



Dr. Nazerath Charles, the Founder and Chairman of Stella Mary's College of Engineering and the Managing Director of the Exblowra Group of Companies, Doha, Qatar is an International entrepreneur and a philanthropist who has accomplished a phenomenal success in his beneficence towards Global Trade and Contracting, Investment, Education, Economics, Environment, Entertainment, Social responsibility, and Charity.

He would always insist on being pleasant, polite and proactive. He would always encourage us to be a ground-worker rather than playing the role of an on-looker because according to him all teachers have to be a good role model to their students.

He has received many awards and laurels. Recently, he has been recognized and conferred with the prestigious '**The Best NRI Award**', by the Ministry of Commerce, Qatar, the highest honour conferred on global Indians, that brings to fore the proud achievements of NRIs, who have chosen to adopt their home in the Middle East showcasing them to the world platform.



PREFACE



“ELECTAS”, the association of Department of Electronics and Communication Engineering, Stella Mary’s College of Engineering presents “**SMARTRONIX 2020**”, a one day National level Technical Symposium on 13th of March 2020.

A gathering of more than 300 students from various fields of Engineering, bring forth their technical skill mixed with their talent at this meet to exploit their knowledge and explore the unknown frontiers, adapting themselves in the latest trends in Electronics and communication Engineering.

This souvenir abstracts the various trends the future is about to be impounded with, hoping to mould the best of engineers, arming them with the necessary information face the future with confidence.

Our sincere thanks to the Management, Director, Principal, Vice Principal, Joint Director, Head of the Department of Electronics and Communication Engineering and all the staff members of the Department of Electronics and Communication Engineering for their encouragement and support for our efforts in compiling this souvenir.

Chairman's Message



Warm greetings to you,

The term 'Education' encompasses more than just knowledge and knowing. It gives me great joy that the Association of Electronics and Communication Engineering 'ELECTAS' of Stella Mary's College of Engineering is organizing a one day national level technical symposium 'SMARTRONIX 2020' on 13th march 2020.

This magazine is a platform for the students to express their innovative pursuit which develops in them originality of thought and perception.

As an educator, I had an earnest desire to build up an institution where an education blended in all colours of human values could be given and today I feel proud to say that this symposium surely exhibits the thoughts and ideas of students from various institutions. I have always believe that excellence is never an accident its always the result of high intension, sincere effort, intelligent direction and skilful execution of students.

I extend my warm wishes to the faculties and students of ECE Department to continue this journey on the road of excellence.

I pray that God, in his divine benevolence, continues to lead and guide this prestigious institution for generation to come.

With warm regards
Dr. Nazerath Charles, Ex. Indian Navy

Message from the CEO



Dear all,
Greetings!!!

It is my vision to provide the world with motivated, responsible and disciplined youth, to shape a better future. It is indeed my honour and privilege that the Department of Electronics and Communication Engineering in hosting a one day national level technical symposium 'SMARTRONIX-2020' ON 13th march 2020.

Along with the academic excellence and vast sports opportunities, this symposium is aimed at providing an efficient platform for the students to exhibit their technical expertise and be instrumental in enlightening them about the current trends of Electronics and Communication Engineering.

I also believe that, sharing of your own technical perspectives with regional / global experts would further make this symposium rich in its content, with a win-win situation for all.

I wish you an engaging and productive participation!

With regards

Mr.J.Carol Judeson

(Chief Executive Officer)

Vice Chairman's Message



Dear all,

It gives me immense pleasure that the national level technical symposium 'SMARTRONIX-2020' is hosted by the Electronics and Communication association ELECTAS of Stella Mary's College of Engineering.

Change in today's world is riding an accelerated pace and we need to pause and reflect it on the entire education system. I firmly believe that this symposium will initiate a spirit of team work and provide an amazing platform for implementing ingenuity in the various fields of Electronics and Communication Engineering.

I take this opportunity to render my best wishes to all connected with this symposium for success in all their endeavours.

With regards

Mrs. Sumitha C. Judeson

(Vice- Chairman)

Director's Message

Greetings!!!

It gives immense pleasure to pen a few words as prologue to the department of ECE, ELECTAS to bring out the first issue of the technical magazine SMATRONIX 2020 exclusively meant for churning out the latent writing talent which bears immense potentiality of sharpening the student's skills as a part of their overall personality development. I congratulate all the contributors for bringing out such a beautiful magazine.



With regards,

Mr. P. Rengitham.

