TCET
DEPARTMENT OF ELECTRONICS ENGINEERING (ETRX)
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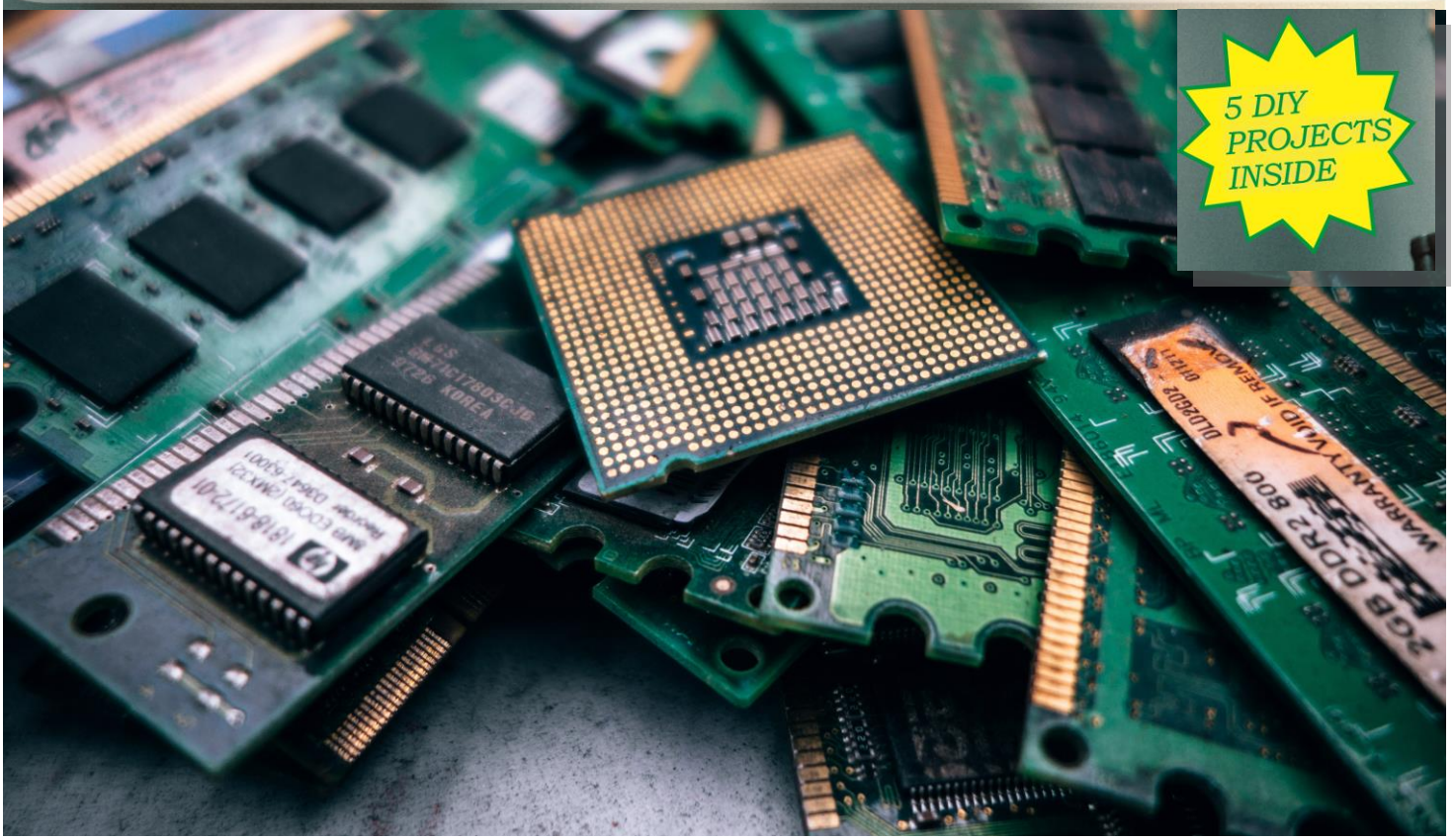
CBCGS-2016(R)
Estd. 2001

TECHTRONICS

Technology, like art, is a soaring exercise of the human imagination.



THE BEST INTEL PROCESSOR FOR YOU
PG 30

5G Techonology

Data Mining

Volume 6
Issue No 1

E-Magazine Committee

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(TE ETRX)

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Editors Message

It gives us great pleasure to welcome you to this edition of *Techtronics*. The E-Magazine committee presents the 'this that' issue of the E-Magazine of the Department of Electronics called *Techtronics*. No matter how long it takes; no matter how many revisions have been scrapped, we have perceived and come to the consensus that this magazine is what our fellow students would love to read and divulge their valuable time into.

In this and every issue, we offer a look at the twists and turns in the latest technological developments, ideas and innovations and ubiquitous insights on the current industry. Research articles and news form the bulk of the content, with a few innovative project ideas also as a section. The methodological quality of such publications has improved dramatically over the past few years.

Peer review remains a vital component of our assessment of submitted articles. There have been criticisms of this process, including delaying publication, unreliability of decision making, overly conservative approach automatically rejecting 'non-standard' ideas, and that peer review is poor at detecting errors and misconduct. However, these weaknesses can be managed by an effective and active editorial office, and I believe they are outweighed by the benefits. There is a strong consensus

that accepted articles are often improved by peer review after referees' comments and criticisms are dealt with; this explicit appraisal process also helps to engender the trust of the reader.

It is important that we have a good balance of different article type within the magazine. We are keen to encourage publication of high-quality evidence-based guidelines. Such articles are widely read (and downloaded), can have a major impact on scientific practices, and tend to be highly cited to the benefit of our Impact Factor. The magazine also has the potential to (re-) shape thinking on important concepts in science & technology.

Techtronics will always continue to publish high-quality research content in science & technology. The committee is thankful to the Department of Electronics and to the college for giving us this opportunity to be a part of.

Principal's Message:

I have great pleasure in conveying my best wishes to the Department of Electronics Engineering for releasing the technical magazine "TECHTRONICS" which brings the students and teachers of various disciplines on a common platform to share and display their ideas and creative talents.

I wish all the faculties and students who have involved in bringing out the magazine for their greater success and career ahead!!

Dr. B. K. Mishra

Principal

Dean's Message

It is a noble task on the part of the Department of Electronics Engineering to once again make it with their frequent issue "TECHTRONICS". I wish that this TECHTRONICS establishes to be a flint to fire the enthusiasm and excite their minds for many intrusive innovations among the faculty and students inspire passion among the members of the faculty of Electronics Magazine committee. My greeting to the editorial board to keep the good work!!!

Dr. Lochan Jolly

Dean SSW

HOD's Message

Once again, it's a moment of pride for the whole department of ETRX as we present the latest issue of our magazine "TECHTRONICS". This time around the magazine isn't just a regular one, it is much more exciting and much more innovative and informative. I appreciate my team for their sincere efforts in putting up such a beautiful magazine on the line. And I wish the radiance of ETRX keeps breaking old boundaries and set's up new limit, as we believe in aiming at stars...for sky is the limit for us.

Dr. Sandhya Save

HOD ETRX

Dy HOD's Message

The Electronics & Communication Engineering is one of the most dynamically changing and ever evolving branch since more than 100 years. Electronics is the foundation on which Information Technology and Computer Engineering has grown. All high-speed networks and computers work on the hardware designed by electronic engineers.

21st century is the century of communication as communication engineering has been growing exponentially in recent years. At TCET, department of electronics Institute developed state-of-art laboratories & centres of excellence so as to train our students in Electronics Engineering through flexible, adaptive and progressive training programs, Bridge Courses, Various project in signal System and communication Domain and other Domains along with cohesive interaction with the research organizations, academicians and industries and having experience faculties in the department. It is my pleasure to work with imminent students who egger to develop the carrier in Electronics Engineering.

Dr. S. C. Patil

Dy. HOD ETRX

About the Department:

Department of ELECTRONIC ENGINEERING was established in the year 2008 at TCET. The ELECTRONICS branch has 14 qualified faculty members. The department has 9 well equipped labs and 3 classrooms. The course also focused on project-based learning such that the students can develop skills which are beneficial for upcoming demands of the industry.

The ETRX department also has a professional body named IETE (The Institution of Electronics and Telecommunication Engineer) which is recognised all over the globe. IETE plans various technical seminars and workshops for students for nurturing the technical skills of the students.

Vision of the Department:

Electronics' Department of Thakur College of Engineering and Technology (TCET) will thrive to achieve academic excellence in electronics and electronics related technical education in Mumbai University to develop internationally competent professionals with a sense of responsibility and social sensitivity.

Mission of the Department:

Electronics' Departments mission is to achieve academic excellence by creating the right academic Ambience, Nurturing, enhancing personal and professional skills enabling the students to compete globally.

Disciplines of the Department:

POs:

1. Ability to demonstrate knowledge of electrical & electronics engineering.
2. Ability to demonstrate ability to identify, formulate and solve.
3. Ability to design electrical and electronic circuits and conduct experiments with electrical systems, analyze and interpret data.
4. Ability to design digital and analog systems and component.
5. Ability to visualize and work on laboratory and multidisciplinary tasks.
6. Ability to demonstrate skills to use modern engineering tools, software and equipment to analyze problems.
7. Ability to demonstrate knowledge of professional and ethical responsibilities.
8. Ability to communicate effectively in both verbal and written form.
9. Understanding of impact of engineering solutions on the society and also will be aware of contemporary issue.
10. To develop confidence for self-education and ability for life-long learning
11. Ability to recognize and adapt to emerging applications in engineering and technology.
12. To participate and succeed in competitive examinations like GATE, GRE.

PEOs:

1. To provide students with a strong foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems at hand and to prepare them for graduate studies.
2. To develop the ability among students to synthesize data and technical concepts from applications to product design.
3. To provide opportunity to students to work as a team on multidisciplinary projects and to promote awareness among students for life-long learning and introduce them to professional ethics and codes of professional practice.

PSOs:

1. Should be able to clearly understand the concepts and applications in the field of Electronics such as semiconductor technology, signal processing, embedded systems, communication etc. and acquire skills to Identify, formulate & solve problems in related fields of Electronics.
2. Should be able to design electronics and computer-based components and systems for applications including signal processing, communication and control systems with the capability to comprehend the technological advancements with the help of modern design tools to analyze and design subsystems/processes for a variety of applications.
3. Should be able to understand the impact of engineering solutions in a Global, Economic, Environmental, and Societal context and co-relate the learning to derive solutions to real world problems.

4. Should be able to demonstrate skills to communicate in verbal and written form effectively and demonstrate the practice of professional ethics along with the concerns for societal and environmental wellbeing.

Domain In-charge (Electronic Devices & Circuits Modelling & Simulation):

This domain covers understanding of various devices used in Electronics in terms of principle of operation, applications in the field of Electronic Circuit Design. Enable students to design simple projects and perform analysis of Circuits and Systems.

Also enable students to learn Computer aided simulation and synthesis tool for circuit design and simulation. With theuse variety of computer hardware and software applications different projects and research can be carried out. This field is basis of electronics and has lot of research opportunities in India and abroad.

Mrs. Poorva Waingankar

Domain In-charge (Signal Processing & Communication):

The Electronics & Communication Engineering is one of the most dynamically changing and ever evolving branch since more than 100 years. Electronics is the foundation on which Information Technology and Computer Engineering has grown. All high-speed networks and computers work on the hardware designed by electronic engineers.

21st century is the century of communication as communication engineering has been growing exponentially in recent years. At TCET, department of electronics Institute developed state-of-art laboratories & centres of excellence to train our students in Electronics Engineering through flexible, adaptive and progressive training programs, Bridge Courses, Various project in signal System and communication Domain and other Domains along with cohesive interaction with the research organizations, academicians and industries and having experience faculties in the department. It is my pleasure to work with imminent students who egger to develop the carrier in Electronics Engineering.

Dr. S. C. Patil

Teacher's Words of Wisdom

"Successful teaching is about shaping the information flow so that the student experiences it – moment by moment - at the right level of difficulty"

"Healthy teachers set boundaries and create healthy routines so that their work is meaningful, rich, and energetic, and they can also have healthy lives outside of their classrooms and institutes.

Mr. Vaibhav Gijare

Assistant Professor

"One looks back with appreciation to the brilliant teachers, but with gratitude to those who touched our human feelings. The curriculum is so much necessary raw material, but warmth is the vital element for the growing plant and for the soul of the child."

Mrs. Archana Belge

Assistant Professor

"The dream begins with a teacher who believes in you, who tugs and pushes and leads you to the next plateau, sometimes poking you with a sharp stick called truth."

"The task of the excellent teacher is to stimulate apparently ordinary people to unusual effort. The tough problem is not in identifying winners: it is in making winners out of ordinary people"

Dr. S.C. PATIL

Associate Prof, Dy.HOD

Now a day's I am surprised to see students not having a habit of reading. This not only surprises me, but I also feel dreadful. Dear students it is a sincere request to you from a teacher that please develop reading habits in yourself. Books are our best friends. Also, for this you need to be patient first. What I feel is that the root cause behind this is today's generations' impatient behaviour. This is obvious because from the beginning you got things readymade, let it be your toys or let it be your notes. You all are habitual of getting the things served on plate. But it is never late, still you have that energy; you just must concentrate it. Read good books, get your topics cleared by reading. Avoid learning things only through YouTube. I hope this suggestion will be very helpful to you.

Mrs. Sonal Barvey

Assistant Professor

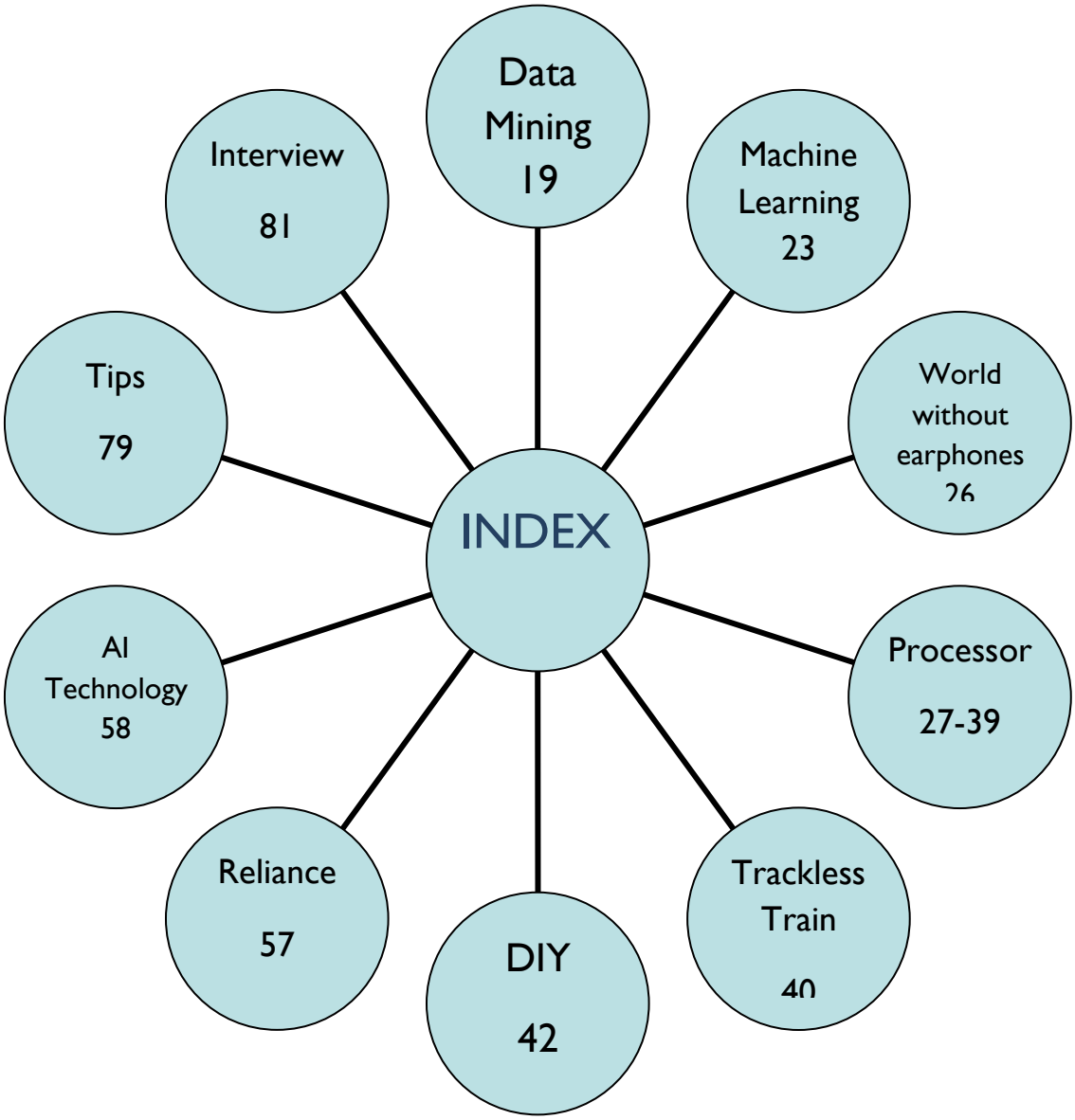
If we can achieve the state of self-mastery, we will more consistently have the personal power and peace of mind we need to get ahead, since we are not giving our energy, and power away to others. If we take responsibility for ourselves, we will realise how much we can affect change in our lives and in the society.

