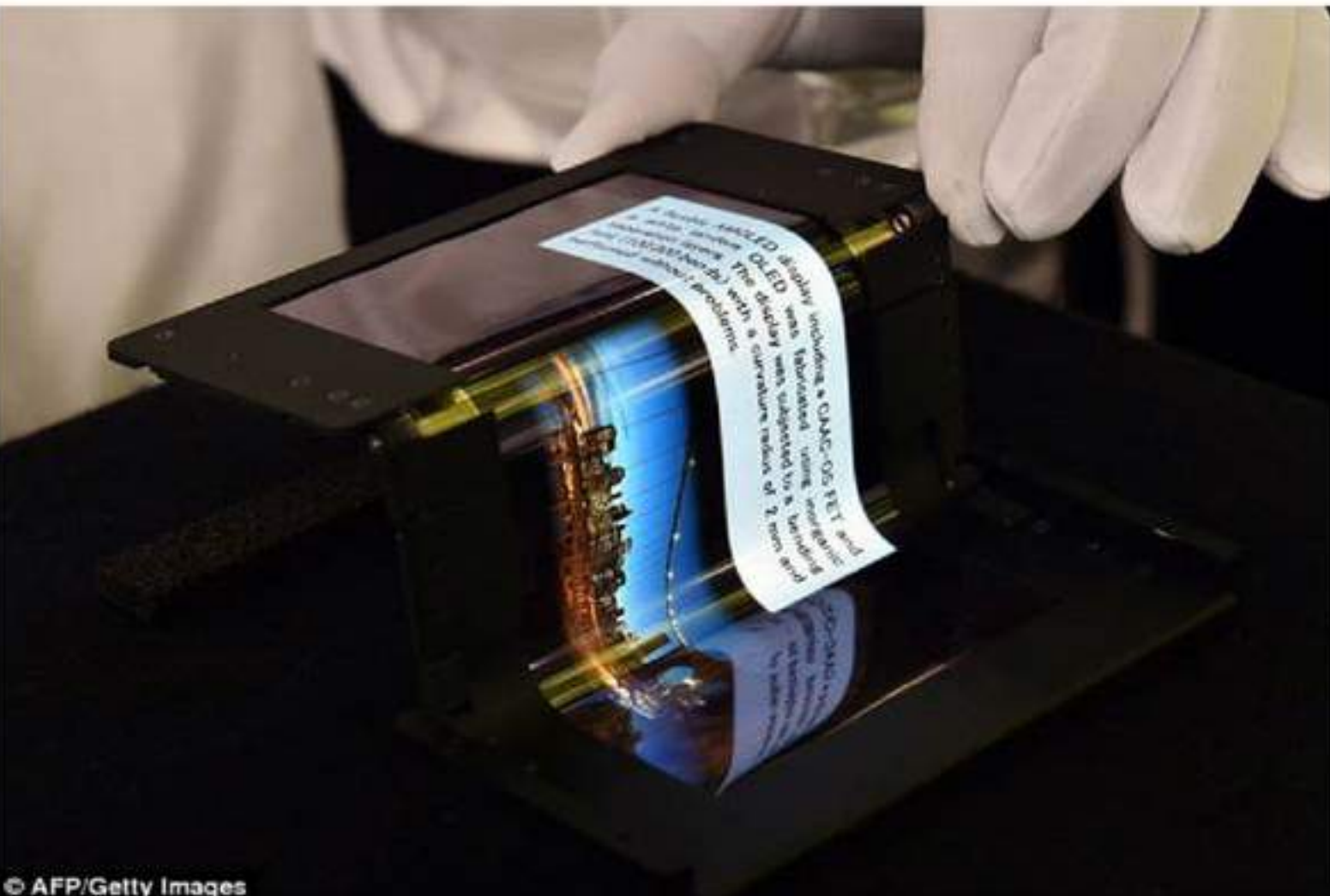
Technology

Hyper-flexible touch

Paresh J Choudhary
MECH-A

In recent years, much effort have been dedicated to achieve thin, lightweight and even flexible energy-storage devices for wearable electronics.
There is a strong interest in thin, flexible energy hold able devices to meet modern society needs for applications such as interactive packaging, radio frequency sensing, and consumer products. In this article, we demonstrate a novel kind of "HYPER-FLEXIBLE TOUCHSCREEN" i.e., our phone can "BEND & STRETCH".

Nowadays nobody likes to roll their fingers over glass of water, but interest can be created by a new and malleable touch sensors and a lot more than just unbreakable screens. Scientific interest have been developed by the researchers for past few years in order of developing malleable displays for



smart phones which can actually bend and stretch. Not only phones but TV's also which can be rolled like a bunch of sheets.

According to a research organization team called by name Sarwar, which has actually developed such flexible smart phone says –

It comprises of highly conductive gel ,sandwiched between the layers of silicone – is actually a hybrid effort, bringing together numerous functionalities in one pliant form. So easily many function can be compromised in a single layer and due to which the screen width will be reduced i.e., it will become thin which is what the 1st requirement of the consumer. The one thing to make a malleable device that register's touch when it's deformed, but it's more of a challenge to make the same material detect fingers that aren't even in contact with the device.
To make this possible, the team used HYDROGEL electrodes that are embedded in the silicon layers, which project an electric field above the sensors so that not only 1 but more than 1 fingers prints can be detected.

Also the material used is very cheap, because of the hydrogel which is actually obtained at cheap rate therefore the phone will not cost much and a middle class man can easily afford it.
So if such a smart phone is constructed, which can actually bend and stretch itself, then a new era of smart phone will start. A company name Lenovo has Started building the Prototype of the model.

Following things will automatically developed once the phone will be created:-
1. Since gel is used inside for constructing phone, water resist property may get enhanced, i.e., the phone will be water proof,
2. Damage to the screen will be reduced if it falls,
3. Easily handy, hence comfortable.

Hence most awaited technology for the present generation.

PULVERIZING E-WASTE TO NANO DUST

Within few years the advancement in field of technology is rapidly
taken place ,coming from converting the large large particle into smallest atom or combining atom to form a big molecule. As we people
are already aware of the fact that usage of electronics gadget is increasing day by day ,the need to dispose or destroy the electronic
product is our challenge.
Thus According to a new study, We can simply recycle the pulverize the
dumped electronics into Nano dust(1 AU) – which Researcher Say Could
be a more Efficient and Environmentally Friendly Way of Breaking
Down Unwanted Appliances and Technology into ultrafine particle that
can be repurposed.
We can say that that "In every case , the cycle is one way and burning
or using chemical takes a lot of energy while still leaving waste". To
convert any object to nano particle it can be done by bombarding the
electron on the particular surface by using top down approach and
followed by using Scanned Electron Microscope ,but basically what the
team follows is top down approach they conducted an experiment in
which they took Two circuit boards and use a cyromill to grind them at
a extremely cold temperature about 120 degree ,cyro mills contain
Argon gas and a small steel ball, which when agitated pulverize the
circuit board.

Converting the electronic waste into nanodust not only reduces the
pollution but also has a great contribution to the disposal of electronics
waste. For context when we talk about the nano particle ,its exactly
count to 80,000 to 1,00,000 nanometer wide of human hair, so u can
think of it how small we are talking about. considering the fact
nanodust won't contribute much to the pollution. While pulverizing the circuit won't solve our mountainous e waste
problem, but as a proof it can built a new path ahead for recycling.
Thus Nano science can take advantage of physics . When u heat things
,they are more likely to combine. These Nano particles have Unique
properties that will allow Researcher to see more clearly at cellular as
well as inter molecular level. This technique of converting E-waste to
Nano Dust can give a great boon to science and Technology

Pradeep D Kapri
MECH A

MATHS: $\sqrt{}$ COMPUTER SCIENCE

where one's and zero's meet

Being a maths lover from very young age and a newcomer in computer science I always tried to relate these two subjects…and this relation fascinates me. But then there are people who don't like maths or they started disliking it after 10th/12th when it gets crucial and still they are expecting a very good career in engineering or more precisely in computer science.

In following article I would like to explain mathematics as the base of computer science.

Let's first elaborate "computer science", as per definition it's a branch of science(so it has to be analytical) that deals with computational devices. Now word computational means "the action of mathematical calculation". As per conventional point of view mathematics is numbers, equations or graphs but if you dig a bit deeper you will realize that it's a whole different language…it's the language of the universe and our civilizations biggest achievement ever. Having the capacity for abstract reasoning, critical thought, and logical deduction that's the mathematical way of thinking. In this regard, a strong background in mathematics is imperative for succeeding in computer science.

1. Math teaches understanding and communication through abstract language.

Computer programming has its own languages, which are very abstract. Using syntax, one must represent specific processes, commands, and visuals through punctuation, symbols, and single words. To someone with no experience thinking or communicating in abstract languages, learning a programming language can be terrifying.

However, abstract programming languages are very similar to the mathematical language that students learn in math class. From simple equalities to complex mathematical representations, learning mathematics teaches students the art of reading, comprehending, formulating thoughts, and communicating with abstract language.

Of course, mathematical language and computer programming languages aren't exactly the same. But experience using any abstract language gives an advantage to the beginning computer scientists.

2. Math teaches how to work with algorithms.
Algorithm is among the most bandied-about terms in the technology scene.

In short, an algorithm is an abstraction of some process into a form in which the process can be repeated, implemented in different ways, and applied to new problems.

The word may be used more frequently in computer science, but most students first use algorithms in mathematics. For example, consider an equation like 5 + x = 7. Students learn to find an unknown summand by subtracting the known summand from the sum. This is an algorithm -- one that students quickly learn to apply to new problems and implement in different ways.

3. Math teaches students how to analyze their work.
In a day's worth of programming, any computer scientist is guaranteed to make a mistake. Programmers must know how to assess a problem, analyze their work, and fix errors.
Math is one of the few subjects where students analyze their own work in this way. A student might answer a math question (How much do the puppy and kitten weigh together?), realize that their answer is unreasonable (231 pounds), and analyze their own process to understand their mistake and how to fix it (maybe they forgot to convert from ounces to pounds). Math, in short, prepares students for fixing bugs.

4. General skills aside, computer science still involves a lot of math.
In addition to general skills ,importantance for computer science, the facts and figures of math are essential. As computer programming interacts more with our world, the importance of accurately modeling that world through mathematics grows.
For example, to build a self-driving car, the equations used to program its turns, acceleration, and acceptable distance from other cars must be spot-on.
Becoming a computer scientist requires a fair amount of mathematical knowledge and skill. Even more importantly, success in computer science requires the ability to think mathematically. So why is it necessary to talk about how math helps prepare budding computer scientists for their academic careers?

Shubhankar V. Gore

ROBOTS

on which side of the line?

What is a robot? A robot is a machine which is programmable by a computer and is capable of carrying out a complex series of actions automatically.

Years ago when 'Iron Man' movie was released, I was overwhelmed by the fact that a machine can be helpful in so many ways that we can't even imagine. But then I saw movies like 'Terminator', 'I, Robot' and 'Avengers Age of Ultron' and it showed me how disastrous robots can be. Whether a robot can be hero or villain everything depends upon the user.