Joint Director's Message

Greetings,

I take great pride in welcoming all the attendees of “SMARTRONIX 2020”, a technical symposium organized by Department of ECE, Stella Mary's College of Engineering. This technical program will provide a unique opportunity to share and exchange the newest advancement in the field of Electronics and Communication. I extend my heartfelt wishes to all the attendees.



With regards,

Dr. R. K. Mathumathi

Principal's Message



I congratulate the department of ECE, ELECTAS to bring out the first issue of the technical magazine, SMATRONIX 2020, I'm sure that the magazine will provide a platform to the student and faculty members to expand their technical knowledge, sharpen their hidden literary talent and will also strengthen the all-round development of the students. I am hopeful that this small piece of literary work shall not only develop the taste for reading among students but also develop a sense of belonging to the institution as well. My congratulations to the editorial board who took the responsibility for the arduous task most effectively. I extend best wishes for the success of this endeavour.

Regards,

Dr. R. Suresh Premil Kumar

Vice Principal's Message

Greetings to you all!

I am glad to know that the Department of Electronics and Communication Engineering of Stella Mary's College of Engineering is organizing a National Level Technical Symposium on 13th of March, 2020. Taking this opportunity, I would also extend my appreciation to the Head of the Department, the faculty members and the students of the Department of Electronics and Communication Engineering for constantly promoting activities that has crafted the young Engineering minds to be inventive rather than being only innovative, through your association ELECTAS, and I strongly believe that the event will result in concrete output in support of its topics.



It's indeed a laudable endeavor by the organizing team and I would like to appreciate their efforts in planning the coordination of the event.

My best wishes for your continued success!!!

Sincerely,

HOD's Message

Dear all,

Greetings!!!

It is an occasion of great pride and satisfaction for the department of ECE, ELECTAS to bring out the first issue of the technical magazine SMATRONIX 2020. It gives me immense pleasure to note that the response to the magazine has been overwhelming. The wide spectrum of articles gives us a sense of pride that our students and faculties possess creative potential and original thinking in ample measures. I applaud the contributors for their stimulated thoughts and varied hues in articles contributed by them.



With regards,
N. Michael Franklin.



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About College

The college is run by nova educational trust started in the year 2007, to provide the highest quality educational and research facilities to the students across the country. The trust manages the premier educational institutions like Bapuji Memorial higher secondary school, Bapuji Memorial College of Education, Stella Mary's College of Engineering and Stella Mary's CBSE School.

Dr. Nazerath Charles, the Founder and Chairman of Stella Mary's College of Engineering is an International entrepreneur and a philanthropist who has accomplished a phenomenal success in his beneficence towards Global Trade and Contracting, Investment, Education, Economics, Environment, Entertainment, Social responsibility, and Charity. He is incipiently an Electrical Engineer and served the Indian Navy from 1968 to 1978. He is also endowed with an honorary doctorate from the University of Sacramento, United States of America in the year for his unique and valuable contribution to society in the field of social responsibility and governance. He is a high profile baron, an influential ecologist on the Global stage and a benign philanthropist, who has cogently contributed towards the impoverished sections of society which summates to his enormous contribution towards both, business and society. Recently, he was recognized and conferred by the Ministry of Commerce, Qatar, with the prestigious 'The Best NRI' Award, the highest honour conferred on global Indians, that brings to fore the proud achievements of NRIs, who have chosen to adopt their home in the Middle East (Bahrain, Jordan, Kuwait, Oman, Qatar, Saudi Arabia and UAE), showcasing them to the world platform.



Vision

To emerge as a premiere institution, acknowledged as a centre for excellence imparting technical education, creating technocrats who can address the needs of the society through exploration and experimentation and uplift mankind.



Mission

To provide an education that transforms students, through rigorous course-work and by providing an understanding of the needs of the society and the industry.

About Department

Electronics and Communications Engineering (ECE) is the application of science and mathematics to practical problems in the electronics and communications field. Electronics and communications engineers engage in research, design, development and testing of the electronic equipment used in various systems. This field is closely aligned with Computer Science and Engineering (CSE) and the advances in CSE play a significant role in the advancement of ECE. This is why a degree in ECE is always in high demand.

The Department of Electronics and Communication Engineering was started in the year 2013 with an annual intake of 60 students. It offers an under graduate program in Electronics and Communication Engineering with the following objectives

- Train the students to become top Electronics and Communication Engineers.
- To provide avenues to the students for Industrial training and Career counseling
- Personality development to become responsible citizen of the nation.

To strengthen the Industry Institute Interaction cell. The department has a strong team of highly qualified and experienced faculty members. The department has some of the finest labs, with modern equipments like Digital storage Oscilloscope, Microwave sources and active, passive devices etc. which give the students an hands on experience.