Life has no meaning if we all don't live it whole heartedly. Live life with full of love, happiness will embrace you on its own.

Mrs. Sujata Alegavi

Assistant Professor

Table Of Contents



Data Mining

Data mining is the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems. Data mining is an interdisciplinary subfield of computer science with an overall goal to extract information

because the goal is the extraction of patterns and knowledge from large amounts of data, not the extraction (mining) of data itself. It also is a buzzword and is frequently applied to any form of large-scale data or information processing (collection, extraction, warehousing, analysis, and statistics) as well as any application of computer decision

(with intelligent methods) from a data set and transform the information into a comprehensible structure for further use. Data mining is the analysis step of the "knowledge discovery in databases" process, or KDD. Aside from the raw analysis step, it also involves database and data management aspects, data pre-processing, model and inference considerations, interestingness metrics, complexity considerations, post-processing of

discovered structures, visualization, and online updating. The term "data mining" is in fact a misnomer,

support system, including artificial intelligence (e.g., machine learning) and business intelligence. The book Data mining: Practical machine learning tools and techniques with Java (which covers mostly machine learning material) was originally to be named just Practical machine learning, and the term data mining was only added for marketing reasons. Often the more general terms (large scale) data analysis and analytic – or, when refer

ring to actual methods, artificial intelligence and machine learning – are more appropriate.

The actual data mining task is the semi-automatic or automatic analysis of large quantities of data to extract previously unknown, interesting patterns such as groups of data records (cluster analysis), unusual records (anomaly detection), and dependencies (association rule mining, sequential pattern mining). This usually involves using database techniques such as spatial indices. These patterns can then be seen as a kind of summary of the input data, and may be used in further analysis or, for example, in machine learning and predictive analytic. For example, the data mining step might identify multiple groups in the data, which can then be used to obtain more accurate prediction results by a decision support system. Neither the data collection, data preparation, nor result interpretation and reporting is part of the data mining step, but do belong to the overall KDD process as additional steps.

The related terms data dredging, data fishing, and data snooping refer to the use of data mining methods to sample parts of a larger population usually provide the mathematical background) to database data set that are (or may be) too small for reliable statistical inferences to be made about the validity of any patterns discovered. These methods can, however, be used in creating new hypotheses to test against the larger data populations.

The manual extraction of patterns from data has occurred for centuries. Early methods of identifying patterns in data include Bayes' theorem and regression analysis. The proliferation, ubiquity and increasing power of computer technology has dramatically increased data collection, storage, and manipulation ability. As data sets have grown in size and complexity, direct "hands-on" data analysis has increasingly been augmented with indirect, automated data processing, aided by other discoveries in computer science, such as neural networks, cluster analysis, genetic algorithms, decision trees and decision rules, and support vector machines. Data mining is the process of applying these methods with the intention of uncovering hidden patterns in large data sets. It bridges the gap from applied statistics and artificial intelligence (which

management by exploiting the way data is stored and indexed in

databases to execute the actual learning and discovery algorithms more efficiently, allowing such methods to be applied to ever larger data sets.

Pre-processing:

Before data mining algorithms can be used, a target data set must be assembled. As data mining can only uncover patterns actually present in the data, the target data set must be large enough to contain these patterns while remaining concise enough to be mined within an acceptable time limit. A common source for data is a data mart or data warehouse. Pre-processing is essential to analyze the multivariate data sets before data mining. The target set is then cleaned. Data cleaning removes the observations containing noise and those with missing data.

Data mining involves six common classes of tasks:

1] Anomaly detection (outliner/change/deviation detection) – The identification of unusual data records, that might be interesting or data errors that require further investigation.

2] Association rule learning (dependency modelling) – Searches for relationships between variables. For example, a supermarket might gather data on customer purchasing habits.

3] Using association rule learning, the supermarket can determine which products are frequently bought together and use this information for marketing purposes. This is sometimes referred to as market basket analysis.

4] Clustering – is the task of discovering groups and structures in

the data that are in some way or another "similar", without using known structures in the data.

apply to new data. For example, an e-mail program might attempt to classify an e-mail as "legitimate" or as "spam".

6] Regression – attempts to find a function which models the data with the least error

5] Classification – is the task of generalizing known structure to

7] Summarization – providing a more compact representation of the data set, including visualization and report generation.

Results validation:

Data mining can unintentionally be misused, and can then produce results which appear to be significant; but which do not actually predict future behaviour and cannot be reproduced on a new sample of data and bear little use. Often this results from investigating too many hypotheses and not performing proper statistical hypothesis testing. A simple version of this problem in machine learning is known as over-fitting, but the same problem can arise at different phases of the process and thus a train/test split - when applicable at all - may not be sufficient to prevent this from happening.It is recommended that an individual is made aware of the following before data sets are collected:

- the purpose of the data collection and any (known) data mining projects;
- how the data will be used;
- who will be able to mine the data and use the data and their derivatives;

the status of security surrounding access to the data;

how collected data can be updated.

Machine Learning

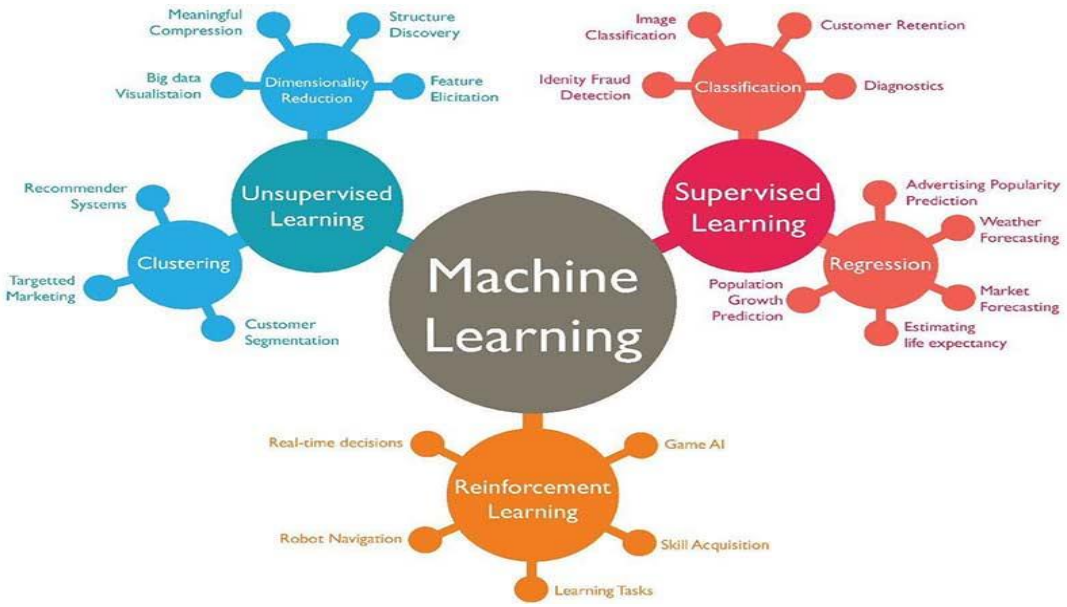
Machine learning is a field of artificial intelligence that uses statistical techniques to give computer systems the ability to "learn" (e.g., progressively improve performance on a specific task) from data, without being explicitly programmed. The name machine learning was coined in 1959 by Arthur Samuel. It explores the study and construction of algorithms that can learn from and make predictions on data– such algorithms overcome following strictly static program instructions by making data-driven predictions or decisions, through building a model from sample inputs. It is employed in a range of computing tasks where designing and programming explicit algorithms with good performance is difficult or in feasible; example applications include email filtering, detection of network intruders, and computer vision. Machine learning is closely related to (and often overlaps with) computational statistics, which also focuses on prediction-making through the use of computers. It has strong ties to mathematical optimization, which delivers methods, theory and application domains to the field. It is sometimes conflated with data mining, where the latter sub field focuses more on exploratory data analysis and is known as unsupervised learning. Within the field of data analytic, machine learning is a method used to devise complex models and algorithms that lend themselves to prediction; in commercial use, this is known as predictive analytic. These analytical models allow researchers, data scientists, engineers, and analysts to "produce reliable, repeatable decisions and results" and uncover "hidden insights" through learning from historical relationships and trends in the data.

Machine learning tasks are typically classified into several broad categories:

1] Supervised learning: The computer is presented with example inputs and their desired outputs, given by a "teacher", and the goal is to learn a general rule that maps inputs to outputs. As special cases, the input signal can be only partially available, or restricted to special feedback.

2] Semi-supervised learning: The computer is given only an incomplete training signal: a training set with some (often many) of the target outputs missing.

3] Active learning: The computer



can only obtain training labels for a limited set of instances (based on a budget), and also has to optimize its a dynamic environment, such as driving a vehicle or playing a game against an opponent.

Machine learning applications:

choice of objects to acquire labels for. When used interactively, these can be presented to the user for labeling.

4] Unsupervised learning: No labels are given to the learning algorithm, leaving it on its own to find structure in its input. Unsupervised learning can be a goal in itself (discovering hidden patterns in data) or a means towards an end (feature learning).

5] Reinforcement learning: Data (in form of rewards and punishments) are given only as feedback to the program's actions in

1] In classification, inputs are divided into two or more classes, and the learner must produce a model that assigns unseen inputs to one or more (multi-label classification) of these classes. This is typically tackled in a

supervised way. Spam filtering is an example of classification, where the inputs are email (or other) messages and the classes are "spam" and "not spam".

2] In regression, also a supervised problem, the outputs are continuous rather than discrete.

3] In clustering, a set of inputs is to be divided into groups. Unlike in classification, the groups are not known beforehand, making this typically an unsupervised task.

4] Density estimation finds the distribution of inputs in some space.

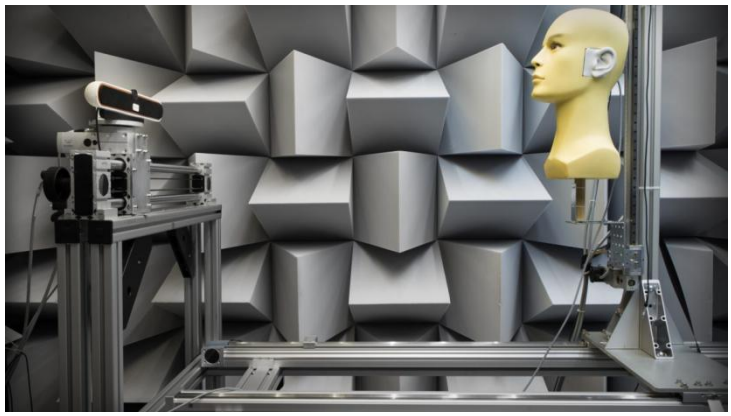
5] Dimensionality reduction simplifies inputs by mapping them into a lower-dimensional space. Topic modeling is a related problem, where a program is given a list of human language documents and is tasked to find out which documents cover similar topics.

Among other categories of machine learning problems, learning to learn learns its own inductive bias based on previous experience. Developmental learning, elaborated for robot learning, generates its own sequences (also called curriculum) of learning situations to cumulatively acquire repertoires of novel skills through autonomous self-exploration and social interaction with human teachers and using guidance mechanisms such as active learning, maturation, motor synergies, and imitation.

Although machine learning has been trans-formative in some fields, effective machine learning is difficult because finding patterns is hard and often not enough training data are available; as a result, many machine-learning programs often fail to deliver the expected value. Reasons for this are numerous: lack of (suitable) data, lack of access to the data, data bias, privacy problems, badly chosen tasks and algorithms, wrong tools and people, lack of resources, and evaluation problems. In 2018, a self-driving car from UBER failed to detect a pedestrian, who got killed in the accident. Attempts to use machine learning in health-care with the IBM Watson system failed to deliver even after years of time and billions of investment.

A World Without Earphone's

NOVETO, Israel's based company claimed that they are developing a speaker technology which can deliver a sound directly to your ears without using earphones or any other external device by using focused audio effect. It uses a 3-D tracking technology to detect the ears along with a set of camera & sensors to perfectly track the user's head. It also uses a wave-shaping algorithm & a transducer which sends a focused audio beam to user's ear. Suppose there are more than one passenger in the car so by NOVETO'S virtual mobile system each of them can connect to the car's entertainment system via Bluetooth. So by creating a sound bubble around passengers head each of them can listen a different sound in spite of what others are listening. Basically NOVETO'S speakers are hidden in your houses so sound coming from any device can easily follow you. The cost of installation is around $249 to $299.

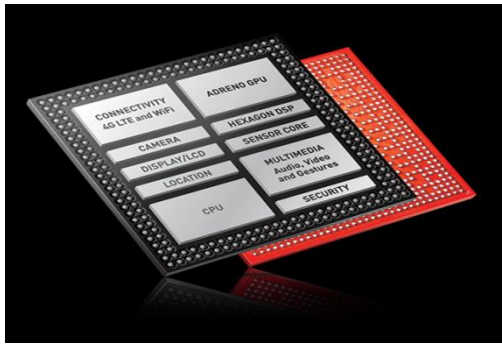


Snapdragon

Snapdragon is a suite of system on a chip (Soc) semiconductor products designed and marketed by Qualcomm for mobile devices. The Snapdragon central processing unit (CPU) uses the ARM RISC instruction set, and a single Soc may include multiple CPU cores, a graphics processing unit (GPU), a wireless modem, and other software and hardware to support a smart phone's global positioning system (GPS), camera, gesture recognition and video.

Snapdragon semiconductors are embedded in devices of various systems, including Android and Windows Phone devices. They are also used for net-books, in cars, wearable devices and other devices.