In this 21st century, from drones to medical equipment, robots are playing a pivotal role in shaping the Homosapien world. ASIMO(Advanced Step in Innovative Mobility) is a humanoid robot designed and developed by Honda. It is the world's first and the most advanced two-legged robot. ASIMO has the ability to recognize moving objects, postures, gestures, surrounding environment, sounds and faces which enables them to interact with humans.

Other types of robots like industrial robots and military are used for automation applications and for military combat respectively. At this point of life everyone must have anticipated that automated world is coming and managing the unemployment won't be easy. Its a well known fact that robots can work up to 24 hours without breaking a sweat, show consistency, work faster and more importantly doesn't delay its work, so why should we hire humans? By hiring robots businessman can acquire greater profits because robots don't demand money. Well if that's the case then the gap between the rich and poor will just widen more which can be very lethal.

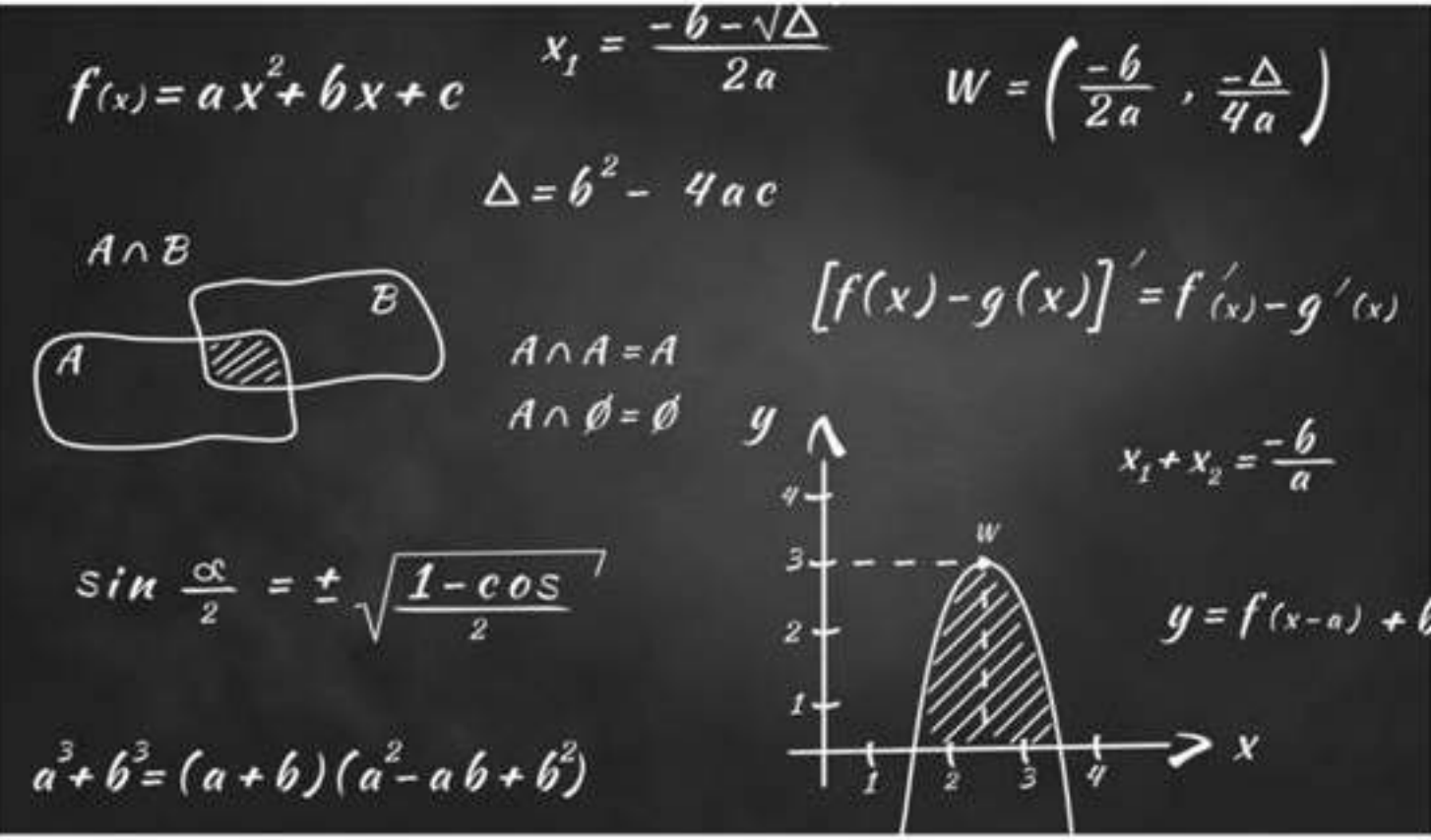
A moment may come when computers and robots are smarter than humans. Vernor Vinge calls this "the singularity". It may be somewhat or possibly very dangerous for humans. What if the robots start to think on their own? What if they wipe the mankind just to prove the superiority? Well these kind of ethical questions are discussed all over the world and scientists are doing their best to avoid this situation.

I personally think that we need to let robots take over. They will do jobs we have been doing, and do them much better than we can. They will do jobs we never imagined even needed to be done. At the end I would like to quote a thought by Robin Sharma - "Change is hard at first, messy in the middle and gorgeous at the end."

Sourav Padwal
MECH A

CODE 9

nine ways to mess with your mind



-Nitin Vishwakarma FE MECH B

The number 9 is everywhere in the plain of sight. Numbers were not invented but discovered. The number 9 is the last number in the " base 10" system which is the last and limit of all i.e 9 a is number which has many interesting qualities that other number do not have. If you think 9 is just a number ,you are in a big surprise there is something more interesting about it that most people and scientists don't know. Now you will soon discover that there is a hidden code that reveals the greatest truth of all time and it is used for the construction of the universe and our lives. It is called the "9 code".

1.) There are 360 degrees in a circle why? Do you think this is arbitrary? No, let me prove.

360 = 3+6+0 = 9

180 = 1+8+0 =9

90 = 9+0 = 9

45 =4+5 =9

22.5 =2+2+5 =9

11.25=1+1+2+5=9

5.625 =5+6+2+5 = 18 =1+8=9,therefore the resulting angle always reduces to 9 , converging into a singularity . Conversly when infinite polygons are inscribed in a circle their vector communicate an outward divergence .

2.) Nine models ' everything ' and 'nothing simultenously '. What do you mean by that? For example; the sum of all digits excluding 9 is 36 i.e 1+2+3+4+5+6+7+8=36(3+6=9). Paradoxically , Nine plus any digit returns the same digit i.e 9+5=14 (1+4=5). So nine quite literally equals all the digit (36) and nothing zero .

3.) The number 9 seems to govern not only properties of physical reality but also time. Let's see how .

1,440 minute In a day adds ap to 9. (1+4+4+0=9)

8,6,400 second in a day adds upto 9.

10,080 munutes ina weak adds upto 9.

525600 minutes in a year adds upto 9.

So, minutes and seconds in a day ,week, month, year ,will always reduce to nine . Totally unaffected by the varying number of days and years i.e "Leap Years", the result will always reduce to a Digits root of 9 .The number 9 seems to govern time and space . The number 9 also seems to existant and non existant at the same time . It seems to cancels itself out , meaning, using digital root method you cannot distinguish between a 9 and a 0 . What do I maean by this ? . If we add upto the digits of a number until, there is only one number left we have fount what is called the DIGITAL ROOT and used by the ancients called Numerology and used as a shortcut for solving cetain math equations by organizing numbers. In other words The sum of digits of a number is calles its digital root.

Example 1

458=4+5+8=17

17=1+7 =8

Example 2

3954=3+9+5+4=21

2+1=3

But here's the trick

"Its called casting out of nines "

The important to keep in mind about digit sums is that you can remove any nines or any combination of numbers that adds upto 9 , while you are summing up your number ,and the number you are left with is the required result. Numbers are alive and govern the universe and help create reality, form and symmetry . Numbers are the bots moving in and out of reality alive and thinking, forming , giving thought to ,creating events ,ideas ,and they're always trying to get your attention.They themselves have power "9" being the most powerful.

" THE GIFT OF MENTAL POWER COMES FROM GOD,DIVINE BEING,AND IF WE CONCENTRATE OUR MINDS ON THAT TRUTH ,WE BECOME IN TUNE WITH THIS GREAT POWER."- NIKOLA TESLA

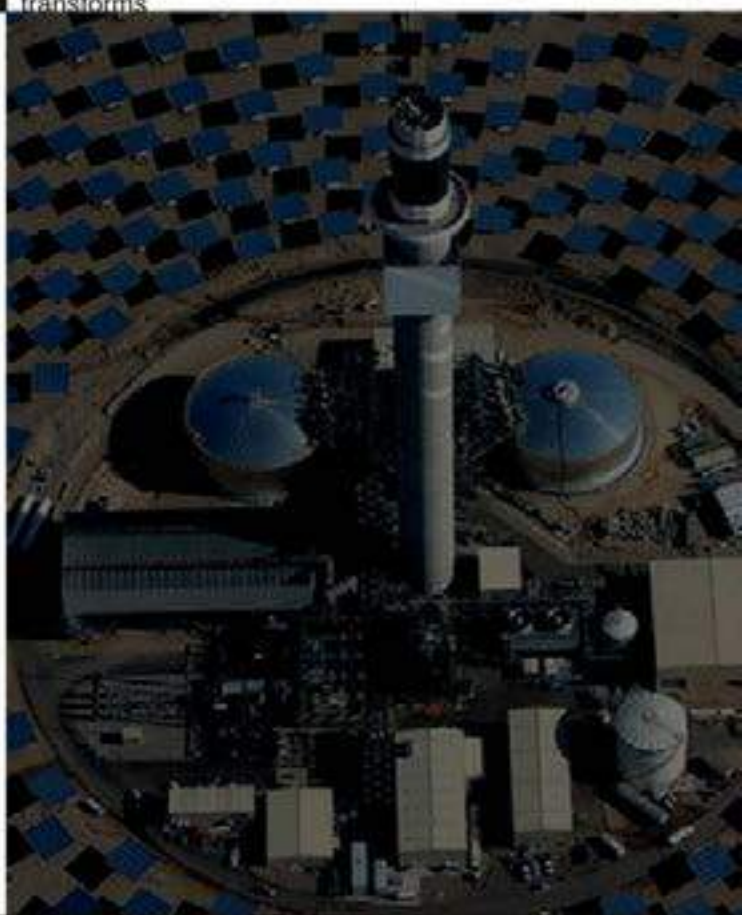
LIQUID STORAGE OF SOLAR ENERGY

It is more effective that solar energy storage can be used in form of a chemical liquid i.e. a new technology in chemical science introduced to the world. The stored energy can be deported later which is in form of energy packet and then released as in form of thermal energy whenever needed as per ones need . It is been consider that the sun is one of the source through which renewable resources can be obtained whose energy can be stored somewhere and later and can be used. Its been acting as an obstacle in front of we humans to store solar energy and deport them in form of energy as per human demands. Some of great scientist making this impossible technology to possible means to convert the solar energy directly into energy which is been stored in the bonds of a chemical fluid i.e.a breaking of pie and sigma bond as a so called molecular solar thermal energy generating system. In this the energy is been stored in this energy packet which can be later used by humans. The liquid which is used as a chemical reactant for this process makes it possible to stored energy and then deport the stored solar energy and release it on demand of one .By this method maximum recovery of the storage medium can be obtained. The process is based on the chemical organic compound known as norbornadiene which is an polycyclic unsaturated hydrocarbon that upon falling of light transforms

it into quadricyclane which is an muti-cyclic hydrocarbon with potential used in rocket propellants an another chemical compound. This technology simply means that one can store the solar energy in this liquid chemical reactant bonds and then release the energy as thermal energy whenever one need it in form of product. Combining that liquid chemical energy storage with H2O heating solar panels enables a transformation of more than 80 percentile of the incoming sunlight which is an electromagnetic radiation. Currently, the solar energy transformation efficiency was 0.01 percent and the expensive element which is rare transition metal belonging to the platinum group of the periodic table ruthenium([Kr]4d^75s^1) played a major role in this chemical compound. Now, few years later, the system stores 1.1 percent of the incoming sunlight as latent chemical energy(an thermodynamic concept) which is an improvement of a factor of 100. Also, ruthenium has been replaced by much cheaper carbon-based elements which act as an active catalyst for hydrogenation through which norbornadiene is transformed into to quadricyclane whose reaction is been shown below

.Applications: Current Organic Synthesis, Thermal Decomposition, Propellant of Rocket.