Vision

To excel in higher learning, innovative research and to produce creative solution for community based needs

Mission

To impart quality education in Electronics and Communication Engineering.

To provide technical expertise along with professional ethics as per societal needs.

Continuous technical up gradation to reach global excellence and to make student entrepreneur.

THE ASSOCIATION OF THE DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

The Electronics and Communication Engineering Association – ELECTAS was inaugurated by the chief guest Mr. Vincent Jain, Deputy Chief Executive – South Indian Federation of Fisherman societies (SIFFS) on Monday 21st August 2017. Mr. P. Renjitham, the Director presided over the function, Dr. R. Suresh Premil Kumar, Principal, Prof. N. Michael Franklin, HOD ECE, and coordinator of the association Asst Prof K. Gopal Ram were present at the occasion.

The association is involved in several activities like organization of seminars, Workshops, value added courses and kind.

Some of the events that were organized during the present academic year are:



Guest lecture:

A guest lecture on “Advancement in Mobile Communication- 1G to 5G followed by Cognitive Radio” was conducted on 15-7-2019. By .Mrs.G.Shinelet,AP/ Dept of ECE, Karunya Institute of Technology and Science, Coimbatore. Cognitive Radio’s applications and the 5G technology’s advancements were delivered by the expert and students get idea in this field. Moreover, the resource person gave project ideas in Cognitive radio and nanotechnology.





Guest lecture:

A guest lecture on “Arduino programming and project presentation” was arranged on 22/08/2019 by Mr.A.Joel Livin AP/Dept of ECE, IBRA College of Engineering, Oman. An introduction about Arduino processor and programming were lectured by the expert. Also, hands on training about arduino projects were given to students.



Guest lecture:

A guest lecture on “Artificial Intelligence” was conducted on 26-8-19 by Dr.E.Praynlin AP/ Dept of ECE, VV College of Engineering, Tisayanvilai, Tirunelveli. An overview of Artificial Neural networks, Fuzzy logic and Evolutionary Algorithms were lectured by the expert. Also, hybrid algorithms and its importance were discussed. Furthermore, project ideas in artificial intelligence and its applications were delivered by him and students get idea in this domain.



Certified Course:

Our department is providing a certified course on “IOT” for our students from August 2019 to till date. With the help of this course, students are undergoing project work

SMARTRONIX 2020

A one day National Level Technical Symposium is conducted on 13th March, 2020. This technical forum aimed at providing a technical edge to the existing engineering fields by means of exposure in current trend and the various spheres of electronics and Communication Engineering and also provides a Platform for the development of communication skills.

The Various events conducted are:

- Paper Presentation
- Project Presentation
- Circuit Debugging
- Quiz
- Photography
- Spell bee
- Find me
- PubG

Several participants from various colleges inside and outside Tamil Nadu registered for events. A brief description of events conducted is given below,



PAPER PRESENTATION:

Paper presentation is an event that unleashes the research and presentation skills of a person, provided to be innovative and competitive. It results in amazing fusion of the various fields of science and technology. The future technologist is given a platform to showcase their views and discoveries. Audience and judges can question the participants regarding the paper.



PROJECT PRESENTATION:

It is typically a demonstration, introduction, lecture, or speech meant to inform, persuade, inspire, motivate, or to build good will or to present a new idea or product. The presentation is for explaining your project - both the product and the process - to the evaluators. The presentation complements the project documentation and the product demo. It gives evaluators a chance to clear up doubts by asking questions on the spot.



CIRCUIT DEBUGGING:

The technical event circuit debugging is to test the debugging skills with three rounds. The selected participants of the former round are tested on their knowledge of digital or electronic circuitry. In the later round the concepts of digital electronics and electronic circuits will be given and they are supposed to identify the faults and rectify the circuit.



QUIZ:

This is an event which puts the participants 'technical and general knowledge to test at various levels. The participants have to answer a series of questions. This event includes two rounds the prelims and the finals. The participants will be given a set of questions which comprises of both technical and current affairs. Based on this the students will be qualified for the finals.



PHOTOGRAPHY:

Photography is an art, application and practice of creating durable images by recording light or other electromagnetic radiation, either electronically by means of an image sensor, or chemically by means of a light-sensitive material such as photographic film. It is employed in many fields of science, manufacturing, and business, as well as its more direct uses for art, film and video production, recreational purposes, hobby, and mass communication.