The first Snapdragon product to be made available to consumer device manufacturers was the QSD8250, which was released in November 2007. It included the first 1 GHz processor for mobile phones. Qualcomm introduced its "Krait" Micro architecture in the second generation of Snapdragon SoCs in 2011, allowing each processor core to adjust its speed based on the device's needs. At the 2013 Consumer Electronics Show, Qualcomm introduced the first of the Snapdragon 800 series and renamed prior models as the 200, 400 and 600 series. Several new iterations have been introduced since, such as the Snapdragon 805, 810, 615 and 410. Qualcomm re-branded its modem products under the Snapdragon name in December 2014.



Incredible mobile experiences:

Snapdragon mobile platforms are designed to support experiences you have to see to believe. From the lightning-fast streaming of video and audio, to alternate reality exploration, to machine learning capabilities that can personalize your experience the robust processing strength, ground breaking battery efficiency and superior connectivity of our mobile platform help bring innovative user experiences to life.

Meet the Qualcomm Snapdragon 845, the power behind next-gen phones:

The highly anticipated and heavily rumored Qualcomm Snapdragon 845 processor is finally here. The new chip is set to power the next generation of high-power, flagship-quality smart phones in 2018, likely starting with the likes of XIAOMI and Samsung, both of which took the stage at Qualcomm's Snapdragon

Already, developers are building ways to take full advantage of the new chip. Elliptic Labs, for example, announced that its Magic Snap Ultra Sound sensor technology leverages the device's new Neural Processing Engine, allowing you to create gestures in the air around the phone to control the device itself. With the Snapdragon 845, Qualcomm has focused on five key areas of development. We'll run through each one below.

Artificial Intelligence:

According to Qualcomm, the Snapdragon 845 is the third generation of mobile artificial intelligence platform. In the Snapdragon 845, Qualcomm has improved neural network performance by a factor of three. That's a pretty big deal as artificial intelligence gets increasingly powerful, especially on mobile devices, devices will need to be able to handle the extra workload.

More advanced artificial intelligence also plays a role in better image processing. Google made headlines with the Pixel 2 for using one single camera to produce excellent portrait mode photos, thanks largely to artificial intelligence that can detect backgrounds and blur them to create a BOKEH EFFECT. With the Snapdragon 845, those kinds of image-processing systems will only get better, and faster. Qualcomm is following Huawei's innovation with the Kirin 970 and its Neural Processing Unit (NPU), which enables A.I. scene recognition and settings adjustment in the camera app on the Huawei Mate 10.

The chip also offers improved voice recognition and low-power voice processing, and Qualcomm will work with Chinese internet technology company Baidu on providing A.I. voice control for mobile and other Snapdragon 845-powered devices used in the home. Using Baidu's conversational A.I. platform Duer OS, expect low-power voice activation controls to arrive in more devices, particularly those made in China, ready to wake up phones using a simple command.

To make developing apps and tools for the Snapdragon 845's A.I. easier, Qualcomm has included support for Google's TensorFlow and Facebook's Caffe frameworks. Those frameworks, coupled with the Snapdragon Neural Processing Engine, should make for a much smarter smartphone.

Qualcomm Snapdragon 845 may power future Chromebooks:

The Snapdragon 845 platform, Qualcomm's latest 64-bit chipset, was revealed in Hawaii earlier in December. It's built on Samsung's 10nm LPP FinFET process technology and it's is expected to power a number of 2018's most powerful phones. A recent discovery in the Chromium repository suggests it may also power some of the next Chromebooks, too.

The Chromium repository is the codebase where the open source files and documentation for Chrome lives. It's maintained by Google and aims to help third-parties create products for the Chrome OS. Yesterday, the folks over at XDA Developers spotted references to a new board overlay there, called "cheza," for a reference device that would work alongside a chip known as "chipset-qc845." This is believed to denote the Snapdragon 845, and it's a moniker that appears several times throughout the repository, while Qualcomm is also specifically mentioned.

This would be the first Qualcomm Snapdragon-powered Chromebook to hit the market, following speculation (which originated from Google employees) that Qualcomm wouldn't be involved in the Chromebook market due to its reluctance to deliver long-term Chromebook support.

Things might have changed since those reports, however, as Qualcomm recently announced support for Windows laptop systems (the first of which were just seen earlier this month). These computers are said to come with up to 25-hour battery life and house LTE connectivity features that would also go down well on Chromebooks. Though the new Chromium commits don't necessarily mean that a Snapdragon-powered Chromebook is in the works, it's a firm indication.

KIRIN-980 PROCESSOR

At the IFA 2018 tech trade show in Berlin , Huawei announced the Kirin 980 processor.It boasts of many impressive specifications including being equipped with AI capabilities.The dual neural processing unit (NPU) performs AI assisted image recognition tasks two times faster than the Snapdragon 845 and about four times faster than Apple's A11.With an architecture based on eight cores , Huawei is looking forward to rival Qualcomm's Snapdragon 845.An integration of 6.9 billion transistors in an area less than 1 square centimetre , Kirin 980 has really focused on accelerating application launches while simultaneously reducing power consumption. The Kirin 980 will offer the world's fastest smartphone Wi-Fi speed, clocking in at 1,732Mbps, which is substantially higher than the Snapdragon 845's best of 866Mbps.After the announcement made three years ago , Huawei has finally come up with their own flagship system-on-chip after going through almost thousands of prototypes. Huawei is yet to come up with a Kirin 980 powered device , scheduled to launch in October 2018.

Which Intel Processor to Pick ?

Picking a processor is one of the tougher choices you'll make when buying a new desktop PC or laptop. Intel makes most of the CPU's on the market, but which is the best Intel processor for you?

However, the chip-maker makes a lot of CPU's. There are various models – not just for desktops and laptops, but different styles within these categories too. Here, we'll break down the differences between Core i3 and Core i9, and look at what the jumble of numbers and letters in an Intel CPU name actually mean.Before you go throwing your money at an Intel processor, though, bear in mind that Intel's new 9th Gen CPU's will be launching this month, boasting more cores and improved clock speeds.

While UK prices haven't been confirmed just yet, the US prices suggest that the 9th Gen CPU's won't actually cost much more than their 8th Gen counterparts. These new processors could be a total bargain and one might well end up being the best Intel processor to buy.

Until Intel's 9th CPU's arrive on October 19 though, read on to find out everything you need to know…

Unless you want to shop for a refurbished or end-of-line bargain, first make sure you

look at a current CPU model. We're in the age of the 8th-generation Intel CPU.

MICROSOFT surface pro 6 Surface Pro 6 tear down reveals the hybrid is hiding a terrible secret You can tell if a CPU belongs in this family by looking at the number directly after the ‘i3’, ‘i5’, ‘i7’ or ‘i9’ in the processor name. An Intel Core i7-8550U is an 8th-generation chip-set. An i7-7500U is from the 7th, the older generation.

In recent years, we said you could get by with an older CPU. However, 8th-gen model shave brought significant changes to the party. Intel increased the number of cores across the board, dramatically improving the power available – to slim and light laptops in particular thanks to the reveal of the new Whiskey Lake and Amber Lake processors.

The letter at the end of a CPU’s name is the second most important part of the Intel code to note. In desktop CPU's, you’ll see either no letter at all, or a ‘K’. Need to stick to a tight budget, or making a PC for basic tasks? You’ll be fine with an Intel CPU without a letter. These are standard consumer-grade processors. K-series CPU's are ‘unlocked’. This means you can overclock them more freely, increasing how hard they work to improve performance. These processors are for enthusiasts who put extra thought into the cooling

system in their PC. Overclocking increases the level of heat a CPU creates, and can cause issues with a stock cooler. You can buy ‘standard’ and ‘unlocked’ versions of the Core i3, i5 and i7 processors.

Dig a little deeper and you’ll find CPU's with ‘X’, ‘T’ and ‘B’ letters too. T and B CPU's have extra features for business

use. And X-series processors are part of the 7th generation. They remain the fastest processors around, but are far too expensive for most budgets.

The 18-core Intel i9-7980XE costs £1800, for example. You can make a very high-end computer for this price.

The lineup of Intel laptop processors is fairly simple these days. If you're after a system you can carry around and will last a good while off a charge, you'll want a processor that ends in a 'U'. These are ultra-low voltage processors made for high power efficiency.'H'-series processors are used in the highest-performance laptops, such as the Alienware 15. They consume more power and will therefore offer shorter battery life, but performance will be better. Right at the top of the laptop lineup sits an 'HK' CPU, the i9-8950HK. Just like K-series desktop processors,this one is unlocked to allow for greater overclocking.

In one of the most exciting updates in Intel laptop CPU's for some time, there are now also 'G' processors. These incorporate RADEON RX Vega M graphics processors that often deliver PlayStation 4-beating gaming performance in a portable laptop.If you want a desktop and you don't plan to overclock it, buy a standard Intel CPU without a letter on the end of its name. Long-lasting laptops use U-series processors. And if you want a gaming PC that isn't big or heavy, look for a model such as the HP Spectre X360 with a G-series chip-set.

The recent announcement of the Whiskey Lake and Amber Lake-based CPU's bring some new changes to the table, namely support for gigabit Wi-Fi, faster video rendering, integrated LTE and a number of efficiency gains which all add up to better power management and improved performance over all.That said, all of the Whiskey

Lake CPU's announced so far bear the U-series suffix, while the Amber Lake CPU's are all Y-series models.

Best Intel processor: Core i3 vs i5 vs i7 vs i9 in a desktop

Now that we've explained some of the more confusing bits of Intel's naming conventions, let's look at which model you should opt for: Core i3, i5, i7 or i9? As you'd expect, performance increases as you upgrade through the ranks from a Core i3 to a Core i9. But we need to break it down further. Intel Core i3 desktop processors have four cores. They offer excellent performance for their cost, but they lack support for two core technologies found in higher-end CPUs. These are Hyper-Threading and Turbo Boost.

Hyper-Threading creates virtual cores to operate in a way that a processor with more cores would operate. Turbo Boost dramatically increases the clock speed when more power is needed.

Intel Core i5 desktop CPUs have six cores. Like Core i3 models, they don't offer Hyper-Threading, but they do have Turbo Boost. Core i7 processors have both Turbo Boost and Hyper-Threading. They may have six cores like an Intel Core i5, but can operate as if they have 12 cores. At the time of writing, we're still waiting for 8th-generation Core i9 desktop CPUs to arrive.

Related: Best graphics cards

So, which do you need – Turbo Boost or Hyper-Threading? Turbo Boost is useful for most people as it increases the maximum performance of a processor.

Hyper-Threading would prove most useful for heavy multi-taskers and those who use applications such as video editor Adobe Premiere Pro or 3D rendering software. It's less useful for games or simple applications, which don't exploit a huge number of cores.

However, this doesn't mean there's no benefit to be had from a higher-end CPU if you don't

use such demanding software. Higher-end processors also have higher clock speeds, meaning each of the cores is more powerful, and has a larger CPU cache. This is used to store data handled by the CPU. The larger the cache, the smoother it will operate.

A Core i3 CPU has 6MB, a Core i5 9MB and a Core i7 has 12MB. This a reminder that there's more to a CPU's performance than just clock speed, and the number of cores it features.

Here's a run-down of the main modelsto consider before the 9th Gen CPUs hit the market:

Intel Core i3-8100

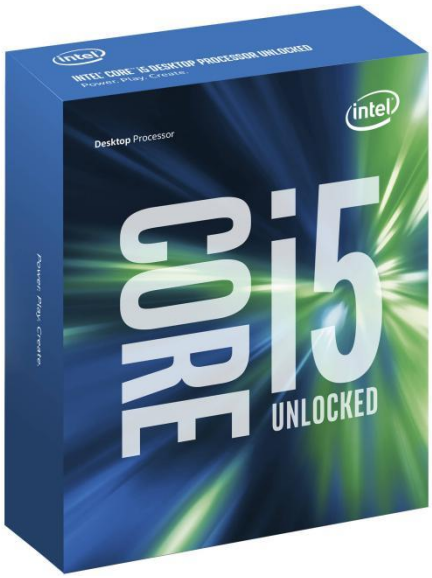
£99.99

Don't turn your nose up at the Core i3 too quickly. It's a fantastic sub-£100 brain for an everyday PC or low-cost gaming setup. You can use a relatively high-end graphics card, such as an Nvidia GTX 1070 with this CPU, without much bottlenecking.

Intel Core i5-8400

£168.71

This is the best Intel processor to buy for the majority of people. It's a powerful 4-core CPU



offering great general performance, and it has enough power to pair with the most expensive consumer graphics cards around. For around £10

more, you can upgrade to the i5-8500, which has a slightly higher clock speed. But the performance difference is minor.

Intel Core i5-8600K

If you want to be able to overclock your CPU significantly, but don't want to spend thousands on a setup, check out the Intel Core i5-8600K. The price is reasonable, and it's roughly 15% more powerful than the i5-5400 – even before you start overclocking.

Intel Core i7-8700K

Let's get serious. The Intel Core i7-8700K has six cores with 12 threads, a 4.7GHz turbo mode and 3.7GHz standard clock speed. While single-core speeds are only a tiny bit better than those of the i5-8500K, its two additional cores result in a more than 40% boost to multi-core performance.

Best Intel processor: Core i3 vs i5 vs i7 vs i9 in a laptop

The situation in laptops is a little different. First, relatively few laptops use Core i3 processors compared to Core i5 and i7, though it's worth noting that two of the six Whiskey Lake and Amber Lake CPUs announced at IFA 2018 are Core i3's.

Secondly, unlike the desktop version of the Core i3's, which are all quad-core CPUs, laptop Core i3's are dual-core processors which feature both Hyper-Threading and Turbo Boost. Where are all the Core i3 laptops? This 'entry-level' processor hasn't been around for as long as its Core i5 and i7 siblings, and often isn't deemed low-end enough to fit into truly affordable laptops.

Manufacturers often use AMD and Intel Pentium CPUs in their low-cost models instead. The Intel Core i5-8250U and i7-8550U are very popular, however.

The Core i5 model has four cores, eight threads and Turbo Boost. So does the Core i7, but its clock speed and turbo are both faster. There isn't a radical difference in the performance of these models, however.

There's a greater difference when you switch to an H-series chipset. These are more power-hungry processors, the kind found in high-performance laptops that might only last a couple of hours off a charge.

The Core i5-8300H has four cores, eight threads – similar to the i5-8250U model made for slimmer laptops. However, the Core i7-8750H has six cores and 12 threads, giving it dramatically higher multi-core power.

Right at the top of the tree, the Core i9-8950HKhas six cores and 12 threads, too, but is around 20% more powerful than the Core i7. And it's more overclock-able. It's an enthusiast CPU.

Here are the top CPUs you should look out for:

Intel Core i5-8250U

This is the best Intel processor to seek out if you want a portable laptop with excellent performance. Lots of premium and mid-range laptops use it, and it's almost twice as powerful as the comparable model from the previous generation. Video editing? 3D modelling? The 8th-gen Core i5 is powerful enough to handle these advanced apps.

Intel Core i7-8550U

Most ultra-premium slim and light laptops use this processor. It isn't dramatically more powerful than the Core i5 version, but you do get a little more pep, with slightly higher clock speeds and a larger cache. CPU upgrades in laptops often come as part of a RAM and SSD bundle too, for a more compelling overall package. The highest-end 13-inch version of Apple's MacBook Pro is powered by an i7-8559U CPU.

Intel Core i7-8750H

A true performance laptop will have one of these H-series CPUs. It has an extra two cores over its U-series alternative, for much higher multi-core performance. However, its TDP – the amount of heat it creates – is much greater too, so you're unlikely to find this CPU in slim and light laptops.

Intel Core i9-8950HK

Oddly enough, the move from Core i7 to i9 isn't actually as great a leap as the one between the U-series and H-series processors. It's 5-15% faster than the i7. However, it also allows for greater overclocking.