(Amish Punmiya, IT B)



INFORMATICS

computers , jack of all trades

- Bioinformatics is the converging point of engineering and biology.
- Bioinformatics is a field that develops methods and software tools for understanding biological data.
- The primary goal of bioinformatics is to increase the understanding of biological processes.
- Using software to study biological data can help identify disease causing cells and methods to eliminate them.

Informatics, or more broadly referred to as computer science, is the science of computer information systems. (The field considers the interaction between humans and information alongside the construction of interfaces, organisations, technologies and systems.) Often it is presumed that computer science and biology have very less connection with each other. However development of the medicine and engineering go hand in hand. Earlier , studying the structures and compositions of cells/biological data used to be a complex task but with the development and advancement in bioinformatics we're able to do so with less difficulty.

Bioinformatics is the science of developing methods and software tools for analyzing biological data. It combines computer algorithms, maths, and engineering to interpret and analyze biological data. Bioinformatics involves the incorporation and application of theoretical and practical knowledge of mathematics, statistics, computer science, biology and engineering. It allows in silico analysis of biological content and computerised interpretation of that data for future applications. Bioinformatics is used now commonly to identify and consequently, categorize various candidate genes and nucleotides. It involves the development of algorithms to collect data, search and manipulate biological data, like DNA.These have led to advances in computer science, machine learning, string searching algorithms and database theory. This process of identification is utilized to increase our understanding of the genetic causes and origins of diseases, it's anomalous adaptations or evolutions, useful characteristics (specifically agricultural samples), or the several specific, distinctive properties that differ in populations.

What makes bioinformatics unique, what is not found in other approaches, however, is

Sequence databases are collections of computerized protein, nucleic acid and other polymer sequences. For biologists ,who may not be technologically gifted, to easily acess and comprehend these databases, user-friendly software is essential. These statistical tools not only allow the use of digital/computerized methods and statistics smoothly but also allow scientists to select methods and algorithms best suited to understand the function, evolution and adaptation of genes and species.

Advancements in field of Genetic Engineering make it possible to avail the knowledge obtained on its methods and processes as well as its practical applications in order to expand the scope of their utilization to numerous other fields like biotechnology,research, medicine, agriculture and cosmetics among scientists and researchers (even manufacturers). Using software to study biological data can help identify disease causing cells and methods to eliminate them. With further development in bioinformatics we may have a cure for diseases that are presently incurable. All humans have 99.9% similarity in their DNA. The 0.1% determines which abilities, character traits and even physical appearance we have . This makes humans fundamentally different from each other. Advancement in bioinformatics can someday lead to the synthesis of an entirely new DNA strand. Dolly, the first sheep to be cloned consisted of DNA extracted from another animal (sheep), however making DNA strands from scratch can be very difficult. If synthesized, it can help humans as it can be used to produce insulin and human growth hormones, develop drugs, innovate novel strains to clone hybrid animals, conducting in vitro research, and in gene therapy using antibodies and vaccines.

Using a new tool for editing genomes, known as CRISPR, researchers have genetically engineered immune cells and improved the ability of these cells to kill cancer cells in mice.

Everyday bioinformatics is done with sequence search programs like BLAST, sequence analysis programs, like the EMBOSS and Staden packages, structure prediction programs like THREADER or PHD or molecular imaging/modelling programs like RasMol and WHATIF. This set of tools allow you to compare structures with the known structure databases.

UGENE is computer software for bioinformatics.

Rrutum Lavana

Shrutika Agarwal

FE CMPN A

Speech recognition technology

SIRI VS CORTANA

Mainly the meaning of the above title in simple word is that the devices having this kind of technology can easily recognise your voice by just speaking in front of the device.Basically, this technology is a mixture of "ADVANCE ARTIFICIAL TECHNOLOGY " as well as "ADVANCE COMPUTER CODING".What I mean is today you can control the Pc From a long distance, you can control the voice of your music player as well as you can amplify its voice, give directions to your car(Driverless car) by just speaking in front of it. You are also using this technology in your day to day life especially in your Pc, I am talking about "Cortana" that is already installed on your PC in which you can directly order your Pc to open various files or folder by just speaking in front of it.This technology can make life easier for Computer coders, Managers , Chartered accountants, People in share market as well. But this technology has not reached it's peak point.It is in its advancement or upgradations state.Already software giants like Microsoft as well as Amazon have entered in this field.

Microsoft is in touch with Intel for the upgradations of its current technology and brings some more feature like chatbots, checking emails etc.

Some of the companies which currently uses speech recognition technology are.

1)Microsoft(Cortana)

2)Amazon Echo

3)SK Telecom and Conexant: -It uses speech recognition technology for the smart speakers in Korea.In a release, Conexant systems, together one provider of audio and voice technology solutions and SK telecom Korea's largest mobile carrier have announced that together complementary audio smart forfilled voice solutions in the NUGOS smart speakers.

4)Andrea Electronics:-Andrea electronics is a pioneer of digital array and noise reduction software solutions.It was the first company to create an array for Pc & automotive industries.It's super beam speech recognition microphone was already a major hit as 10 lakh product of it was sold.

4)Setem Technologies:-Their goal is to separate voice from noise.Their unique algorithm provides excellent results to improve far field voice input for speech recognition system and human communication in noisy and highly reverberant environment.

Some of their features are:-connected home,smart connected car,personal sound amplification,security.

So from this all examples i can surely say this technology can make a person's life easier as well as safe.And with this technology people can use multiple options or task in a single go.

REFERENCE:-PC quest Magzine
http://www.iotevolutionworld.com
http://www.andreaelectronics.com
http://www.setemtech.com

JHA RAHULKUMAR RANJEET
CMPN-A (FE)

SMART CARS

something that can do anything

- NILAY GAWDE
FE MECH A

We live in a world where survival without technology isn't possible. From the moment we wake up till we sleep rather even after we sleep we rely on technology. We are always looking out for better technological upgrades, smart devices. Surrounded with our smartphones, smart tv's, laptops, smart watches our lives have become much simpler and easier. Such smart devices save our time, makes our lives hassle free and easy.

But there is one such machine that still hasn't been upgraded. The cars. Even after so many years, there hasn't been any major change in the cars Technology. Cars rather car accidents are one of the major reasons for the deaths caused around the globe. Yes, it's true that safety features like ABS EBD Airbags are introduced but still, they haven't helped much. In fact, its the need of the hour for smart cars to rise. Smart cars basically is a concept where all the cars will be connected to each other through the internet. So over the internet, we can actually say that all the cars can communicate with each other. They can sense the atmosphere or the terrain and can optimise the ride to give a luxurious experience to the passenger. Smart cars have the ability to analyse the traffic conditions and can take us to our destination in the least possible time. Even Driverless cars won't be a fiction anymore.

As these cars can communicate with other smart cars through a common platform, they would have the ability to avoid accidents and traffic situations. There won't even be the need for traffic signals as the car can literally talk to another car like "Please reduce your speed I am going to cross the junction after 30 seconds." Smart cars can include technologies like A.I software, spherical tyres, fully electric vehicles and auto pilot. Smart cars have less maintenance cost and give better performance, safe rides, and are very reliable. Tesla Motors, Mercedes, Daimler are one of the major companies who is inventing new technologies and producing smart cars.

Smart cars can even be compatible with spherical tyres. The tyre company Goodyear, have made their masterpiece by which you can literally rotate your car in 360° on the same spot. Such tyres with help of A.I can result in absolutely no traffic. They can help in increasing the parking spaces as spherical tyres can get the car out in any direction. Smart cars are beneficial for both, the driver and the pedestrians. They are user-friendly and eco-friendly and even light on your wallet. According to some major electric car companies, "There will be a time when all the cars in the world are replaced by smart cars then things can get soo safe that you can actually sleep and let the car take you to your destination."

ARTIFICAL SUN

CAN HAVE ONE IN MY BACKYARD

M. Mushahid Hashmi
FE MECH A

The latest invention of German scientists has made a huge impact in the field of science which is described as "the world's largest artificial sun. Scientists believe that it may provide sunlight and will have no hazardous effect on human life as well as the environment. The description of the artificial sun is quite ebullient containing about 149 spotlights which are referred to as "Synlight". Conditions which is required to fulfill is quite difficult to satisfy the need of artificial sun.
Prof Bernhard Hoffschmidt, head of solar research said "the dazzling display is designed to take experiments done in smaller labs to the next level, adding that once researchers have mastered hydrogen-making techniques with Synlight's 350-kilowatt array, the process could be scaled up ten-fold on the way to reaching a level fit for industry".
This experiment requires a lot of electricity which can create a huge effect on the economy. The energy which would be generated will contain the temperature around 1,000 degrees. German government is spending huge money on this type of project and can be recognized as the biggest investor in this renewable resource. As building the new technique may basically open up the gate of new ultimate revolution a fundamental change in the scientific and human life respectively. Creating the clone of the sun is obviously difficult. It's an incredibly daunting task to undertake and thus, quite justifiably, will take many years before it becomes a reality.

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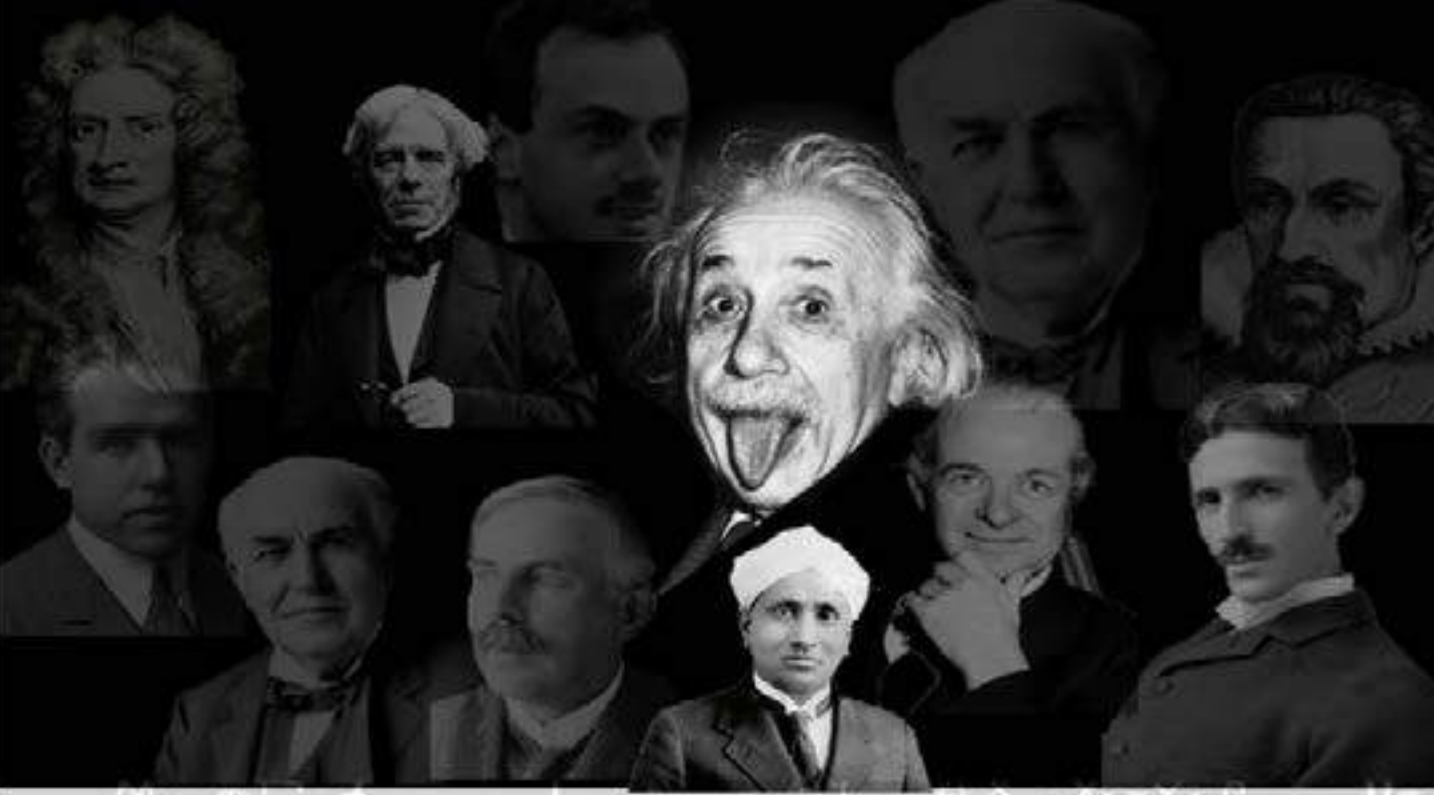
Process of how Artificial Star can be made:-

Experiment should be highly determined and optimized. Area needed in this experiment should be equal to 4 times the cricket ground approximately. In this experiment a laser beam is allowed to pass through the lenses which hereby allow the laser to split into different beams which can be converted into the ultraviolet light. UV light will be focused onto the center of a capsule. The inside of this capsule have the aluminum and concrete-coating.

Striking of light produces X-rays which thereby produces energy which later creates pellet and the capsule blows off and explosion takes place which in turn triggers the nuclear reaction responsible for producing large amount of energy.

Present Status/My Ideas on the Topic!

Technology is developing in day to day life. According the data available on google our sun is 25,000 light years away from the center of the Milky Way and scientists believe that there are suns in other galaxies too which quite bigger compared to our solar system sun. Creating an artificial sun is not so easy. It requires special conditions but it is possible as the word impossible itself says "I m Possible". According to the website of universe today, "Although our Sun appears to be yellow, it is actually white. It merely appears to be yellow because of the effect of the atmosphere. Our Sun is brighter than most of the other stars in the galaxy which are also red dwarfs and only about 5% of stars in the Milky Way are larger than the Sun". Hypothetical idea is that Sun may use or have the power due to which the planets are held to their respective orbits in short the gravitational pull which was believed by ancient scholars. Sun's core in which continuous fusion reactions take place cannot be made easily because the high temperature which triggers the reaction but in other way a catalyst or a substitute can be used which can have the same advantage or the same effect.



There was a petrol pump in Chicago. At 7 am the owner of the petrol pump was standing by his car, on the verge of crying and waiting for someone to come to the petrol pump and help him getting his car repaired. He was on the verge of crying because his son met with a fatal accident and he wanted to go there but his car generated a very big problem and he could not start it.At this moment a gentleman comes in a car to fill the gasoline in his car. The owner of the petrol pump narrated all his story and requested him to get the car repaired if he can.The gentleman opened the bonnet of the car, inspected it and went under the car and got it repaired in 15 minutes. The owner of the car was very much happy and under obligation offered him a high salaried job of supervising a petrol pump. The gentleman thanked him for his offer and said, “sir, thank you very much I have a job”. He then got into his car and went away.

OH ★ GREAT

SCIENTISTS

• • NISHANT MALHOTRA •

Do you know who he was ?

He was a great astro physicist Prof. Enrico Fermi. He was an Italian physicist born on 29th September 1901 AD. He is renowned for his work on induced radioactivity. He has accomplished a ton during his lifetime. One of his earliest accomplishments was getting scholarship in physics in year 1918. He discovered statistical laws also known as Fermi Statistics in 1926. He was the first person to split an atom in 1934. The theory of beta decay was discovered by him.

He is guru of many noble laureates like S.Chandrashekhar, P.A.M Dirac, Majorana to name a few. He was also a member of Manhattan Project Team headed by another great astro physicist Robert Oppenheimer, the team included Einstein and made the first atom bomb of America.

He is guru of many noble laureates like S.Chandrashekhar, P.A.M Dirac, Majorana to name a few. He was also a member of Manhattan Project Team headed by another great astro physicist Robert Oppenheimer, the team included Einstein and made the first atom bomb of America. He was a professor in schools like Columbia University and the University of Chicago.

He has received Matteucci Medal, Nobel prize, Hughes Medal, Medal for Merit, Franklin Medal, Rumford prize for his incredible contribution in the field of physics.

He has majorly contributed in the field of radioactivity. His work on induced radioactivity which occurs when a previously stable material has been made radioactive by the exposure to specific radiation is remarkable. Also, he supervised the first man-made self-sustaining a nuclear chain reaction. Thus we can say that he was the pioneer of modern nuclear physics.

"EXPERIMENTAL CONFIRMATION OF A PREDICTION IS MERELY A MEASUREMENT. A
EXPERIMENT DISPROVING A PREDICTION IS A DISCOVERY"

- ENRICO FERMI.

Nishant Malhotra
(FE Mech A)

HYPERLOOP

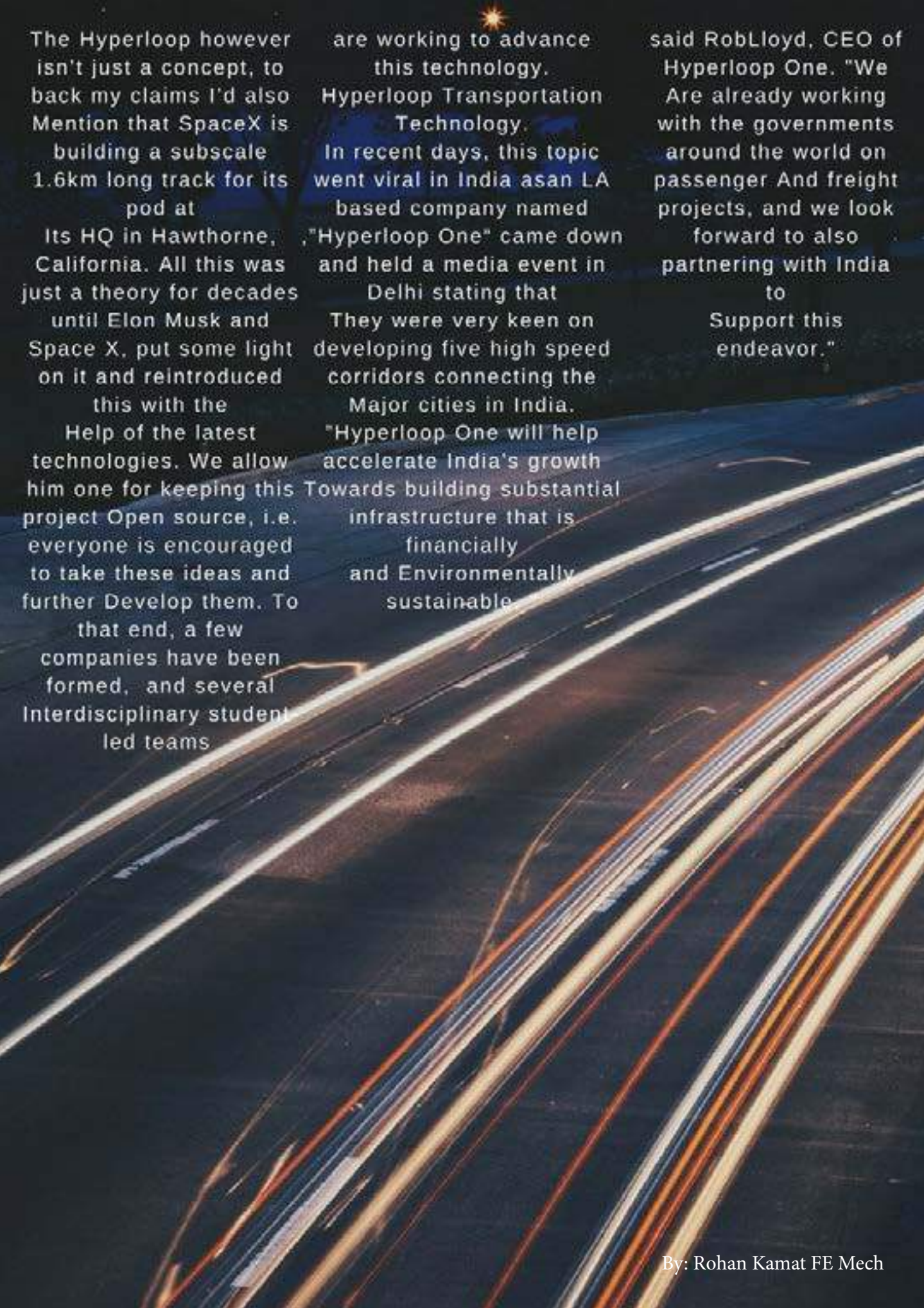
ARE BULLET TRAINS OUR LIMIT?