Intel Core i7-8705G

This is perhaps the most 'fun' CPU Intel has made to date. It incorporates RADEON RX Vega M GL graphics, radically better

than the GPU of any other Core-series CPU. More powerful than an NVIDIA GTX 1050 GPU, there's enough power here to provide a true 'gaming' laptop experience.

Best Intel processor: Real-world performance and gaming

If you do a lot of video editing or 3D rendering, then the greater the CPU power, the better. However, there are more important considerations if you want a productivity PC or a system for games.

An Intel Core i3 has enough power to run Windows 10 well, but you need an SSD rather than a hard drive for slick performance.

The G-series laptop CPU's are also the only models with good gaming abilities baked in. An Intel Core i5-8305G will let you play The Witcher 3 at High graphics settings, 1080p resolution, at around 50fps.

All other Intel CPU's use a version of the UHD 630 graphics chip-set. It will play The Witcher 3 at Low graphics settings, 720p, at around 23fps – which isn't great. No Intel desktop CPU is any good for gaming on its own. And if you want to find the right processor to put at the heart of a gaming rig, we'd recommend spending more on the GPU and less on the CPU if the budget is tight.

For example, a Core i3-8100 CPU with an NVIDIA GTX1080 will provide better frame rates than a Core i7-8700 CPU with NVIDIA GTX1060 GPU.

That said, we do recommend treating the Core i5-8400 as an absolute minimum, if you want a CPU to be paired with a very high-end GPU.With certain games, a lower-end CPU will act as a bottleneck. This is particularly true of games such as Civilization 6 and Total War: War hammer 2, as a result of all the background calculations involved. Most glossy action adventure games are a lot more GNU-led, and will run fine with a Core i3.

TRACKLESS TRAIN

Self-driving cars are either already here or perpetually a few years away, depending on who you ask. Companies like Tesla and Uber are working to build self-driving trucks to ferry cargo across all the countries. For any given mode of transportation, someone is trying to make it autonomous. But for one Chinese company, it's not enough to make self-driving versions of the vehicles that already exist. Rail transit company CRRC invented a brand new type of vehicle that

is a train and then made it self-driving. This train uses ART (Autonomous Rail Rapid Transit) system which is intelligent rail system that works on sensors & rubber wheels creating a cross between tram and train. ART consist of different sensor assist the driver to follow the right route. ART bears the physical appearance of a train but it doesn't rely on following a track. Instead, it follows a virtual route using an electric power-train and tires. A Lane Departure Warning System helps to keep the vehicle in its lane and automatically warns, if it drifts away from the lane. A Collision Warning System supports the driver on keeping a safe distance with other vehicles on the road and if the proximity reduces below a given level, it alerts the driver by a warning sign. The Route Change Authorization is navigation device, which analyses the traffic conditions on the chosen route and can recommend a detour to avoid traffic congestion.

The Electronic Rear-view Mirrors work with remotely adjustable cameras and extract clearer view than conventional mirrors including an auto dimming device to reduce the glare.

Mainly this autonomous train is powered by lithium-titanate batteries, though Hydrogen is expected to be a

primary source powering trains by 2030 Hydrogen for locomotive power is expected to be driven by nuclear, all wind, solar, and hydro-electric resources, as well as other evolving ways of generating hydrogen. Hydrogen is expected to provide ecological and renewable non-carbon energy sources to power rail and transit lines electrically, and would thus reduce energy cost and help lower pollution. Hydrogen fuel cells can find potential application in hybrid rail vehicles. Hydrogen fuel cells are expected to replace diesel engines and generators used in current diesel-electric trains, by using energy generated by the fuel cells, which is stored in batteries and is constantly recharged as the engine moves. With 10 minutes of charge this train will travel up to 25 km.

The product has been described as a combination of a train, bus, and tram. An ART train with three carriages is around 30 meters long and costs about US$ 2.2 million to construct. It can travel at a speed of 70 km/h and provides space for maximum 300 passengers.

Although diesel–electric locomotives have been running hybrid systems since the 1930s, the adoption of the electric drive-train and electric motor for personal and now public transportation has opened the door to more possibilities than previously thought. It shouldn't surprise too many to see old ideas revisited while combining the best of all worlds. In this case, the trackless electric train is really a hybrid bus and tram designed to be incorporated as easily as possible within cities

Interesting Project Ideas

PROJECT TITLE: Visual Basics with Microsoft SQL Management Studio 2008 R2

Aim: Linking Visual Basics Form with SQL database.

Software: Visual Basics 2018, Microsoft SQL Management Studio 2008 R2

Theory:

Visual Basic is a third-generation event-driven programming language and integrated development environment (IDE) from Microsoft for its Component Object Model (COM) programming model first released in 1991 and declared legacy during 2008. Microsoft intended Visual Basic to be relatively easy to learn and use. Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using Data Access Objects, Remote Data Objects, or ActiveX Data Objects, and creation of ActiveX controls and objects.

A programmer can create an application using the components provided by the Visual Basic program itself. Over time the community of programmers developed third-party components. Programs written in Visual Basic can also use the Windows API, which requires external function declarations.

The final release was version 6 in 1998 (now known simply as Visual Basic). On April 8, 2008, Microsoft stopped supporting Visual Basic 6.0 IDE. The Microsoft Visual Basic team still maintains compatibility

for Visual Basic 6.0 applications on Windows Vista, Windows

Server 2008 including R2, Windows 7, Windows 8, Windows 8.1, Windows Server 2012, Windows 10 and Windows Server 2016 through its "It Just Works" program. In 2014, some software developers still preferred Visual Basic 6.0 over its successor, Visual Basic.NET. In 2014 some developers lobbied for a new version of the VB6 programming environment. In 2016, Visual Basic 6.0 won the technical impact award at The 19th Annual D.I.C.E. Awards. A dialect of Visual Basic, Visual Basic for Applications (VBA), is used as a macro or scripting language within several Microsoft applications, including Microsoft Office.

SQL Server Management Studio (S.S.M.S.) is a software application first launched with Microsoft SQL Server 2005 that is used for configuring, managing, and administering all components within Microsoft SQL Server. The tool includes both script editors and graphical tools which work with objects and features of the server.

A central feature of SSMS is the Object Explorer, which allows the user to browse, select, and act upon any of the objects within the server. It also shipped a separate Express edition that could be freely downloaded, however recent versions of SSMS are fully capable of connecting to and manage any SQL Server Express instance. Microsoft also incorporated backwards compatibility for older versions of SQL Server thus allowing a newer version of SSMS to connect to older versions of SQL Server instances.

Starting from version 11, the application was based on the Visual Studio 2010 shell, using WPF for the user interface.

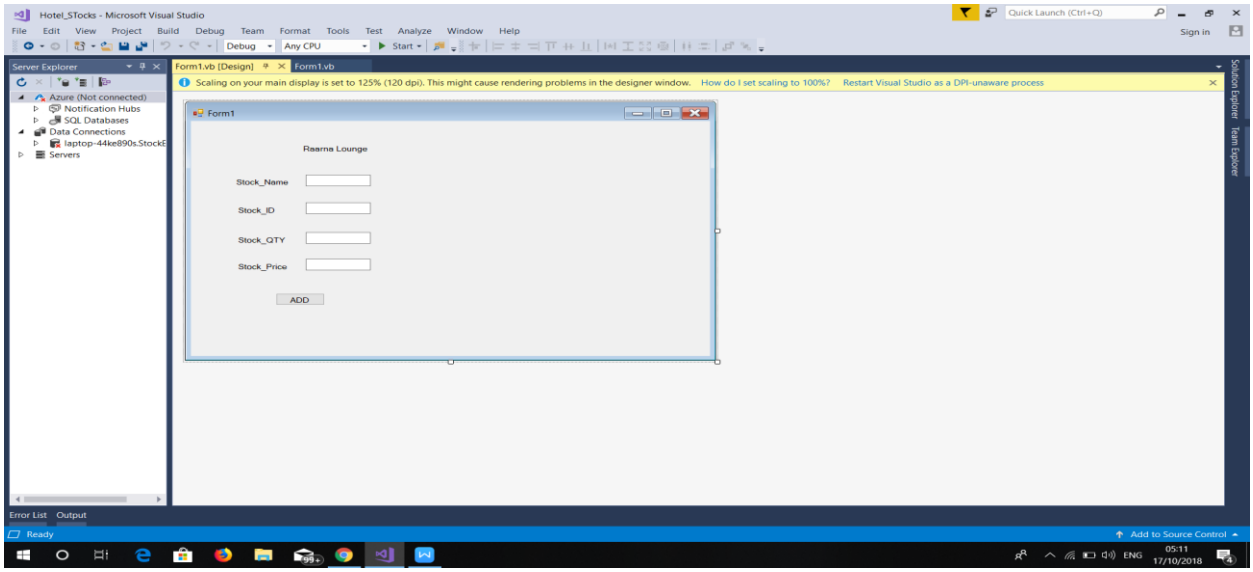
In June 2015, Microsoft announced their intention to release future versions of SSMS independently of SQL Server database engine releases.

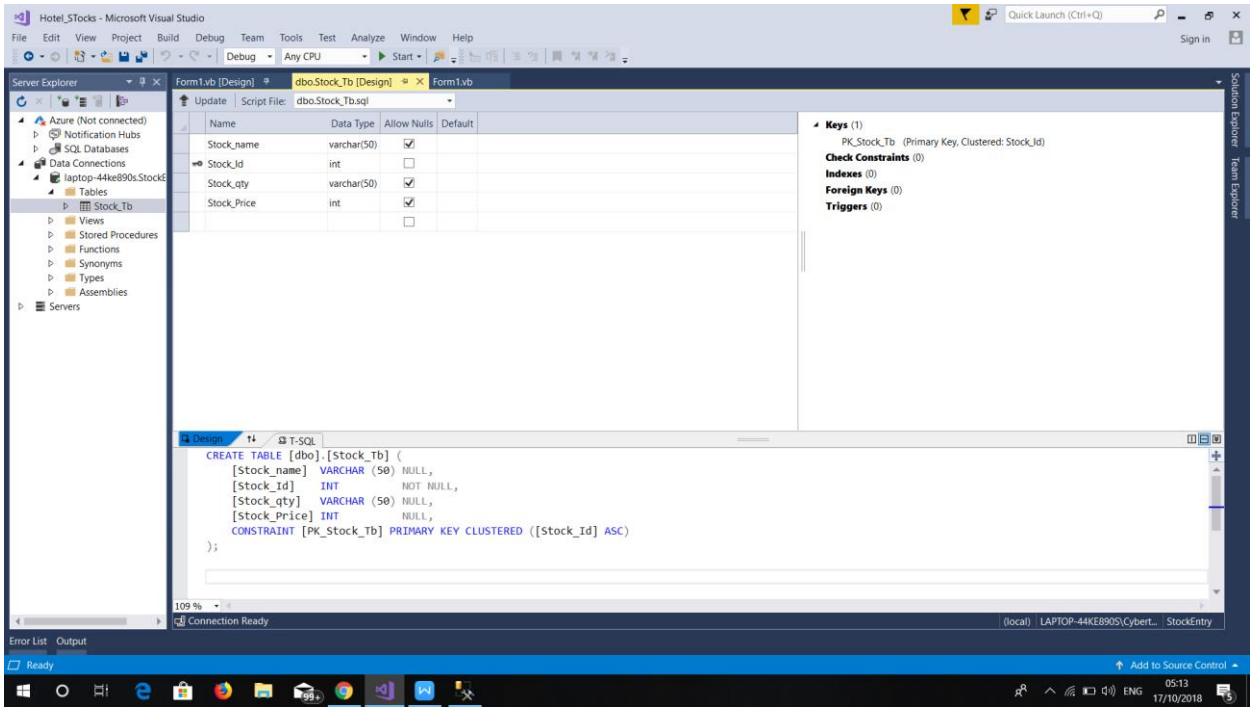
CODE

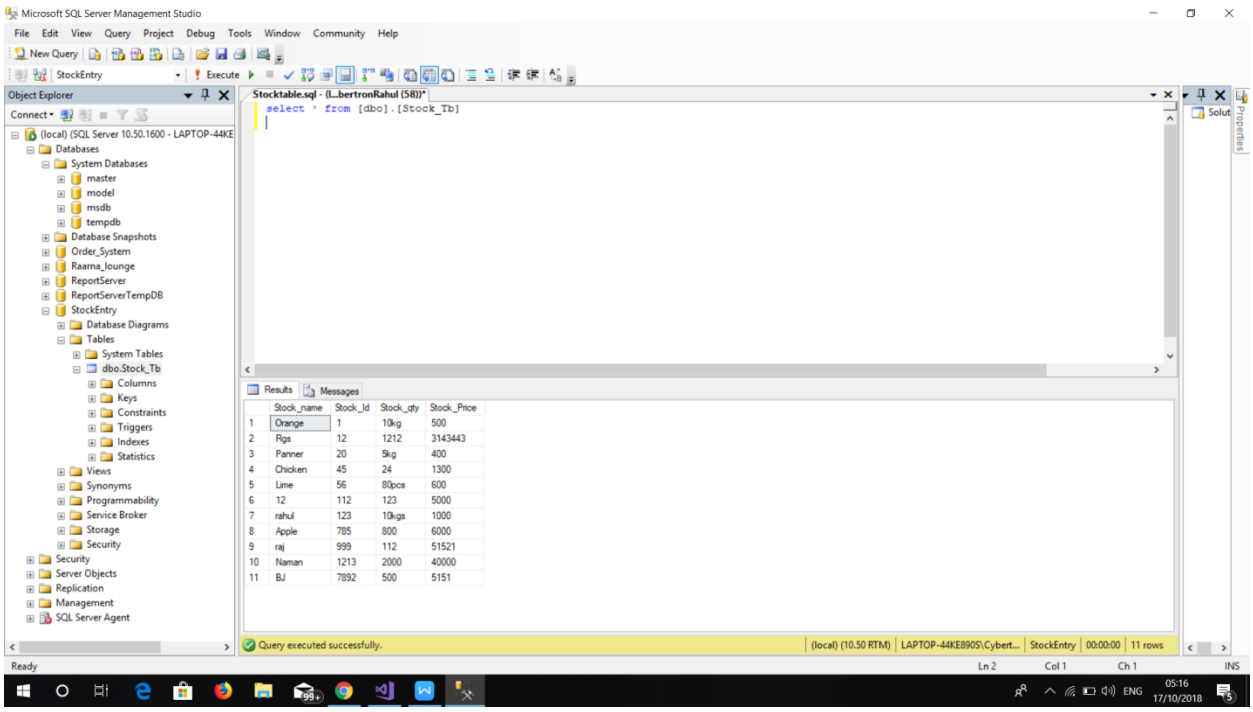
```
Imports System.Data.SqlClient

Public Class Form1


    Dim con As New SqlConnection


    Private Sub btnadd_Click(sender As Object, e As EventArgs) Handles btnadd.Click




        con.Open()
        Dim cmd As New SqlCommand(("INSERT INTO Stock_Tb VALUES('" &
                                           txtSname.Text & "','" &
                                           txtStype.Text & "','" &
                                          txtQty.Text & "','" &
                                           TxtPrc.Text & "')"), con)
        cmd.ExecuteNonQuery()
        con.Close()
        MsgBox("Success....", MsgBoxStyle.Information, "SUCCESS")


        txtSname.Clear()
        txtQty.Clear()
        TxtPrc.Clear()


        txtStype.Focus()


    End Sub


    Private Sub Form1_Load(sender As Object, e As EventArgs) Handles MyBase.Load
```

```
        con.ConnectionString = "Data Source=LAPTOP-44KE890S;Initial
Catalog=StockEntry;Integrated Security=True"

    End Sub


End Class
```

Images of Project







Application of Data-base :

Due the evolution of Database management system, companies are getting more from their work because they can keep records of everything. Also it makes them faster to search information and records about any people or product that makes them more effective in work. So here we are sharing some of the applications and uses of database management system (DBMS).