Transporting or moving people from one place to another whilst cutting Down on the travel time as well as making it affordable for the common Man is the conundrum that drives technologists and inventors nuts! Not Long ago, ElonMusk, the CEO of SpaceX and Tesla, himself put forth the Idea of the 'hyperloop' in the year 2013.The main motive was to replace the California high speed rail. The term hyperloop itself might be unheard of, to Many of us. To break it down in to simple layman terms, you start with a pod, that can be designed to transport both freight and passengers, these pods operate in tubes, which creates a controlled environment, you magnetically levitate the pods instead of using wheels, to eliminate friction, reduce the air pressure in tubes to eliminate almost all air resistance and then get super-fast travel speeds. But after all we are living in the 21stcentury and all your sci-fi fantasies can. Be turned into reality. Well, to some extent. Although we might not have Flying cars, personal robots who write all the assignments for us, artificial Intelligence etc etc. right now, but what we do have so far are a pair of self-lacing Nike Air MAGs. Now that definitely isa 'BacktotheFuture' fan's wet dream come true, isn't it?

The Hyperloop however isn't just a concept, to back my claims I'd also Mention that SpaceX is building a subscale 1.6km long track for its pod at Its HQ in Hawthorne, California. All this was just a theory for decades until Elon Musk and Space X, put some light on it and reintroduced this with the Help of the latest technologies. We allow him one for keeping this project Open source, i.e. everyone is encouraged to take these ideas and further Develop them. To that end, a few companies have been formed, and several Interdisciplinary student led teams are working to advance this technology. Hyperloop Transportation Technology.

In recent days, this topic went viral in India asan LA based company named ,"Hyperloop One" came down and held a media event in Delhi stating that They were very keen on developing five high speed corridors connecting the Major cities in India. "Hyperloop One will help accelerate India's growth Towards building substantial infrastructure that is financially and Environmentally sustainable

said RobLloyd, CEO of Hyperloop One. "We Are already working with the governments around the world on passenger And freight projects, and we look forward to also partnering with India to Support this endeavor."



By: Rohan Kamat FE Mech

REVIEW OF BASALT FIBRES

By: Raj Punjabi FE Civil

Do you think carbon fibre can match them all?

Introduction- BASALT is the fiber made from the basalt rocks at high temperature. The basalt fibers have a wide range of applications due to its remarkable properties. Basalt fiber is a non-metallic fiber made from basalt rock at high temperature. Basalt rock can also make chopped basalt fiber, basalt fabrics and continuous filament wire.

Basalt fiber is originated from volcanic magma and volcanoes which is a hot fluid or semi fluid material under the earth's crust which is solidified in the open air. Basalt is a term commonly used for various types of volcanic rock. Basalt has a fine-grained structure due to the molten rock cooling too quick for large mineral crystals to grow. It may contain larger crystals formed prior to the extrusion that brought the lava to the surface.

Properties - These fibers have High tensile strength and good elastic features, Great durability, higher shear and compression strength in comparison to glass fibers. It has Better chemical resistance, High temperature resistance, and Great thermal protection. Its melting point is around 1500-1700 degrees.

Method of production- Firstly the basalt rock is finely crushed in the range of 5 to 20 mm of size. Then the crushed rock is to be heated at high temperature. This is done by loading all the crushed rock in the loader and then is transferred to the heater for further processing. The heater is called as the furnace where the rock is heated at range of

1400 to 1600 degrees. After heating the mixture is cooled and then is passed through the set of holes from where the mixture gains the shape of continuous wires. The diameter of these wires is very small and ranges up to 9 to 15 microns. Later after getting the wires they are lubricated using the lubricator for enhancing the texture and luster of the material. And finally they are reeled on the bobbins using motors on the roving spool.

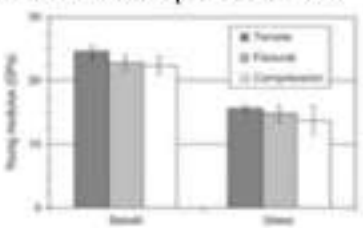
Applications- Basalt fibers are appropriate for a range of applications such as automotive, aviation, construction, and electromagnetic shield, high temperature screen etc. The rovings' and fabrics are used in production of CNG cylinders, brake pads, head liners and other frictional materials. Also sporting goods like skies, snowboards, and bicycle are produced by basalt fabrics. Basalt fabrics are used to make the UD tapes, blades of various turbines. The basalt fibers are for producing the high temperature bearing pipes, shields and other machinery parts. In construction industry the basalt chopped fibers are majorly used as a ingredient in the concretes for better stability and durability. The basalt mesh also reduces the chances of cracking and destruction of the structure. The high tensile strength and elasticity also make it preferable for building high load bearing applications like road , highways etc.

Comparison of fibers- As basalt has very great features for the applications, the reasons due to which the basalt for getting the edge on the other elements is been discussed briefly. According to the comparison the tensile strength of basalt ranges more than the glass fibers while the elastic modulus is less than the carbon fibers. As given the melting temperature of basalt is high therefore can be used high temperature bearing applications can be used at temperature at the range of 650 degree Celsius.

PROPERTIES	BASALT FIBERS	GLASS FIBER	CARBON FIBERS
Tensile strength (MPa)	3000 – 4840	3100 – 3800	3000 – 4900
Elastic Modulus (GPa)	93 – 110	72.5 – 75.5	230 - 800
Melting temperature (C)	1450	1120	NIL
Max temp. range (C)	~650	~380	~600

Production of composites- The composites applications of the the basalt fibers are made by the process called pressing. In this technique firstly the fires are smashed into small pieces of 60mm. Later this batched fiber along with the glass fibers are passed through the carding machine. The carding machine used in this process is multi cylinder carding machine. The carding materials are the needle punched which are the made more consistent. The material is then made to form composite sheets by passing it through the hot pressing at temperature of 200 degrees & pressure of 20 bar.

Comparison of composites- Thanking to the various features and properties of the fibers of basalt, the composites and applications of the basalt fibers had thus proven to be more preferable than other products. The various properties of composites of basalt and glass fibers are compared below.



Conclusion - The basalt fibers have properties much similar to the E glass but due to high resistances it has a more applications. The temperature range & melting is high, thus it also preferred in high temperature applications.

WATER MANAGEMEN

OBSTACLES FOR SUSTAINABLITY

"Climate change and the hydrological variability of water's distribution and occurrence are natural driving forces that, when combined with the pressures from economic growth and major population change, make the sustainable development of our water resources a challenge."

Water considered as a "lifeline to the living souls on earth" needs to be managed and monitored meticulously in-order to ensure that it's quality and quantity are retained for the upcoming years. The targets of sustainable water resource management should include: provision of adequate water for economical sustainability and population's livelihood; maintaining a chaste water environment; ensuring safe and pure drinking water and taking preventing disasters and outbreak of epidemics caused due to flooding and water- logging. However, several factors serve as a deterrent to the practice of sustainable water development. The main reason behind the inefficient water supply practices can be traced back to the fact that most decisions in water r

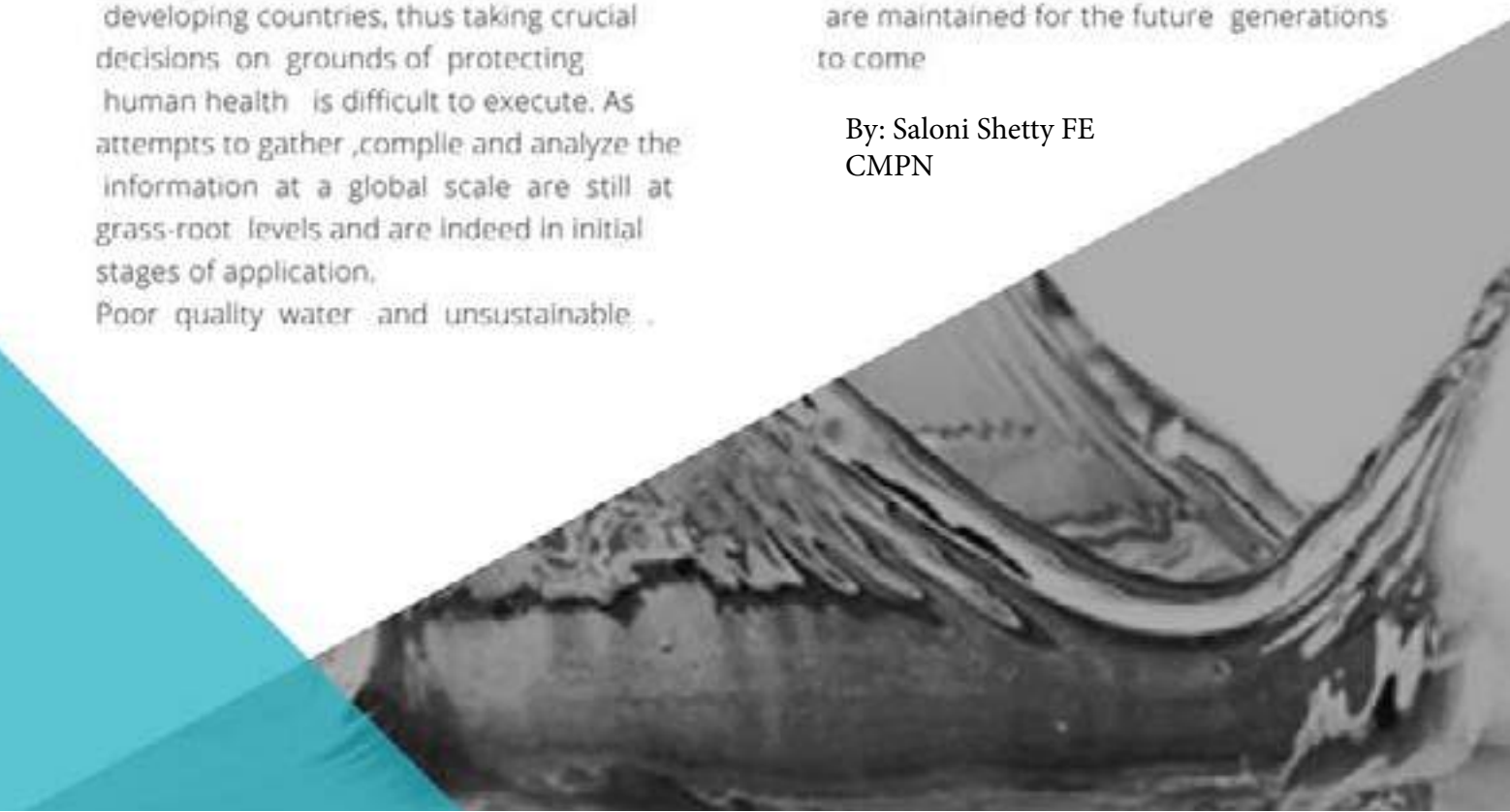
Add a liWater Management Proposals should be backed by the best of the existing scientific breakthroughs and ensure the adoption of multidisciplinary integrated perspectives .The Scientific team should realize the mere fact that today's water related challenges are way immune to the last century's hydraulic scheme treatment. Appropriate amount of funds and r

resources should be flushed in, inorder to ensure that the treatment of water is carried out successfully. Moreover even if the best approach is proposed there are certain corrupt officials at every levels of an organization, who for the mere sake to climb up the social ladder, would carry out illegal practices ,that are punishable by law. Such kind of callous behaviour creates innumerable barriers in the smooth execution of the proposed programmes.

Groundwater resources can prove to be a viable option to overcome climate variations and satisfy the increasing water demands during dry durations .Excessive freshwater run-offs during wet-periods can be used to relinquish aquifer systems. However there's absence of sufficient data for aquifer and groundwater systems ,especially in the countries of Asia and Africa, where water monitoring programmes are not regularly carried out. Water quality monitoring programmes are lacking or insufficient in most of the developing countries, thus taking crucial decisions on grounds of protecting human health is difficult to execute. As attempts to gather ,complie and analyze the information at a global scale are still at grass-root levels and are indeed in initial stages of application.
Poor quality water and unsustainable resources impede the effective management of resources and may give in to adverse livelihood and health issues. Alterations in the landscape hinder the predictions regarding the impact on water resources ,since these modifications disrupt natural hydrological and ecosystem functioning .Due to insufficient water data ,estimations regarding the climatic change impacts on water sources at local and global level are difficult to predict.

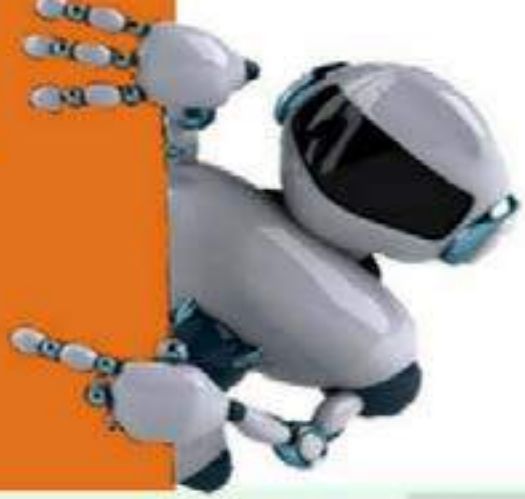
After getting an insight into the obstacles to sustainable management of water ,the focus should be on to reduce the impacts on water quality and quantity .In developing countries modern and appropriate techniques should be initiated from grass roots levels, in-order to curb the impact on the existing water. Overall, there are reasons to be hopeful as new water projects are being launched that stress on the implementation of more sustainable practices in-order to reduce impacts and ensure the the water quality and quantity are maintained for the future generations to come

By: Saloni Shetty FE CMPN



MACHINES

SURGERY'S PAST, PRESENT AND MECHANISED FUTURE



Mechanical engineering in medical field comprises of the research and improvements on the topics such as biomechanics, biofluids, integrated biological systems, neural control, mathematical modelling, and biomedical devices and instrumentation, and applications of these areas to medicine.

As someone with an only Mechanical Engineering degree, biomedical device companies prefer someone with a strong mechanical background, as they are much more flexible in working with several other tasks too in comparison with core Biomechanics Engineers.

A few years ago, it would not be unsurprising to see only Mechanical Engineers working at biomedical device companies; but these days there are way more students graduating with degrees in biomedical engineering.

That being said, most of the BioMed undergraduates aren't qualified enough to make or build up any instrument or device. In fact, most of them didn't even have any mechanical subject in their course.

Overall the devices can be built up on the basis of few parameters listed below:

Class I: These devices present minimal potential for harm to the user and are often simpler in design than Class II or Class III devices. Devices in this category comprise of tongue depressors, elastic bandages, examination gloves, and hand-held surgical instruments and other similar types of common equipment.

Class II: These devices have special controls that include special labelling requirements and mandatory performance standards. Equipment in here are typically non-invasive and include X-ray machines, powered wheelchairs, surgical drapes and infusion pumps.

Class III: These devices are a scientific review to ensure the device's safety and effectiveness, in addition to the general controls of Class I. The examples comprise of replacement heart valves, implantable pacemaker pulse generators, knee joint implants, endosseous (intra-bone) implants and implanted cerebellar stimulators.

Currently there have been revolutionary updates and improvements in this field. Some of them are listed below:

1] Robotic Check-Ups:

Technology is a cheap and an increasingly effective means to connect clinics in the vast and medically underserved rural regions with big city medical centres. The iRobot Corp. and InTouch Health have jointly produced 'RP-VITA' Remote Presence Robot, which is the first such autonomous navigation robot to receive FDA clearance for hospital use. It is basically a mobile cart with a two-way video screen designed to manoeuvre through the busy pathways they are capable of patrolling the hospital, taking routine rounds and managing individual patients diet and medicines without human interference.

2] Melanoma Biopsies cases diminished:

Melanoma being the most deadly skin cancer, a large number of dangerous-looking moles are actually harmless but has always been impossible to know for sure without a surgical biopsy. The MelaFind optical scanner is to provide information in determining whether or not to order a and this is carried by usage of missile navigation technologies on suspicious lesion at 10 electromagnetic wavelengths. The main aim is with the added benefit of eliminating the cost of procedures, reduce patients with needless biopsy scars. The collected signals are worked on using heavy-duty algorithms and matched to a registry of 10,000 digital images of melanoma and skin disease.

Thus by analysing the whole scenario, there seems pretty good scope of mechanical engineering in the biological field, no matter if you are a Biomedical Engineer or a core Mechanical Engineer, you still are equipped with the adequate knowledge to proceed in this field, provided that some general knowledge about the physiological matter is already known.

Swapneel Dutt

Mech A

Super-Capacitors

because earth is one too

The supercapacitor is also known as an electric double-layer capacitor (EDLC), or ultracapacitor, is an electrochemical capacitor with relatively high energy density. In comparison with conventional batteries or fuel cells, EDLCs also have a much higher power density. The use of super capacitor like hybrid power supply has various applications. The main application is in the field of automation. The specific power of the supercapacitor and it's high lifetime (one million of cycles) make it very attractive for the startup of the automobiles.

A capacitor is a system consisting of two metal plate having equal magnitude but opposite charge separated by an insulator or a dielectric. The ability of a conductor to store electrical energy and electrical potential energy is called as the capacitance of the capacitor. Although capacitor can store energy but super capacitor is a better alternate. When compared to the common capacitor, typically on the order of thousands of times greater than a high capacity electrolytic capacitor. For instance, a typical electrolytic capacitor will have a capacitance in the range of tens of millifarads. The same size supercapacitor would have a capacitance of several farads, an improvement of about two or three order of magnitude in capacitance but usually at a lower

from millifarads to microfarad and its energy density is very low. In order to increase the capacity of the capacitor, we need to increase its area and decrease a distance between two plates which are contradictory and not feasible. This disadvantage is overcome by the super capacitor whose value ranges from some farads to thousands of farads, also it's a life span and efficiency is much better.

activated carbon with a very high surface area), an electrolyte(aqueous ororganic), and a separator (that allow the transfer of ions but provides electronic insulation between the electrode). As voltage is applied, ions in the electrolyte solution diffuse across the separator in to the pores of the electrode of opposite charge. Charge accumulates at the interface between the electrodes and the electrolyte and form two charged layer with separation of several angstrom the distance from the electrode surface to the center of the ion layer. The double layer capacitance is the result of charge separation in the interface. Since capacitance is directly proportional to the surface area and the inversely proportional to the distance between the two layers, high capacitance value are achieved. Super capacitor are unique electrical storage device that can store much more energy than conventional capacitor, and offer higher power density than batteries. With its limited power, the battery often cannot supply the required power while still retaining it's open circuit voltage. The larger the voltage drop of the battery the larger the load on the battery. Often ,when a battery needs to supply high power at short pulse width, the voltage drop may be too large,causing lower voltage than required by the end product. The large load decrease the energy stored in the battery, harming it and shortening it's life span. When high power is required in battery operated device the combination of the super capacitor connected in parallel to the battery gives the advantage of both ,enhancing the performance of the battery and extending it's life ,exploiting the batteries to its connected to the battery in parallel produces a voltage damping effect low impedance.

MERITS:

1)Cost effective energy storage.

2)Long life span.

3)Rapid charging and discharging.

4)Extended operation temperature range. DEMERITS:
1)Low Voltage density.

2)Low energy density.

3)Higher self-discharge than that of a battery.

I conclude here by saying that looking at its wide range of merits, the super capacitor is definitely worth a shot. It will not only help in reducing the size but also help in storing more energy.

Jay M Prajapati

GEO THERMAL

The scientists have developed a technique through which we can see the living samples as small as 13 Nanometres. This new technique provides us much magnification as compared to the present microscopes. It can be used to see the samples which are 10 times .

smaller than current capability. This discovery pushed the limits of the microscopy amazingly by the use of high heat and lasers helps researchers to observe the tinniest samples without frying them.

One of the scientists and lead researchers from the university of technology sydney said ,"you need bulky lasers with lots of power for super resolution imaging .the traditional high power laser equipment setup is very expensive typically over $ one million and when this high power laser is projected on the sample it becomes cooked."

So the researchers doesn't want their samples to be cooked so they started finding another option and

- nanomaterial's was the option. So instead of using big expensive lasers for microscopy they used a low powered infrared laser which helps them to block some of luminescence which was created by lasers and observe the sample as small as 13 nanometres.

Jim one of the member of the team said, "to make it more bio compatible we have to reduce the power requirement so the bulky laser. And another interesting point of this technique is that it will not only reduce cost but also complexity of microscopetters, character diaries

Significance:

1. This will give us more evidence of building blocks of life on earth.
2. This will help researchers to see deeper and more clearly at cellular and intra cellular level.
3. This will lead to the new generation of luminescent probes for optical microscopy.
4. Thus opens up an entirely new avenue in biological research's.

VIKAS ANIL TIWARI

NANO-PARTICLES

HOW FAR CAN WE GO?

BY

VIKAS ANIL TIWARI
FE MECH-A

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Nanometres. This new technique provides us much magnification as compared to the present microscopes. It can be used to see the samples which are 10 times smaller than current capability. This discovery pushed the limits of the microscopy amazingly by the use of high heat and lasers helps researchers to observe the tinniest samples without frying them.
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VIKAS ANIL TIWARI
FE MECH B