1. **Railway Reservation System**

   Database is required to keep record of ticket booking, train's departure and arrival status. Also if trains get late then people get to know it through database update.

2. **Library Management System**

   There are thousands of books in the library so it is very difficult to keep record of all the books in a copy or register. So DBMS

used to maintain all the information relate to book issue dates, name of the book, author and availability of the book.

3. **Banking**

   We make thousands of transactions through banks daily and we can do this without going to the bank. So how banking has become so easy that by sitting at home we can send or get money through banks. That is all possible just because of DBMS that manages all the bank transactions.

4. **Social Media Sites**

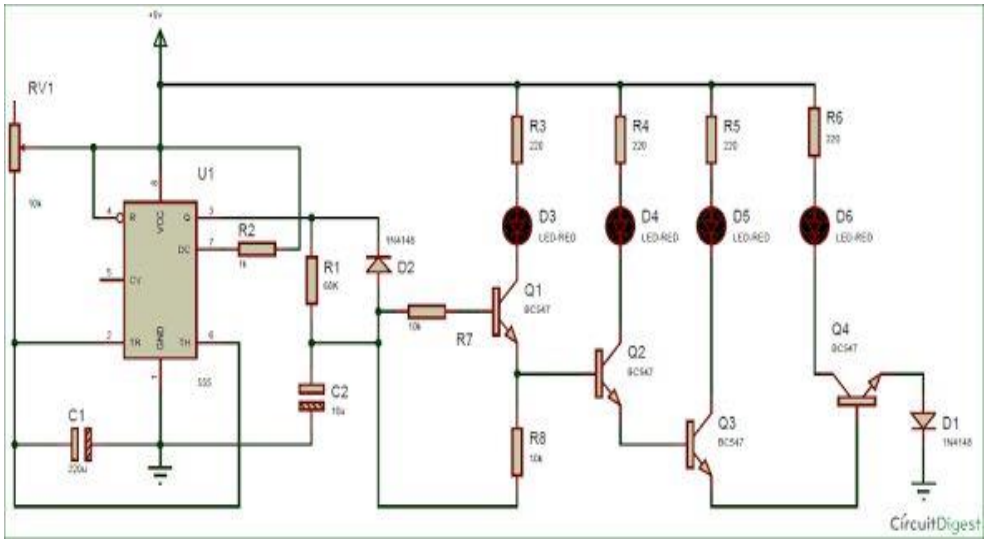
   We all are on social media websites to share our views and connect with our friends. Daily millions of users signed up for these social media accounts like facebook, twitter, pinterest and Google plus. But how all the information of users are stored and how we become able to connect to other people, yes this all because of DBMS.

5. **Military**

   Military keeps records of millions of soldiers and it has millions of files that should be keep secured and safe. As DBMS provides a big security assurance to the military information so it is widely used in militaries. One can easily search for all the information about anyone within seconds with the help of DBMS.

Bike Turning Signal Circuit

BIKE TURNING SIGNAL CIRCUIT PRINCIPLE:



The objective of this circuit is to indicate left or right turn for bike/vehicle. Two identical circuits are needed, one is for left and the other is for right. The main heart of this circuit is a 555 timer. Here, this 555 timer acts as an astable multi vibrator. It generates the pulse signal with variable width. Using this variable width of the pulse, we can set different time delays for the LEDs (ON and OFF for LEDs).

The circuit consists of two 47k resistors, which are connected to a 555 timer and these are used to set the time delay for LEDs. 1n4148 signal diode is connected in reverse bias at the output to maintain constant current at the output. BC547 (NPN) Transistor switches the LED's ON and OFF based on the base currents. 330-ohm resistors are used to drop the voltage otherwise LEDs may get damaged. Here we can vary the time width of output pulse by varying the resistance or capacitance value.

CIRCUIT COMPONENTS:

- Resistors – 3 (47 k ohm)
- Resistors – 5 (10 k ohm)
- Resistors -5 (330 ohm)
- Capacitors – 2 (100uF)
- Transistors – 5 (BC547)
- LED's – 10 (5 mm)
- IC – 1 (NE555)
- Diodes – 2 (1n4148)
- Battery – 1 (12V)

The obtained pulse from the 555 timer is applied to the transistors to switch the LEDs ON and OFF with some delay. Here the operating voltage of LEDs is around 2 to 3v but from battery, we get 12v supply. So, we need to drop the remaining voltage. To drop this

voltage, we are using resistors in series with LEDs.

HOW TO OPERATE THE CIRCUIT?

- Initially feed 12v power supply to the circuit.
- Now observe the LED's they will glow with some delay.
- If you want, set the different time delays for LEDs, and then vary the resistance or capacitance value.
- Now you can see the change in time delay.
- By varying the capacitance value also, you can see the in-time delay of LEDs.

APPLICATIONS OF BIKE TURNING SIGNAL INDICATOR CIRCUIT:

- It is used to indicate left turn or right turn for a motor bike or vehicle.
- We can also use this circuit as an LED knight rider circuit.

AUTOMATIC CHANGEOVER SWITCH CIRCUIT PRINCIPLE:

This circuit is based on the principle of bi-stable mode operation of 555 Timer. In this mode, the Timer output is either high or low depending upon the status of trigger and reset pin. The Timer output is connected to a transistor which acts as a switch, being on or off depending upon the Timer output. Two LEDs in series are used as a load. In case of transistor being switched off, LEDs are driven by the AC-DC power supply whereas in case of transistor being switched on, LEDs are driven by the battery.

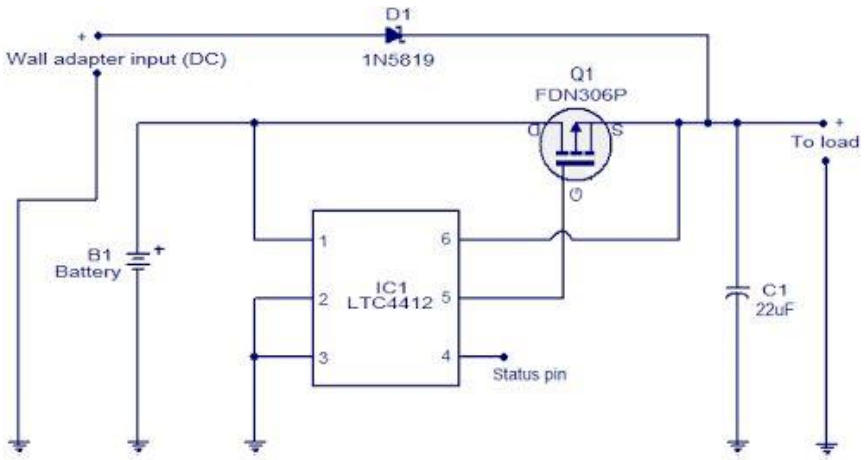
AUTOMATIC CHANGEOVER SWITCH CIRCUIT DIAGRAM:

AUTOMATIC CHANGEOVER SWITCH CIRCUIT DESIGN:

Designing the circuit involves two basic parts –

1. Design of AC – DC Power Supply:

It is the design of a basic AC to DC power supply system using transformer and bridge rectifier. The first step involves selection of the voltage regulator. Since here, our requirement is to drive two LEDs in series along with a Schottky diode, we settle down with LM7809 voltage regulator producing a voltage of 9V. Since input voltage to the regulator must be at least 12V, we settle down with an input voltage of about 20V.



The next step involves selecting the transformer. Since primary voltage is 230V and required secondary voltage is about 20V, we can settle with a 230V/20V basic transformer. The third step is the selection of diodes for bridge rectifier. Since peak voltage across the transformer secondary is around 28V, the total PIV of the bridge would be around 112V. Hence, we need diodes having PIV rating more than 112V. Here we select 1n4007 having PIV of about 1000V.

The final step involves selection of filter capacitor. For a capacitor, peak voltage of 26V and minimum regulator input voltage of 12V, the allowable ripple is about 14V. The capacitance value is then calculated by the formula, C = I (Δt/ΔV), where I is sum of quiescent current of voltage regulator and required load current. Substituting the values, we get a value of about 17uF. Here we select a 20uF electrolyte capacitor.

2. Design of Bi-stable Multi-Vibrator Circuit using 555 Timer:

When a 555 Timer is configured in bi-stable multi-vibrator; its output is either high or low logic signal. Here we use the simple logic that when trigger pin is grounded, output is a high logic signal and when reset pin is grounded, output is low logic signal. Here the output of 555 Timer is connected to the base of transistor BC547.

AUTOMATIC CHANGEOVER CIRCUIT OPERATION:

The circuit operation commences once the switch S1 is at any of its position. When the switch S1 is at position 1, reset pin of the 555 Timer is grounded. Internally this reset pin is the reset pin of the SR Flip flop and hence the output of 555 Timer is a low logic signal. Now since base emitter junction of Q1 is reverse biased, it is in cut off position. The load LEDs are connected directly to the output of the voltage regulator through the Schottky diode. Here is where the operation of AC to DC power supply circuit comes to play. AC power is first stepped down by the transformer and then converted to unregulated and fluctuating DC voltage by the bridge rectifier. The AC ripples from the fluctuating DC voltage is removed by the filter capacitor. This unregulated DC voltage is then converted into a regulated DC voltage by the voltage regulator.

When switch S1 is at position 2, trigger pin of 555 Timer is grounded. This causes the output of the 555 Timer to be a logic high signal. The base emitter junction of Q1 is thus forward biased and the transistor is driven to saturation, thus being in on position. Here we should note two things – First, the Schottky diode now does not conducts as the voltage difference between both cathode and anode of the diode is zero, i.e. there is no potential difference at the junction. Secondly, the LEDs are now biased through the resistor and the transistor and driven by the battery voltage.

APPLICATIONS OF AUTOMATIC CHANGEOVER SWITCH:

1. This circuit can be used as a home lighting system with few modifications.
2. It can be used to drive other DC loads like a DC motor of any electronic appliance or other toy applications.

LIMITATION OF THIS CIRCUIT:

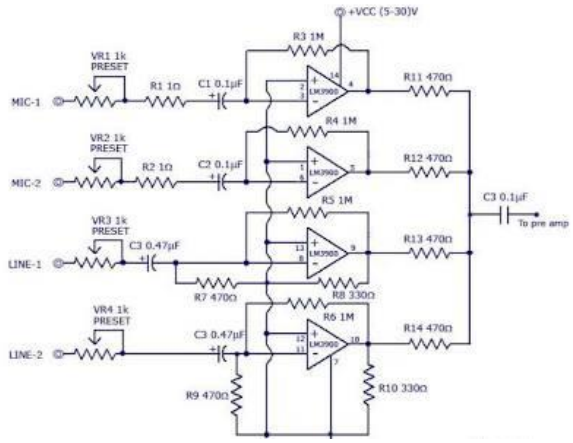
This is a theoretical circuit and may require few changes when implemented on PCB.

Multi-Channel Audio Mixer Circuit using LM3900

Audio mixing is the process of combining multiple audio channels into one or more audio channels. In this process source signals, frequency content, dynamics, level and panoramic position are manipulated. This audio mixing process is used in sound recording in order to produce the output which is more appeal to listeners.

This audio mixing is also done in studios in order to produce album or single. Generally audio mixing process is carried out by the mixing engineer. Currently artists and engineers are using PC (personal computer) for audio mixing. This article describes you how to design a multi-channel audio mixer using lm3900 quad amplifier. This audio mixing circuit has 2 MIC inputs and 2-line inputs. If you want to increase the input channels according to the application, then add same circuit in parallel with the existing circuit. Before going to know about this circuit, get an idea about how simple audio tone control circuit works.

Circuit Diagram of Multi-Channel Audio Mixer using LM3900:



Circuit Diagram of Multi-Channel Audio Mixer using LM3900

Circuit Components:

- LM3900 Quad operational amplifier
- 1k PRESET – 4
- MICs – 2
- 0.47uF Electrolytic capacitor – 2
- 0.1uF Electrolytic capacitor – 2
- 0.1uF capacitor – 1
- 1Ω Resistor (1/4 watt) – 2
- 1M ohm resistor (1/4 watt) – 4
- 470-ohm resistors (1/4 watt) – 6
- 330-ohm resistors (1/4 watt) – 2
- Connecting wires.
- Power supply circuit

MULTI-CHANNEL AUDIO MIXER USING LM3900 CIRCUIT DESIGN:

The main component in this circuit is lm3900 quad operational amplifier. Each input channel of audio mixer is connected the inverting terminal of op amp. The operational amplifier of each stage amplifies every input signal separately. The output of each op amp is given to single output line with resistance of 470 ohm. This circuit does not have low input impedance to mix ideal audio input channels. Here polarized capacitors C1 to C4 are connected to the input channels used for decoupling purpose. Capacitor C5 is the decoupling capacitor at the output. Here variable resistor is connected to each input channel. This variable resistor is used to adjust the volume of corresponding input channel.

LM3900 Quad Operational Amplifier:

This IC consist of 4 high gain, independent, frequency compensated Norton amplifiers. These operational amplifiers are designed to operate for wide range of voltages. These amplifiers provide good response for almost all signal frequencies. This IC is able to provide wide band width and large output voltage swing. This IC has Inbuilt short-circuit protection.

MULTI-CHANNEL AUDIO MIXER CIRCUIT FEATURES:

1. Wide supply voltage range
2. Low input current (30nA)
3. Open loop gain is very high
4. simple design
5. Good frequency response
6. Low noise
7. Output short circuit protection

HOW TO OPERATE MULTI CHANNEL AUDIO MIXER CIRCUIT USING LM3900?

1. Initially give the connections as per the circuit diagram.
2. While giving the power supply, make sure that output is well regulated.
3. Now give the audio inputs.
4. At the output of audio mixer, you will get mixed audio signal.

- This audio mixer is used in sound recording to produce the audio which is more appealing to the listeners.