THE BIG DATA AND HADOOP

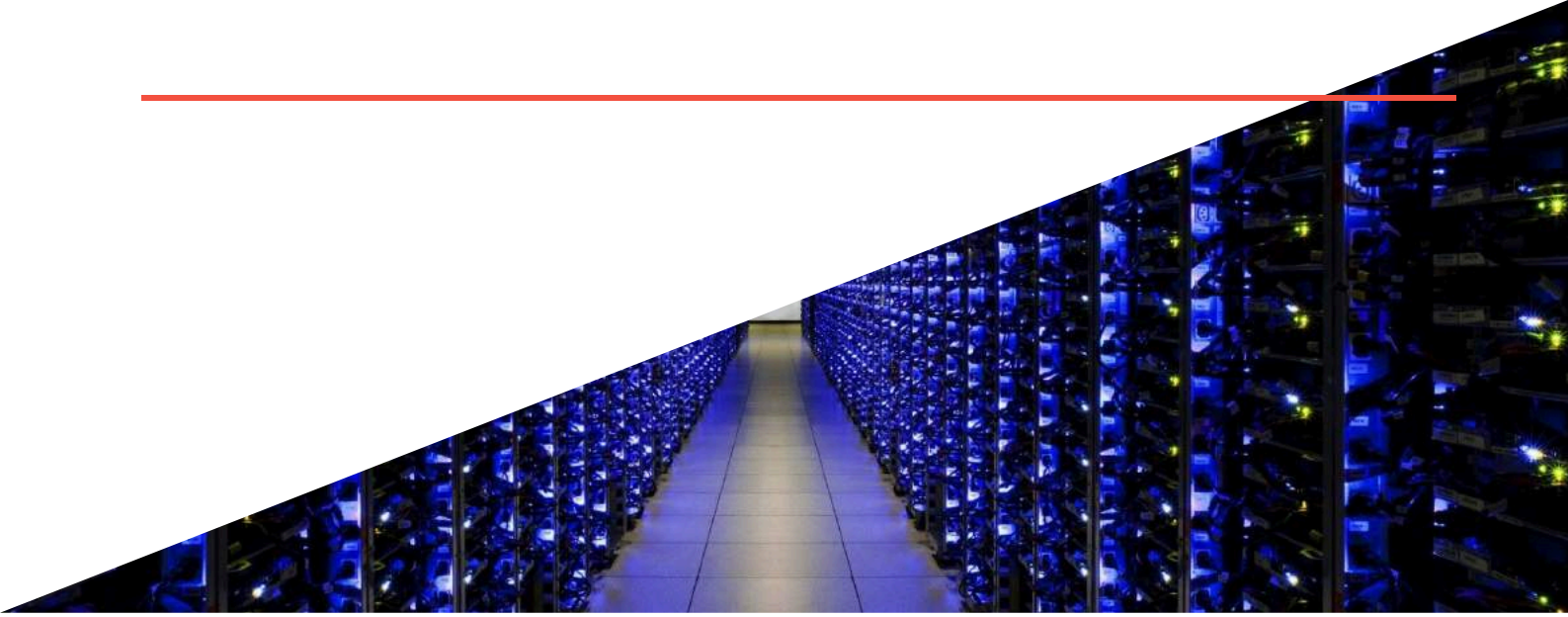
SHASHANK PANDAV
-FE CMPN B

For every photo you upload on Instagram,facebook, for every query you search on Google. Ever imagined where does it go? Like where does it get stored? Where is all the data that is on the internet? It's a big volume of data, how big? One of the ways to answer this can be consider the total amount of data held by all the four big companies namely facebook , amazon , Microsoft and google. Its estimated that there is over 4.4 zettabytes of data between the big four. That is 44000000000000000000 kilobytes of data.and this isn't all of it,it's just a small part of internet.

Some facts related to it,
The rate at which data is created is skyrocketing day by day,more data has been created in 2015-2016 than previous entire human history.The rate at which its growing, by the year 2020, about 1.7 megabytes of new information will be created every second for every human being on the planet.By then,the data will have been increased to 44 zettabytes or 44 trillion gigabytes from the existing 4.4 zettabytes .Every second we create new data.

For example, we perform 40,000 search queries every second (on Google alone), which makes it 3.5 searches per day and 1.2 trillion searches per year. In Aug 2015, over 1 billion people used Facebook in a single day.On an average 31.26 million new messages are sent over facebook everyday and users view almost 2. 76 million videos every single minute

A country's economy is mainly projected by the strength of its stock exchange. Now this is some data you can't ever afford to loose,just imagine you woke up a morning to hear that all the data in Bombay stock exchange has been deleted due to overwhelming amounts of data. This can lead to a financial catastrophe. In simple words everyone looses all the money they have.It's our utmost priority to find a solution on accommodating this growing pile of information, who's value can be equated with billions and billions of dollars.Many opportunities are created as a result of increased amounts of data in the world. Recent advances in technology, such as e-commerce, smart phones, and social networking, are generating new types of data on a scale never seen before—a phenomenon known as "***big data***."



What is Big Data?

Going by general definition big data is the collection of large amounts of data nodes or datasets, such datasets cannot be analyzed with normal or stereotypical methods. The data nodes are so massive, they are measured in exabytes —one quintillion bytes. Comparing, a music file is normally less than 10 mb.
The data does not necessarily mean numbers; they can be movies, images, maps, threads and phrases, and many more.

Structured data is numerical and phrases that can be easily analyzed with ease. These data are generated by things like network sensors embedded in electronic devices, smartphones, and global positioning system (GPS) devices. Structured data also include things like sales figures, account balances, and transaction data. Unstructured data include more complex information, such as customer reviews from commercial websites, photos and other multimedia, and comments on social networking sites. These data cannot easily be separated into categories or analyzed numerically.to keep it simple Unstructured big data is the things that humans are saying

Use of your everyday data.

Ever noticed that a WhatsApp discussion which trendy new shirt you want to buy or the flagship new phone you wish to buy somehow pops into web page ads you see every day. Ever wondered how Whatsapp earns its living even after being a completely free and ads free app? It sells off our daily chats to companies like amazon Flipkart who are more interested in what you want to buy next, or what is your shopping list. This chat history and everything is big data.it is processed and used to generate a preference list based on your own choices.Companies now better understand our lifestyle, choices and daily routine than we do. Thanks to our data stored and transmitted by our smartphones, wristbands, fitness tracker, shopping bills etc.

Data centers

The overwhelming trend towards digital services, combined with cheap storage, has generated massive amounts of data that enterprises need to effectively gather, process, and analyze. Data analysis techniques from the data warehouse and high-performance computing communities are invaluable for many enterprises, however often times their cost or complexity of scale-up discourages the accumulation of data without an immediate need.

These are well long rows of data nodes,each of these has some part of data overall present over the internet. They are stored in high-tech data warehouses which consume as much as electricity as that of a small town, safety of these data centers is ensured by fireproof mechanisms and fully air conditioned centers.also the placement of the center or warehouse is such as the center is out of risk of earthquakes and tsunamis

What is Hadoop?

As valuable knowledge should never be buried in this data,related scaled-up technologies have been developed. Examples include Google's very own MapReduce, and the open-source ecosystem, Apache Hadoop.
Hadoop is an open-source project developed by the Apache Software Foundation. Hadoop's contributors work for some of the world's biggest technology companies. That diverse, motivated community has produced a collaborative platform for consolidating, combining and understanding data.It is not a software,not a program ,nor a language.its an ecosystem.

It is an open-source software framework used for distributed storage and processing of big data sets using the MapReduce programming model. It consists of computer clusters built from commodity hardware. All the modules in Hadoop are designed with a fundamental assumption that hardware failures are common occurrences and should be automatically handled by the framework. Looking at the growing rate at which data is created,transferred study of big data and all the frameworks which handle or analyze this data is a matter of urgency.

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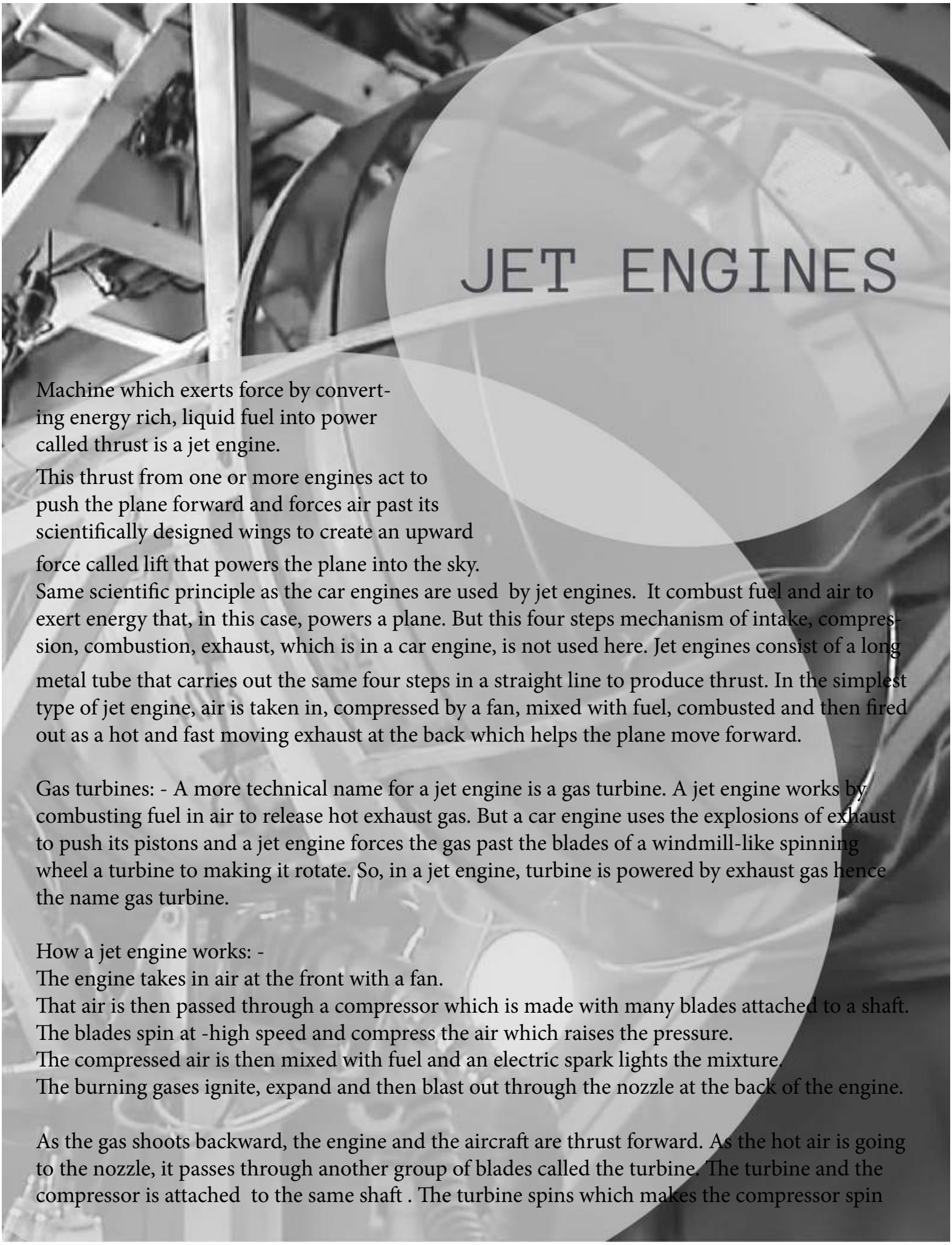


JET ENGINES

Machine which exerts force by converting energy rich, liquid fuel into power called thrust is a jet engine.

This thrust from one or more engines act to push the plane forward and forces air past its scientifically designed wings to create an upward force called lift that powers the plane into the sky.

Same scientific principle as the car engines are used by jet engines. It combust fuel and air to exert energy that, in this case, powers a plane. But this four steps mechanism of intake, compression, combustion, exhaust, which is in a car engine, is not used here. Jet engines consist of a long metal tube that carries out the same four steps in a straight line to produce thrust. In the simplest type of jet engine, air is taken in, compressed by a fan, mixed with fuel, combusted and then fired out as a hot and fast moving exhaust at the back which helps the plane move forward.

Gas turbines: - A more technical name for a jet engine is a gas turbine. A jet engine works by combusting fuel in air to release hot exhaust gas. But a car engine uses the explosions of exhaust to push its pistons and a jet engine forces the gas past the blades of a windmill-like spinning wheel a turbine to making it rotate. So, in a jet engine, turbine is powered by exhaust gas hence the name gas turbine.