Project Title: SCR based battery charger circuit

Aim: To design a battery charger circuit using SCR

Components required:

1.SCR

2.Diodes(1N4001,SD50)

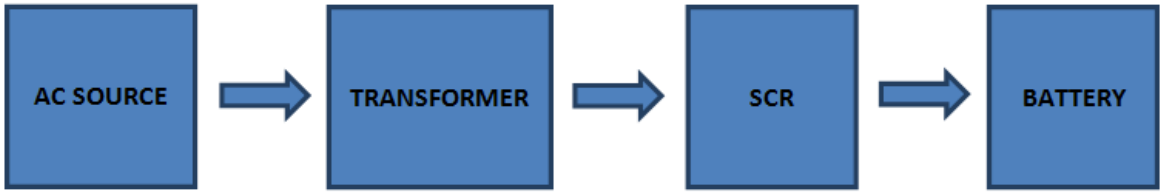
3.Resistors(330 Ohm,22 Ohm,820 Ohm,100 Ohm,1 Ohm)

4.Transistor(BC148)

5.Transformer(230v primary,18V/3A)

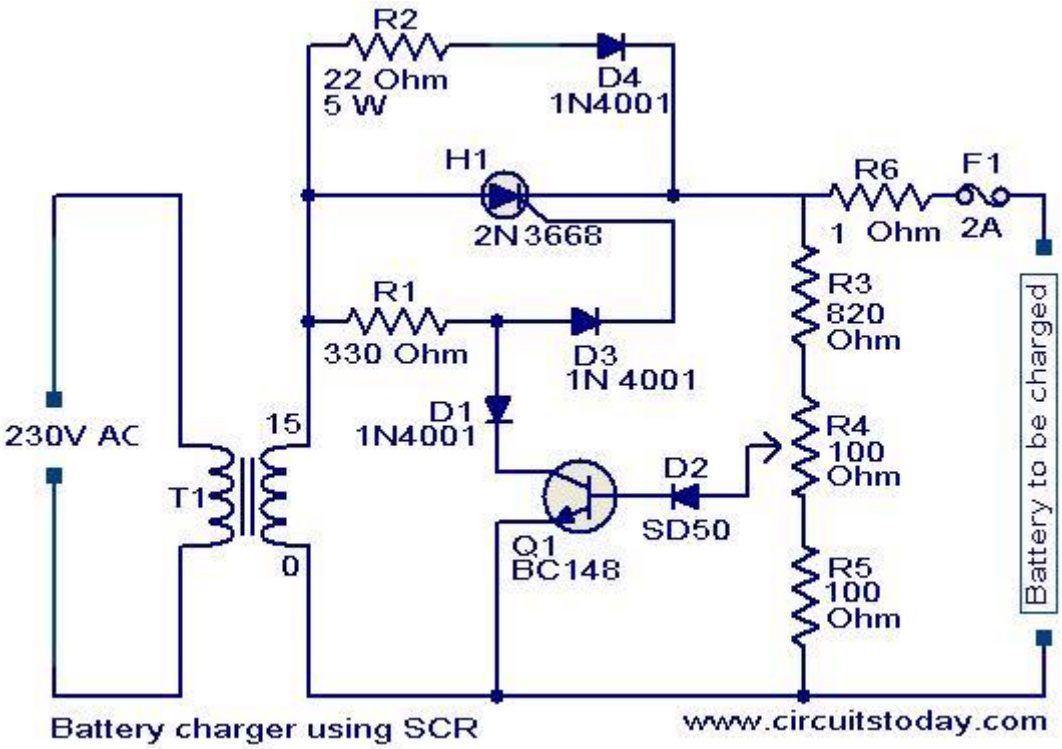
6.AC source

Block diagram:



Block Diagram of Battery Charger Using SCR

Circuit diagram:



Working: A simple battery charger based on SCR is shown here. Here the SCR rectifies the AC mains voltage to charge the battery. When the battery connected to the charger gets discharged the battery voltage gets dropped. This inhibits the forward biasing voltage from reaching the base of the transistor Q1 through R4 and D2.This switches off the transistor. When the transistor is turned OFF, the gate of SCR (H1) gets the triggering voltage via R1 & D3.This makes the SCR to conduct and it starts to rectify the AC input voltage. The rectified voltage is given to the battery through the resistor R6(5W).This starts charging of the battery.

When the battery is completely charged the base of Q1 gets the forward bias signal through the voltage divider circuit made of R3,R4,R5 and D2.This turns the transistor ON. When the Q1 is turned ON the trigger voltage at the gate of SCR is cut off and the SCR is turned OFF. In this condition a very small amount of charge reaches the battery via R2 and D4 for trickle charging. Since the charging voltage is only half wave rectified ,this type of charger is suitable only for slow charging. For fast charging full wave rectified charging voltage is needed.

APPLICATIONS AND ADVANTAGES:

It can be used to charge batteries used for toys.

It is a portable circuit and can be carried anywhere.

It can be used as an automatic battery charger, used specially during driving.

LIMITATIONS OF BATTERY CHARGER CIRCUIT:

The AC to DC conversion here uses only the rectifier and may contain AC ripples as there is no filter.

The half wave rectifier makes the charging and discharging quite slow.

This circuit cannot be used for batteries with higher Ampere-hour rating.

The battery charging may take longer time.

RELIANCE JIO PLANS TO TURN UTTARAKHAND INTO DIGITAL DEVBHOOMI

Reliance Jio has announced that it is partnering with the Uttarakhand state government to improve connectivity status in the state. Reliance Jio said that it won't just promote environment protecting industries and businesses but will also boost sustainable tourism. As a part of the investment in the state, the firm adds that it will also be improving the delivery of health-care, education and government services in the state.

In Uttarakhand, Reliance aims to increase the growth of its retail stores. For now, it has over 100 retail stores.

The company's investment along with the state's pro-business policies are said to bring a healthy growth rate for Hi-tech industries.

"I am confident that the Investor's Summit will lay the ground work for unprecedented growth of the state in the future. As Reliance Industries, we are very satisfied with environment in the state and support that we have received and I thank the state govt. for all their support," said Mukesh Ambani, chairman and managing director of Reliance Industries Ltd at the ongoing Uttarakhand Investors Summit 2018. As per a recent report in Economic Times, Reliance Jio Infocom is expected to report a higher net profit in the fiscal second quarter ending September as compared to the market leader Vodafone-Idea and the second-ranked BhartiAirtel.

It is said that Airtel will be posting a loss in the July-September quarter after nearly 15 years. This is said to happen because of several factors including mounting costs, rupee depreciation, and customer losses ever since the arrival of Jio Phones and the reduction in their prices.

The reason for Vodafone-Idea's loss is expected to happen due to low subscriber additions and rising 4G network expansion costs. IIFL Institutional Equities and ICICI Securities have estimated a net loss of around Rs 2,600 crore.

AUGMENTED REALITY (AR)

The origin of the word augmented is augment, which means to add or enhance something. In the case of Augmented Reality (also called AR), graphics, sounds, and touch feedback are added into our natural world to create an enhanced user experience.

So AR is basically an enhanced version of reality where live direct or indirect views of physical real-world environments are augmented with superimposed computer generated images over a user's view of the real-world, thus enhancing one's current perception of reality.AR is totally different of VR(Virtual Reality). In AR we have to inhabit a new virtual environment instead of AR uses a current environment & simply overwrite a virtual information on top of it. As both real & virtual world coexists at same time users of augmented reality experience a whole new & improved world based on visual information.

Basically AR is categories as:

- Marker Based Augmented Reality:

Marker-based augmented reality (also called Image Recognition) uses a camera and some type of visual marker, such as a QR/2D code, to produce a result only when the marker is sensed by a reader. Marker based applications use a camera on the device to distinguish a marker from any other real world object. Distinct, but simple patterns (such as as QR code) are used as the markers, because they can be easily recognized and do not require a lot of processing power to read. The position and orientation is also

calculated, in which some type of content and/or information is then overlaid the marker.

MARKER LESS AUGMENTED REALITY:

AS ONE OF THE MOST WIDELY IMPLEMENTED APPLICATIONS OF AUGMENTED REALITY, MARKER LESS (ALSO CALLED LOCATION-BASED, POSITION-BASED, OR GPS) AUGMENTED REALITY, USES A GPS, DIGITAL COMPASS, VELOCITY METER, OR ACCELEROMETER WHICH IS EMBEDDED IN THE DEVICE TO PROVIDE DATA BASED ON YOUR LOCATION. A STRONG FORCE BEHIND MARKER LESS AUGMENTED REALITY TECHNOLOGY IS THE WIDE AVAILABILITY OF SMARTPHONES AND LOCATION DETECTION FEATURES THEY PROVIDE. IT IS MOST COMMONLY USED FOR MAPPING DIRECTIONS, FINDING NEARBY BUSINESSES, AND OTHER LOCATION-CENTRIC MOBILE APPLICATIONS.

PROJECTION BASED AUGMENTED REALITY:

Projection based augmented reality works by projecting artificial light onto real world surfaces. Projection based augmented reality applications allow for human interaction by sending light onto a real world surface and then sensing the human interaction (i.e. touch) of that projected light. Detecting the user's interaction is done by differentiating between an expected (or known) projection and the altered projection (caused by the user's interaction). Another interesting application of projection based augmented reality utilizes laser plasma technology to project a three-dimensional (3D) interactive hologram into mid-air.

SUPERIMPOSITION BASED AUGMENTED REALITY:

Superimposition based augmented reality either partially or fully replaces the original view of an object with a newly augmented view of that same object. In superimposition based augmented reality, object recognition plays a vital role because the application cannot replace the original view with an augmented one if it cannot determine what the object is. A strong consumer-facing example of superimposition based augmented reality could be found in the Ikea augmented reality furniture catalogue. By downloading an app and scanning selected pages in their printed or digital catalogue, users can place virtual ikea furniture in their own home with the help of augmented reality.

So in future augmented reality(AR) will touch all parts of our lives, our society, and the subsequent rules we live by. As we adapt to the new capabilities and power that augmented reality bestows on us, we will have to think about things differently and give up some cherished ideas and fantasies. It will change social mores and rules, and challenge those who hold power arbitrarily.

Advancement in medical instrument

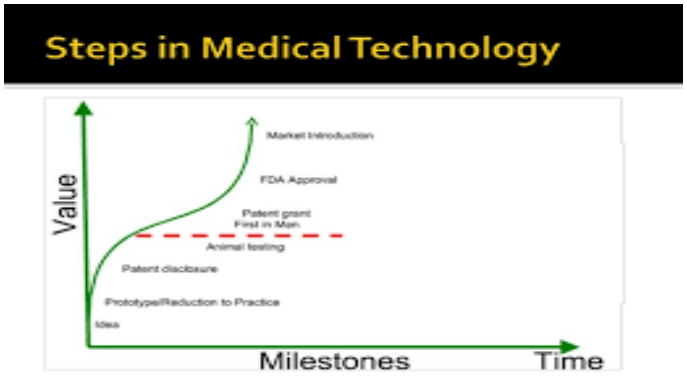
"Doctor are Angel" and angel to require helping hand. Now a day there is progress in medical field due to advancement in medical technology and merging of electronics with the biotechnology results in advancement of medical field. Due to this many un-curable disease are now a day's cure easily with the help of advance technology.

Biomedical electronics technology takes you beyond the basics of electronics into the world of advance technical system related to medical care.

Every doctor require a torch in a routine checkup. We know its quite basic but the medical field has evolve in many ways that is we use electrocardiograph machine to record the electrical activity of heart over a time period .

Capsule Endoscope is also great advancement this is use to record the image of digestive tract. In this capsule sized contain a tiny camera and after patient swallows it, it take the images of gastrointestinal track Capsule endoscopy is used to examine parts of the gastrointestinal tract that cannot be seen with other types of endoscopy. Upper endoscopy, also called EGD, uses a camera attached to a long flexible tube to view the esophagus, the stomach and the beginning of the first part of the small intestine called the duodenum.

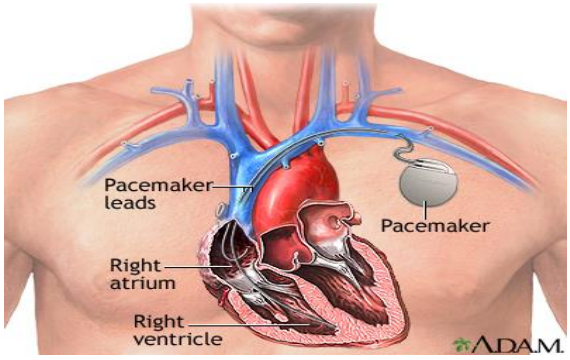
A colonoscope, inserted through the rectum, can view the colon and the distal portion of the small intestine, the terminal ileum. These two types of endoscopy cannot visualize the majority of the middle portion of the gastrointestinal tract, the small intestine. Capsule endoscopy is useful when disease is suspected in the small intestine, and can sometimes diagnose sources of occult bleeding [blood visible microscopically only] or causes of abdominal pain such as Crohn's disease, or peptic ulcers.



Capsule endoscopy can be used to diagnose problems in the small

intestine, but unlike EGD or colonoscopy it cannot treat pathology that may be discovered. Capsule endoscopy transfers the captured images wirelessly to an external receiver worn by the patient using one of appropriate frequency bands. The collected images are then transferred to a computer for diagnosis, review and display. A transmitted radio-frequency signal can be used to accurately estimate the location of the capsule and to track it in real time inside the body and gastrointestinal tract.

Laser plays an significant role in medical field which is use to



cure many alignment such as cancer, eye surgery, cosmetic use for removal of scar, skin resurfacing etc

The reach of technology continues to grow, changing all industries as it evolve

Major challenges and opportunities will arise in the health sector in the future. Although sophisticated medical technology is already available in health system in developed countries ,further advances are constantly being made. As a result of the addition of medical nanotechnology to existing knowledge of r biology, it seems likely that new , more personalized , more accurate and more rapid diagnostic techniques will be devised in the future , as well as new treatment that are also more personalized and promote regeneration of the organism.

Few Examples are-

Pace maker is small battery operated device that senses when your heart is beating too slowly it send the signal to the heart that make you heart beat at correct pace.

Pace has a pulse generator a battery power electronic circuit and one or more electro leads

- Pace maker with one lead are called single chamber
- Pace maker with two lead are called dual chamber
- Pace maker with three lead are called bi-ventricular pacemaker

And the doctor will suggest you the suitable pace maker as per requirement of patients system.

Artificial heart:

Artificial heart is a prosthetic device that is implanted in your body to replace the original biological heart. It is distinct from a cardiac pump, which is an external device use to provide the function both heart and lungs. This artificial heart is use to provide the function of both lungs and heart for few hours most common during cardiac surgery

C.T. scan:

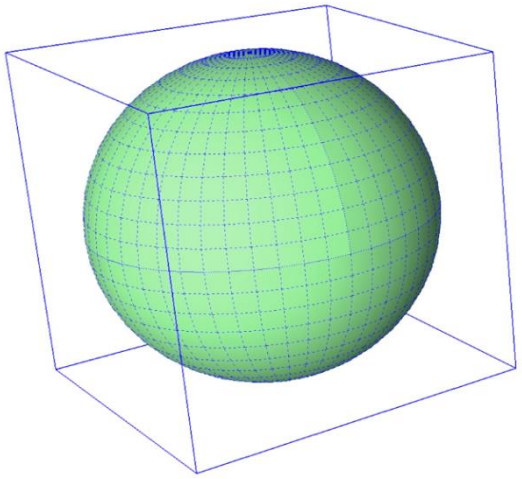
Computed tomography (CT) of the body uses special x-ray equipment to help detect a variety of diseases and conditions. CT scanning is fast, painless, noninvasive and accurate. In emergency cases, it can reveal internal injuries and bleeding quickly enough to help save lives.

As X-ray CT is the most common form of CT in medicine and various other contexts, the term computed tomography alone (or CT) is often used to refer to X-ray CT, although other types exist, such as positron emission tomography (PET) and single-photon emission computed tomography (SPECT). Older and less preferred terms that also refer to X-ray CT are computed axial tomography (CAT scan) and computer-aided/assisted tomography. X-ray CT is a form of radiography, although the word "radiography" used alone usually refers, by wide convention, to non-tomographic radiography.

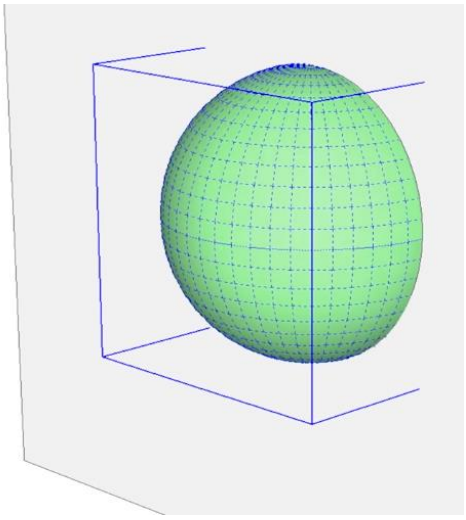
For the easy, faster and comfortable ailment and betterment of the mankind, biomedical field has achieved a great success in making human life more resistive against diseases by introducing advance technology in medical field which are used to eliminate the disease and making the human life healthier, and the medical field has aim to make the world disease free with the help of advancement in technology.

What is Ray Tracing?

Unless you are sitting in complete darkness I would like for you to do me a favour. Take a look around the room you are in and notice a spot on the wall. Then draw a line out of your eyes towards that spot and then follow it on the angle that it would take towards the light source in your room. Congratulations, you have just done the same thing that happens in ray tracing. A graphics rendering techniques that's been in the tech news quite a bit lately on the heels of the launch of Nvidia's Turing family of GPUs, which touts real time ray tracing as a way to get better looking games. But what exactly is ray tracing? Well to understand ray tracing, it helps to know why it's considered a step up from the traditional method by which games draw or render scenes into your screen. Most games today use a technique called rasterization where the game code will direct your GPU to draw a 3D scene with polygons. These 2 dimensional shapes, usually triangles, make up most of the visual elements that you see. After the scene is drawn, it gets translated or rasterized into individual pixels which are then processed by a shader which effects colours, textures and lightning effects on a per pixel basis to give you a fully rendered frame. Then you do this 30 or 60 times per second and you have got yourself a fully responsive video game to enjoy.

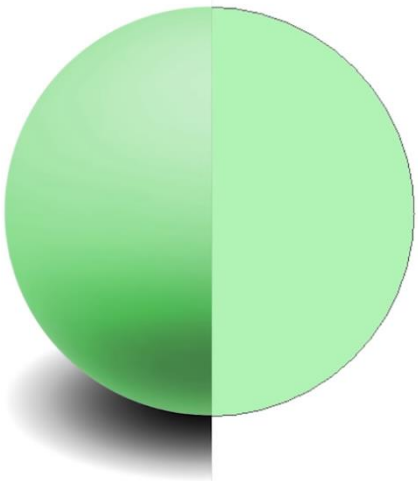


3D shape created by polygons



Rasterized 2D image

But while rasterization has served us well for a long time, trying to approximate an image by translating 3D shapes onto a 2-dimensional screen and then using shaders to estimate what the lighting should be, has inherent limitations because this method of rendering has a hard time tracking exactly how light should



travel and bounce within a certain scene. Ray tracing does a much better job of this and you have actually probably been enjoying it without knowing it for years if you have gone to any recent movie that features CGI effects. What made this possible in movies though is that big budget productions have the luxury of lots of money to render those effects on large server farms, a process that can take months and use much more computationally intensive techniques with many bounces for each photons and a huge number of light rays coming from each source.

So ray tracing is amazing right! Let's use it for everything. Well not quite. The downside of ray tracing is the computational cost. The average 20 something year old gaming at his home does not have millions of dollars or a rendering server and on top of that games have to be rendered at at least 25 or so frames per second and not 1 frame per day as has been the case with some Pixar films. So instead of tracking however many trillions of rays that come from each light source, consumer grade ray tracing lessens the computational load by instead tracing a path from a virtual camera that represents the user's eyes through a single pixel then to whatever object that is behind that pixel and finally back to the in scene light source.

5G Technology

Introduction :

5G stands for the fifth generation of cellular mobile communications and it succeeds the 4G , 3G and 2G systems.5G systems promise the to include features like higher data rate, reduced latency, energy saving, cost reduction, higher system capacity and massive device connectivity.

It is said that 5G could reach upto maximum speeds of 20 Gbps and will have more available bandwidth for data transmission over wireless systems.The comparison of 5G with previous generations is shown below:

allow 5G to access larger

Technology	1G	2G	3G	4G	5G
Deployment	1970/1984	1980/1999	1990/2002	2000/2010	2020
Data BW	2Kbps	14-64Kbps	2Mbps	200Mbps	>1Gbps
Technology	Analog Cellular	Digital Cellular	Broadbandwidth/CDMA/IP	Unified IP and combo of LAN/WAN/WLAN/PAN	4G+WWWW
Multiplexing	FDMA	TDMA/CDMA	CDMA	CDMA	CDMA

How does 5G work?

It is basic knowledge that radio signals are measured by their wavelengths and wavelengths and frequencies are inversely proportional. Thus, for 5G to achieve higher frequencies (between 30 to 300 Gigahertz) the wavelength is very small, in the range of millimetres. The high frequency is an important parameter as it will

bandwidths, meaning many people can send and receive any amount of data simultaneously.

CDMA or Code Division Multiple Access system ensures faster transmission of data via encoding with a unique key.It is far more powerful and flexible than the GSM technique applied in 3G.

LTE or Long Term Evolution turned out to be the most accepted global 4G standard.

5G would be a combination of the CDMA multiplexing technique with 4G VoLTE to give users a speed boost along with data savings.

Drawbacks?

5G is surely the most awaited technology but it will haves its own downsides. Higher frequencies can only travel short ranges and 5G might not be able to give proper coverage. For projection of 5G over long distances , data carriers will need to have a denser infrastructure for their base stations .

Moreover , the upgrade in speed and capacity won't come cheap. Service providers will be spending billions on upgrading their systems and stations which means customers will have to pay hefty prices too.

Smartphones compatible with 5G are not yet developed and 5G would not be compatible with 4G-capable phones.Thus, users will need to upgrade to the latest phones to enjoy the wide range of features that 5G promises.

5G became a trending topic after Verizon introduced 5G home Internet services for test in 4 US cities.

Verizon 5G Home

The journey towards faster next generation wireless networks just took a leap forward after the introduction of Verizon 5G home. Verizon recently announced the launch of its consumer 5G home Internet services which can be accessed in Sacramento, Houston, Los Angeles, and Indianapolis.

It promises speeds of up to 300 megabits per second and could also reach one gigabit per second in some areas. At 1 Gbps, a customer could download a high-definition movie in under a minute.

But to get the service out to customers at this time, Verizon had to use gear that doesn't meet the newest industry-standards for 5G. Some competitors are waiting for compatible equipment, and Verizon is already promising that it may replace customers' non-standard routers in the future if necessary. The service also isn't mobile, as the first 5G compatible smartphones won't hit the market until next year and Verizon is just at the start of upgrading its wireless networks around the country.

Most major cell-phone brands are yet to announce as to when 5G - compatible smartphones will be launched. While Sprint and LG want to be first to launch 5G compatible smartphones , companies like Apple are still unmoved by all the hype surrounding it.

At only 70$ a month , even less for existing customers (50$ a month) ,

with extenders to cover every corner of the house in its field , the Verizon Home could really bring a revolutionary change in the field of wireless networks.

A few might feel that 5G is over-hyped and would not be worth it all , its enhanced speed, responsiveness and ability to handle multiple devices beyond your phone could change the way we live.

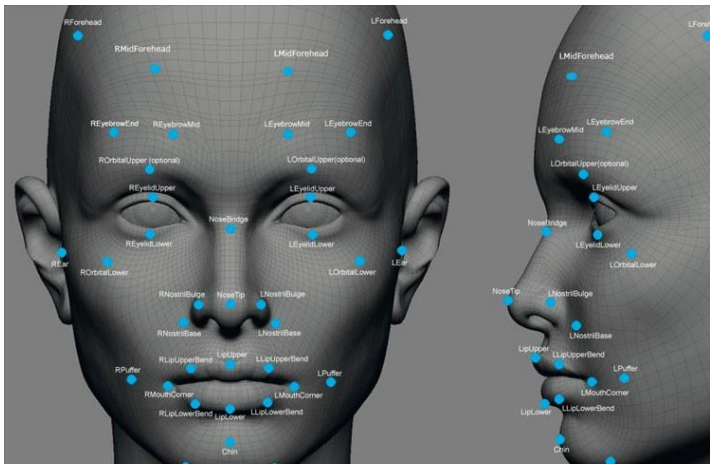
It is expected for 5G services to be launched globally by 2020.It can be a hit among customers if service providers like Verizon and Sprint launch it at reasonable costs. Introduction to 5G will really lead to improvement and easy access to technologies such as virtual reality and artificial intelligence in our daily lives.

Facial Recognition Using AI

What is Artificial Intelligence?

Artificial or machine intelligence is the intelligence displayed by machines. It is a way of making a machine like a computer or a robot to think intelligently , the way humans do naturally.

It is a term related to applications wherein machines perform tasks related to recognition, learning or problem solving. A major field that



involves the use of artificial intelligence is robotics.

The ultimate goal of a robot working on AI would be to have the ability to think, speak, recognize faces , reason and learn and apply.

While roboticists are still working on the rest we have a wide range of applications that work on facial recognition including the smartphones we use. Facial Recognition:Introduction and applications

Facial recognition has become a very popular and commonly used application

of artificial intelligence. Without even noticing we use it everywhere everyday.

Most of our smartphones allow us to unlock them using face recognition. These phones come with an array of sensors which illuminate our face with the help of infrared flood lights. The narrow focus infrared cameras capture detailed facial and iris information which is stored and processed locally on the device using special facial recognition algorithms.

Social media platforms like Snapchat and Instagram are famous for their filters and animated lenses. These use computer vision to track the position of the users eyes or the border of their face to place the filter in proper place.It gets its data from the user's camera at 24 frames per second and

can change on triggering with actions like raising eyebrows or opening your mouth.

There are applications like Face-tune and Perfect365 available which can identify and let the user modify or augment certain aspects of their face , provided the image is static. It allows the user to add makeup or change eye colour or hair colour after recognition of the facial structure.

Security cameras have been working on motion detection or face detection but new generation cameras are said to be focusing on facial recognition for added

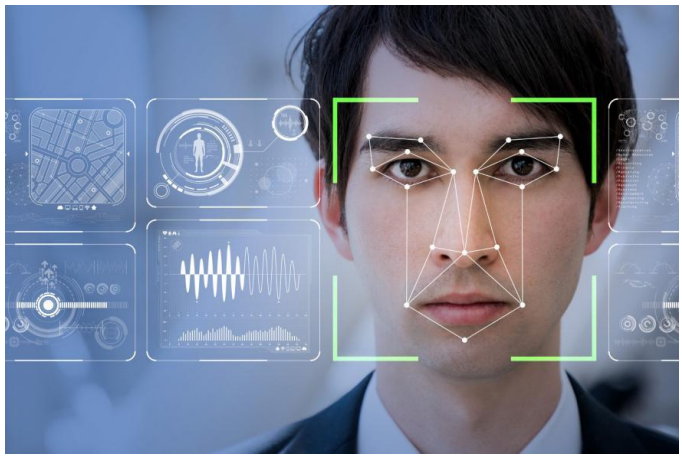
safety.For national safety , the US Department of State runs one of the largest facial recognition systems with data typically drawn by driving license photographs.

Disadvantages and Limitations:

The face angle of the target plays an important role in whether it can be efficiently recognised.AI can identify face profiles when frontal or at 45° but when it comes to lower angles or side profiles it may fail to do so.

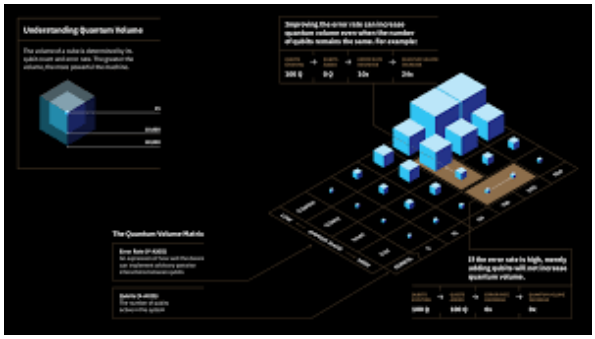
Usage of face unlock for phones is very common and it has also been introduced as a payment method in smartphones which makes users question how safe it can actually be. Hackers will already be looking to replicate people faces in order to trick facial recognition systems, but the technology has proved harder to hack than fingerprint or voice recognition technology in the past.

The advantages of facial recognition using artificial intelligence outweigh the limitations it has and there are still many advances that are being made in the field of Artificial Intelligence as it is a field with wide applications and relevance.



Quantum Computing

Over 50 years of advances in mathematics, materials science, and computer science havetransformed quantum computing which was once o n paper to it coming to reality. Today, real quantum computers can be accessed through the cloud, and many thousands of people have used them to learn, conduct research, and tackle new problems.



Quantum computers could one day provide breakthroughs in many disciplines, including materials and drug discovery, the optimization of complex systems, and artificial intelligence.

But to realize those breakthroughs, and to make quantum computers widely useable and accessible, we need to reimagine information processing and the machines that do it.

Need of Quantum Computing:

We experience the benefits of classical computing every day. Today's computers help and entertain us, connect us with people all over the world, and allow us to process huge amounts of data to solve problems and manage complex systems.

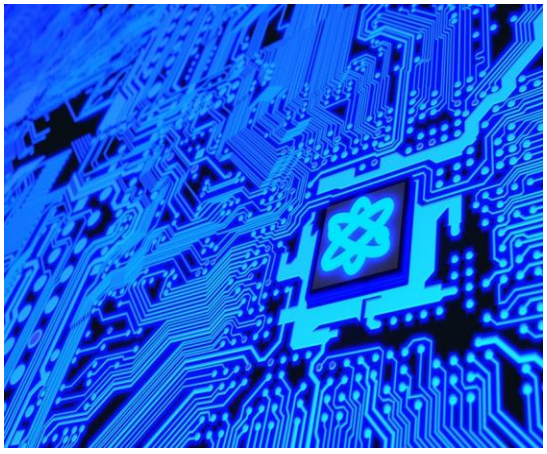
However, there are problems that today's systems will never be able to solve. For challenges above a certain size and complexity, we don't have enough computational power on Earth to tackle them. To stand a chance at solving some of these complex problems, we need a new kind of computing: one whose computational power also scales exponentially as the system size grows.

Now let us study in detail about Quantum Computing :

Quantum computing is computing method which uses quantum-mechanical phenomena, such as superposition and entanglement. A quantum computer is a device that performs quantum computing. Such computers are different from binary digital electronic computers as these computers are basically based on transistors, whereas common digital computing requires that the data be encoded into binary digits (bits), each of which is always in one of two

definite states (0 or 1), quantum computation uses quantum bits or qubits, which can be in superpositions of states. A quantum Turing machine is a theoretical model of such a computer, and is also known as the universal quantum computer. The field of quantum computing was initiated by the work of Paul Benioff and Yuri Manin in 1980, Richard Feynman in 1982 and David Deutsch in 1985.

As of 2018, the development of actual quantum computers is still in its infancy, but various experiments have been carried out in recent times in which quantum computational operations were executed on a very small number of quantum bits. Both practical and theoretical research continues in the field of quantum



computing, and many national government and military agencies are funding quantum computing research in additional effort to develop the quantum computers which will be beneficial for civilians, business, trade, environmental and national security purposes, such as cryptanalysis. A small 20-qubit quantum computer exists in todays time and is available for experiments via the IBM

Quantum Experience project:

D-Wave Systems has been developing their own version of a quantum computer that uses annealing.

The Large-scale quantum computers would theoretically be able to solve certain problems much more quickly and sufficiently than any classical computers that uses even the best currently known algorithms like : Integer factorization using Shor algorithm (which is also known as a quantum algorithm) and the simulation of quantum many-body systems. There exist different quantum algorithms, such as Simon algorithm, that runs faster than any possible probabilistic classical algorithm. Quantum computers are able to efficiently solve problems which are not practically feasible on classical computers.

Working: Wondering how to actually use a quantum computer?

A quantum experiment is defined on a regular computer and translated by electronics into a series of

microwave pulses, which travel to the bottom of the dilution refrigerator, that houses the quantum chip. These microwaves can be controlled to change the state on the quantum processor. Relevant measurements specified by the code are taken and then returned as output, along with information on how the qubits and dilution refrigerator were performing at the time of the experiment.