How a jet engine works: -
The engine takes in air at the front with a fan.
That air is then passed through a compressor which is made with many blades attached to a shaft.
The blades spin at -high speed and compress the air which raises the pressure.
The compressed air is then mixed with fuel and an electric spark lights the mixture.
The burning gases ignite, expand and then blast out through the nozzle at the back of the engine.

As the gas shoots backward, the engine and the aircraft are thrust forward. As the hot air is going to the nozzle, it passes through another group of blades called the turbine. The turbine and the compressor is attached to the same shaft . The turbine spins which makes the compressor spin

too. The air goes in the core of the engine as well as around it. Hence, some of the air is very hot and some is cooler. The cooler air then mixes with the very hot air at the engine exit area. This makes the plane propel forward.

Types of jet engines: -

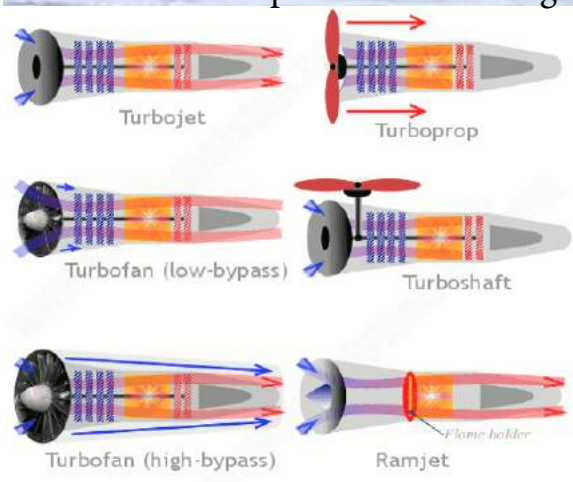
Turbojet: The original jet engine is known as the turbojet. It is the simplest type if jet engine based on a gas turbine.

Turboprop: in a turboprop jet engine, the turbine inside it spins the propeller mounted on the front that pushes the plane forward.

Turbofans: These are used in huge passenger jets. A turbofan produces thrust partly like a turbojet and partly like a turboprop engine. Impressive power and efficiency make turbofans the engines of choice on everything from passenger jets (high-bypass) to jet fighters (low-bypass).

Turbo-shaft: These engines are used in helicopters. There is a huge rotor attached at the top which is powered by one or two gas turbines called the turbo-shafts.

Ramjet: The he inlet of a ramjet is designed as a rapidly tapering nozzle without using a compressor or a turbine to power it. These engines are suitable only for supersonic and hypersonic planes.



The jet engine's invention changed the future. With jet engines, planes can carry more cargo, fly faster and can go farther than any other propeller plane. Jets have changed the way people lived. They've made travelling faster, and more efficient, and have made a big change in militaries all over the world. The jet engine changed history.

PREPARED BY

Shrutika kenjale
FE Mech B

AN INTERVIEW

Mr.Satyamohan
Yanambaka
April 05, 2017
MUMBAI

1. FOR OUR READERS TO KNOW BETTER ABOUT WRITER'S CORP, CAN YOU GIVE US A BRIEF IDEA OF THE WORK THAT THE COMPANY INDULGES IN?

Writer Corporation is India's most trusted business conglomerate operating since 1952, with varied b2b businesses. Writer has four major business entities- Writer Relocations dealing in Global corporate relocations, Writer Safeguard deals with Cash Management services for Banking clients, Middle EastWriter Reality operates Asia's biggest wellness resort At Lonawala and Writer Information which offers Business Process Services, Cloud and Data services and Digital solutions.

Writer operates from multiple the Middle East including UAE and Nigeria in Africa apart from 12 major cities in India.

2. WHAT DOES YOUR TRAINING PROGRAM FOR NEWLY HIRED EMPLOYEES CONSIST OF?

Our induction program will depend on the type of new joiners- Freshers and Management Trainees, Lateral hires.

For the lateral hires, induction will focus on corporate policies, practices, branding and values apart from functional training programs relevant to the roles spread over 2-3 weeks.

For Freshers and Management trainees, training will be multi-phased a combination of institutional training and Hands-on coaching followed by a stint of on the job training. Training goals that are targeted are three-pronged: one to ensure a cultural orientation, two to seed and harness the right set of traits, three to impart the necessary functional skill to deliver the role assigned for. The training program will be an elaborate one scaling between 3-6 months as an investment from Writer to ensure we refine the raw talent hired.

3. AS THE TECHNOLOGY IS PROGRESSING, DO YOU HAVE ANY IDEAS IN MIND HOW TO KEEP THE EMPLOYEES UPDATED WITH THEM?

True,Technology changes every day,every second. If the resources doesn't keep abreast of the changing tech landscape apart from ruining the employees personal career the organization fate is also pulled down by this employees inability to be up to date. Hence, from Writer perspective,it is of paramount importance to ensure our employees are provided every opportunity to refresh and upgrade their technology skills

Writer also believes in a pragmatic approach of imparting new skills to our employee base,so that there is voluntary,self-ignited deep learning. We have a set of three input sources which we make available to our employees. First, tech journals and startup idea seminars to seed new technology thoughts, second paid professional training programs to acquire a chosen skill enhancement with reward along with certification expenses reimbursement and third company sponsorship for techathons in new age technologies to ensure employees volunteer to learn and participate. These three sources are in addition supported by our Learning & Development training programs along with web based CBT material for self- learning.Writer also believes in a pragmatic approach of imparting new skills to our employee base,so that there is voluntary,self-ignited deep learning. We have a set of three input sources which we make available to our employees. First, tech journals and startup idea seminars to seed new technology thoughts, second paid professional training programs to acquire a chosen skill enhancement with reward along with certification expenses reimbursement and third company sponsorship for techathons in new age technologies to ensure employees volunteer to learn and participate. These three sources are in addition supported by our Learning & Development training programs along with web based CBT material for self- learning..

4. MAY I REQUEST YOU TO SUGGEST A METHOD THAT'LL HELP STUDENTS ENHANCE THEIR KNOWLEDGE REGARDING THE CORPORATE SECTOR?MAY I REQUEST YOU TO SUGGEST A METHOD THAT'LL HELP STUDENTS ENHANCE THEIR KNOWLEDGE REGARDING THE CORPORATE SECTOR?

In the Information Age, what is of prime importance to students is to have an intent to learn. Once we have that, each of the students can be innovative in info search from the big data available on the net.

However, if I have to offer a more orthodox approach, I will suggest the following steps:

1. Select the industry on which one needs details, say Banking as an Industry

2. Identify what is the scope of study like .. Performance parameters, growth strategies, leadership models etc.,

3.In the chosen Industry, pick the best and large performing corporate, say HDFC Bank

4.Of the selected corporate, visit the website, prepare an extract of promoters, products, client base etc,

5.Study the last 5 year Financial statements will be available on the website. Compute the key ratios to assess the size and quality of performance trends

6.For further study, analyst reports can be evaluated like KPMG, Karvy, Dun and Bradstreet, Goldman Sachs etc.,

7. Then competition study can be taken up along with Industry influencing factors. Crests and troughs in performance correlation to industry standards can be analyzed.

8. These steps can be repeated for as many industry sectors as the students can be interested in.In the Information Age, what is of prime importance to students is to have an intent to learn. Once we have that, each of the students can be innovative in info search from the big data available on the net.

5. HOW IMPORTANT IS PERSONALITY DEVELOPMENT FOR YOUNG STUDENTS AND WHAT ROLE DOES IT PLAY IN ANY SECTOR?

Education is an enabler while personality is an enhancer of any employee performance. Having the right attitude, right etiquette, intent to learn, passion to excel are some of the important traits which students should imbibe and demonstrate. Once a student displays any if these traits which can easily be acquired through structured personality development programs, the sky is the limit for scaling astronomical heights in one's corporate career. Personal traits are agnostic of industry sector and in most organizations traits overweight academic performance.

6. WHAT OPPORTUNITIES CAN ONE EXPECT TO COME ACROSS IN THE FUTURE RELATED TO THIS FIELD?

Information solutions is an evergreen sector as technology generation changes every 2-5 years. This implies enterprises have to upgrade their technology and hence there will huge demand for information management. Information with new age technology enhancers like Robotics, artificial Intelligence, the Internet, everything even Blockchain technologies are forward-looking and a solid foundation of base technology skills with a pudding of new gen tech capabilities will have a tremendous demand in next 3-5 years.Information solutions is an evergreen sector as technology generation changes every 2-5 years. This implies enterprises have to upgrade their technology and hence there will huge demand for information management.

7. WHAT ACCORDING TO YOU CAN BE DONE TO CATALYZE THE PROGRESS OF YOUR FIELD AND HOW DO YOU SUGGEST TO DO IT?

Our business needs market disruptive strategies like 100% automation using Intelligent Character recognition and reinforced learning technology enhancements. With more and more cloud acceptance, commoditization of cloud services is not ruled out. Latest and modern technology solutions like an HR application integration with beacon devices for attendance management etc out of the box approaches are the order of the day. Value differentiation is the ask and any action in that direction will be a hit in the marketplace.

8. SEEING HOW YOU EVOLVE FROM BEING A 20 EMPLOYEE SERVICE COOPERATION TO A LEADING MULTI-BUSINESS ENTERPRISE WITH OVER 7000 EMPLOYEES, WE WOULD LIKE TO KNOW YOUR VIEWS ON HOW TO BUILD STARTUPS AND NOT LOOSE MOTIVATION IN THE PROCESS

Rome is not built in one day and neither are businesses. Patience pays and never treat any setbacks as failures. Cherish every bottleneck as a learning. This approach to life kept us going and we are now a Multi-million conglomerate.

Believe in yourself, have conviction in your idea and pursue with passion. Once you are convinced, start up and rest of the world will follow suite. These few words would be my suggestions for start-up entrepreneurs.

9. WHAT IS YOUR ADVICE TO THE CURRENT BATCH OF STUDENTS?

Learn for wisdom and not for scores. It isn't necessary that you need be a jack of all trades but be master of at least one subject which you love.

Pursue excellence success will follow.

10. WHAT DO YOU, AS THE CEO OF THE WRITER'S WISH TO CONTRIBUTE TO THE FIELD IN THE NEXT 5 YEARS?

We have set ourselves a transformation agenda, intelligentsia .of being a market disrupted and introduce new standards in Digital solutions and business process services. We will mastering new practices and will be guiding through NASSCOM our practices as the best yielding practices for the industry. We plan to conquer the world in Healthcare blockchain services and be ahead intelligentsia.

Best of Luck for all the students and Thanks to the sponsors for the opportunity.

SOME ACTIVITIES UNDER H&S

AND SOME MORE....

ACTIVITIES UNDER ISTE

ACKNOWLEDGEMENTS

It gives us great pleasure to bring you the first issue of "The Byte", H&S Department Magazine. This department has always been keen and determinant about working with all of our passion
for presenting the first edition of "The Byte". We would like to place on record our gratitude and heartfelt thanks to all those who have contributed to make this effort a success. We profusely
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.

Thank You
Editorial Team

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