Quantum Computing Development: Quantum computing is, in a way paving the way for the development of fifth generation of computers and scores over existing computing methods by performing more efficient algorithms than traditional computing. According to an Accenture report, governments across the world are forging ahead with quantum computing initiatives – the US, based on a 2016 report from the National Science and Technology Council, "recommended significant and sustained investment in quantum information science by engaging with academia, industry and government." While the Australian government in early 2016 announced an AUD$25 million investment over a period of five years toward the development of a silicon quantum integrated circuit. And the European Commission plans to launch a $1.13 billion project in 2018 to support a range of quantum technologies.

Likewise, India, in an attempt to tap into the next big advances in computing technology, the Department of Science and Technology (DST) is planning to fund a project to develop quantum computers. The Physics departments at the Indian Institute of Science, Bangalore have also forayed into the theoretical aspects of quantum computing. However, Indian experts deem that the true quantum computers are still years away, and existing systems use principles of quantum computing to solve very limited problems.

Self Driving Car

A self-driving car (also known as an autonomous car or a driverless car) is a vehicle that is capable of sensing its environment and moving with little or combine a variety of sensors to perceive their surroundings, such as radar, computer vision , Lidar , Sonar , GPS, odometry and vision with inertial measurement units. Advanced control systems interpret sensory information to identify appropriate navigation paths, as well as obstacles and relevant signage.

Potential benefits of a diver less car include reduced costs, increased safety, increased mobility, increased customer satisfaction and reduced crime. Safety benefits include a reduction in traffic collisions, resulting injuries and related costs, including for insurance. Automated cars are predicted to increase traffic flow; provide enhanced mobility for children, the elderly, disabled, and the poor; relieve travelers from driving and navigation chores; lower fuel consumption; significantly reduce needs for parking space; reduce crime; and facilitate business models for transportation as a service, especially via the sharing economy

The following are the beneficial things about self driving car. Now let us see what can be the probable disadvantages of the same as well:

A direct impact of widespread adoption of automated vehicles is the loss of driving-related jobs in the road transport industry. There could be resistance from professional drivers and unions who are threatened by job losses. In addition, there could be job losses in public transit services and crash repair shops. The automobile insurance industry might suffer as the technology makes certain aspects of these occupations obsolete. A frequently cited paper by

Michael Osborne and Carl Benedict Frey found that automated cars would make many jobs redundant. Privacy could be an issue when having the vehicle's location and position integrated into an interface in which other people have access to. In addition, there is the risk

of automotive hacking through the sharing of information through V2V (Vehicle to Vehicle) and V2I (Vehicle to Infrastructure) protocols. There is also the risk of terrorist attacks. Self-driving cars could potentially be loaded with explosives and

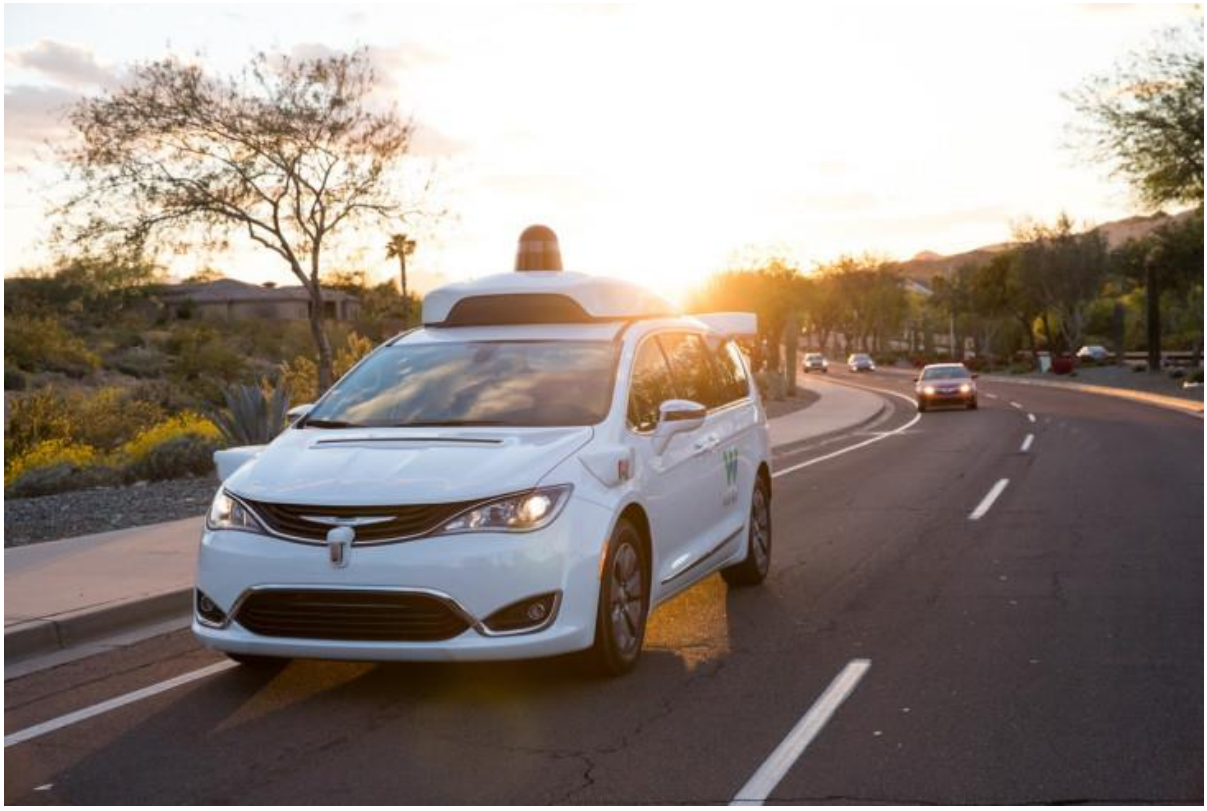
used as bombs. Technical challenges The challenge for driver less car designers is to produce control systems capable of analyzing sensory data in order to provide accurate detection of other vehicles and the road ahead. Modern self-driving cars generally use Bayesian simultaneous localization and mapping (SLAM) algorithms, which fuse data from multiple sensors and an off-line map into current location estimates and map updates. Waymo has developed a variant of SLAM with detection and tracking of other moving objects (DATMO), which also handles obstacles such as cars and pedestrians. Simpler systems may use roadside real-time locating system (RTLS) technologies to aid localization. Typical sensors include Lidar, stereo vision, GPS and IMU. Udacity is developing an open-source software stack. Control systems on automated cars may use Sensor Fusion, which is an approach that integrates information from a variety of sensors on the car to produce a more consistent, accurate, and useful view of the environment.

Driverless vehicles require some form of machine vision for the purpose of visual

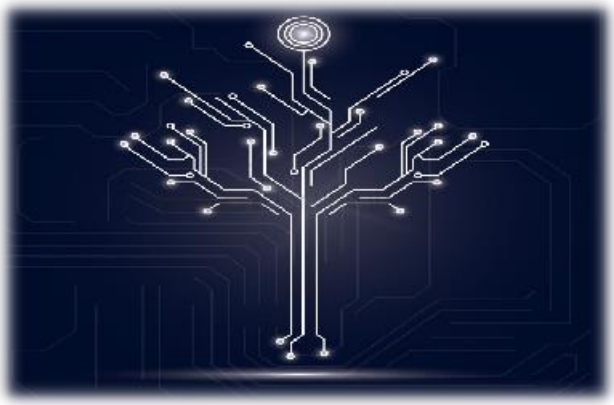
object recognition. Automated cars are being developed with deep neural networks, a type of deep

learning architecture with many computational stages, or levels, in which neurons are simulated from the environment that activate the network. The neural network depends on an extensive amount of data extracted from real-life driving scenarios, enabling the neural network to how to execute the best course of action.

In May 2018, researchers from MIT announced that they had built an automated car that can navigate unmapped roads. Researchers at their Computer Science and Artificial Intelligence Laboratory (CSAIL) have developed a new system, called Map Lite, which allows self-driving cars to drive on roads that they have never been on before, without using 3D maps. The system combines the GPS position of the vehicle, a topological such as OpenStreetMap, (i.e. having 2D features of the roads only), and a series of sensors that observe the road conditions.



Tips on Circuit Designing



Electronics Design can cover a vast array of technical options. A schematic drawing is only one part of creating a design in electronic engineering. Your schematic should be able to be read and understood by others in the electronic engineering field. If you are good with your schematic, the reader of your design should be able to understand at least the objectives of your design. This can be done successfully if you follow five simple tips.

Tip 1 – Block Diagram

The first part in your electronics design schematic should be a block diagram. This diagram should be an extract from your document showing the hardware design. This section should not take long to add and is similar to an outline for an essay. It gives you the ability to provide an overview of your architecture, as well as giving your reader a reference. Great block diagrams will include page numbers to your schematic sections.

Tip 2 – Name the Nets

Even though it can be a time-consuming process, you need to name every net you have on the board, as well as state its purpose. The reason naming the nets is vital is because you will need them to debug your program and allow simulation runs. Regardless of what anyone else tells you, naming them is needed on every electronics design schematic created.

Tip 3 – Make it Flow

When you create an electronics design, make it flow. This may mean you have to create dozens of pages to show the design and organize the blocks. You should

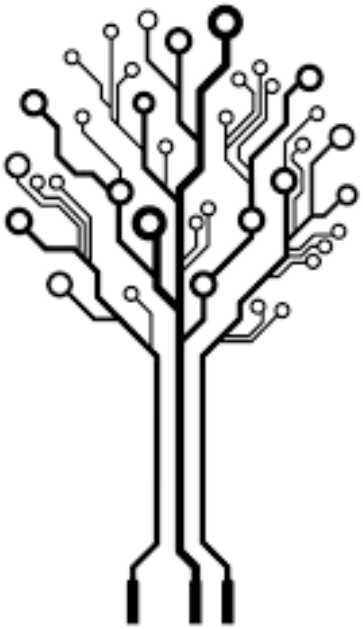
never try to shortcut with your schematics. When you try to condense your plans, they can be very hard to follow. This means it may not be able to be recreated.

Tips 4 – Visible Connectors

You need to make your connectors appear as connectors. Your electronics design schematic should have pins in order and draw the connector. If they are easy to identify, then they will be easier to follow. You will also allow all readers to know exactly which pin you are looking for.

Tips 5 – Keep Notes

In electronics design you never, ever throw out your notes. Whatever you are thinking and utilizing when planning your electronics design, you need to make available to the readers. If you need to, create a separate document and attach it to the design. Ideas for notes include why you included a component, or why you did not include a component. What your logic table settings are, and any considerations with the power supplies should be made are two other items that should be included in your notes.



If you have done a great electronics design, then anyone can at least pick it up and understand where you were going with the schematic. If you follow these tips, then you will have a design that people can understand, simulate, and reproduce. You will also have a plan that you can quickly debug if needed.

Another key tip in electronics design is using the right tools for creating your schematics drawings. The option to create your own schematic is not available in some of the PCB design software. You can always hand sketch out your schematic or even "bread board" your design by using wires and components to manually create your design. This works great for simple electronics design. However, when using more complex components and surface mount components creating a printed circuit board from your schematic will be a much better option.

Interview Section

1. **Considering recent reports of automation sweeping away jobs of the IT Sector, what impact do you think will it have on the electronics industry?**

There is sort of feeling among people that automation have a negative impact on employee. Manufacturing companies tend to increase use of machinery in their productivity as they could achieve more precision in their unit. But with increase in use of machinery, I think there is no need of any concern for electronics engineer. Automation helps to eliminate monotonous work that helps employee to get more free time and thereby have more time for high level, strategic responsibilities.

2. **What advice would you give to the next generation of engineers with the generally rising expectations of the industry?**

Engineers, now should have more technical skills irrespective to some particular domain and enlarge their knowledge as per their interest and should also have some knowledge of other industries as well because then they could have an upper edge over multidisciplinary projects. Also, they should have critical thinking, creativity and team player abilities. One should indulge in activities that would find these experiences and help them build those skills.

3. **How much emphasis would you lay on practically of the particular domain during our 4-year course considering it sometimes not taken seriously?**

Any engineer would progress if he would have both theoretical as well as practical knowledge. Generally, university focuses on theoretical knowledge and students in these four years course put themselves in pattern of regularly completing assignments and then focusing on exams. The important thing is you should not just learn the thing but think of its practical implications. Once you develop this habit, then while learning theory or listening to classes, your mind will start to automatically relate it to practical situations.

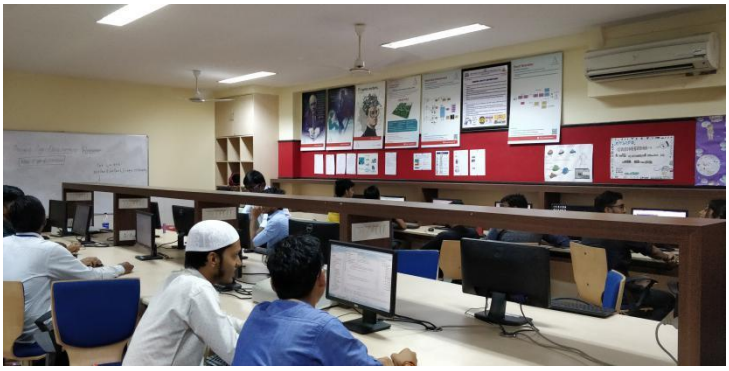
4. **Are internships during the course an integral part how an engineer shapes up to be in future?**

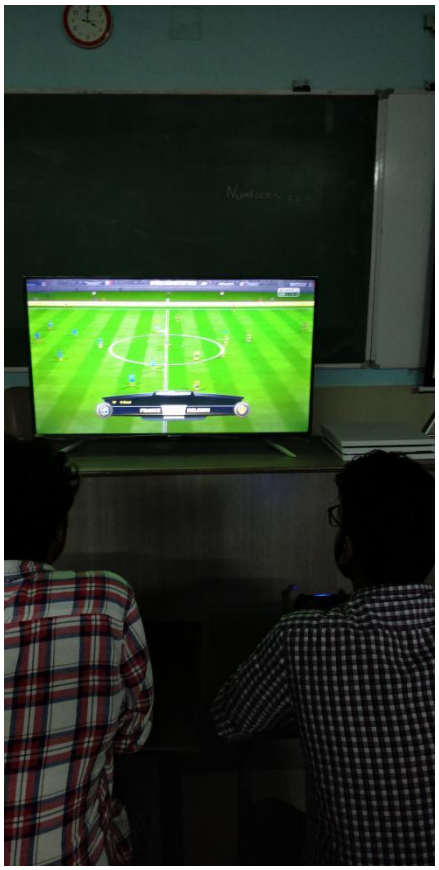
Internship are always helpful because they help students understand the practical atmosphere in industry. Also it would help students to understand what they are good at, or what they like doing. Without doing an internship, you might have a very different idea of what you are good at and what you enjoy doing. Therefore, spending some time in the line of work that you intend to grow in is crucial to making a realistic decision about your future career.

5. **How can an engineer categorize himself on a productivity scale ? What improvements are required to increase their market worth**

An engineer should be creative and have a good client and customer relationship to develop market value. Innovation is one method by which market share would increase. When a firm brings to market a new technology, its competitors have yet to offer, consumers wishing to own the technology buy it from that company, even if they previously did business with a competitor. Many of those consumers become loyal customers, which adds to the company's market share and decreases market share for the company from which they switched.

Rohit Nair - Software Engineer Analyst, Accenture





ZEPHYR PHOTOS