SPELL BEE:

Spell bee is a competition in which contestants are asked to spell a broad selection of words, usually with a varying degree of difficulty. To compete, contestants must memorize the spellings of words as written in dictionaries, and recite them accordingly. Most valuable learning result of spell bee competitions is gaining competency over vocabulary and this allows them to improve significantly at reading, writing and speaking. The ability to understand more and more words will allow children to become literate and enjoy reading a wide range of materials.



FIND ME:

Puzzles can test many problem-solving skills including logic, pattern recognition, sequence solving, spatial recognition, and word completion. Puzzle games focus on logical and conceptual challenges. While many action games and adventure games include puzzle elements in level design, a true puzzle game focuses on puzzle solving as its primary game play activity. Word games are generally used as a source of entertainment, but can additionally serve an educational purpose for students.

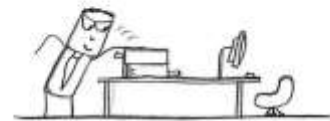


PUBG:

Battlegrounds is a player versus player shooter game in which up to one hundred players fight in a battle royal, a type of large-scale last man standing death match where players fight to remain the last alive. Players can choose to enter the match solo, duo, or with a small team of up to four people. Playing pubg students are involved with multitasking, focusing power, teamwork and also for time pass. To make students interactive and to entertain pubg makes a great part.



HAPPINESS IS



**...fixing electronics
by hitting them.**

“

**Failure is central to engineering.
Every single calculation that an
engineer makes is a failure
calculation. Successful engineering
is all about understanding
how things break or fail**

”

– Henry Petroski



STUDENTS ACHIEVEMENTS DETAILS-2019-2020

SL No	Name	Year	EVENT	PRIZE	ORGANIZED	DATE
1	Dhana Shaifee C	IV	Paper Presentation	Ist Prize	V.V College of Engineering	4/9/2019
2	D.DenoShalu	III	Paper Presentation	Ist Prize	Rohini College of Engineering and Technology	2/15/2020
	Y.Akshal Jasmine					
3	S.AasbinReeja	III	Circuit Debugging	Ist Prize	Rohini College of Engineering and Technology	2/15/2020
4	S.AasbinReeja	III	QUIZ	II Prize	Rohini College of Engineering and Technology	2/15/2020
	M.Ashmitha					
5	Y.Akshal Jasmine	III	Tech Talk	Ist Prize	Rohini College of Engineering and Technology	2/15/2020
6	M.Ashmitha	III	Face Painting	Ist Prize	Rohini College of Engineering and Technology	2/15/2020
	Y.Akshal Jasmine					
	B.Ahilaa					
	R.S.Reshma					
7	Y.Akshal Jasmine	III	Paper Presentation	Ist Prize (1000 cash prize)	Mar Ephraem College of Engineering	2/18/2020
	D.DenoShalu					
8	S.AasbinReeja	III	Paper Presentation	Ist Prize (500 cash prize)	Mar Ephraem College of Engineering	2/18/2020
	R.S.Reshma					
9	S.AasbinReeja	III	Circuit Debugging	Ist Prize	Mar Ephraem College of Engineering	2/18/2020
10	Dhanusha D J	III	Circuit Debugging	II Prize	Mar Ephraem College of Engineering	2/18/2020
11	Y.Akshal Jasmine	III	Quiz	II prize	Mar Ephraem College of Engineering	2/18/2020
	D.DenoShalu					
12	Y.Akshal Jasmine	III	Just a Minute	Ist Prize	Mar Ephraem College of Engineering	2/18/2020
13	B.Ahilaa	III	Word Hunt	Ist Prize	Mar Ephraem College of Engineering	2/18/2020

14	Y.Akshal Jasmine	III	Paper Presentation	Ist Prize (1000 cash prize)	PONJESLY College of Engineering	2/22/2020
	D.DenoShalu					
15	D.DenoShalu	III	Blind Coding	Ist Prize	PONJESLY College of Engineering	2/22/2020
16	M.Ashmitha	III	Blind Coding	II prize	PONJESLY College of Engineering	2/22/2020
17	Y.Akshal Jasmine	III	Quiz	II prize	PONJESLY College of Engineering	2/22/2020
	D.DenoShalu					
18	Y.Akshal Jasmine	III	Paper Presentation	II prize	St.Xavier`s Catholic College of Engineering	2/21/2020
	R.S.Reshma					
19	Y.Akshal Jasmine	III	Essay Writing	II nd PRIZE (700 CASH)	Rohini College of Engineering and Technology	2/24/2020





Kudos

AIM HIGH



**Great things
are never
done by one
person**



**III YEAR
ECEIANS**



Inauguration of Electronics & Communication Association – ELECTAS was inaugurated by the chief guest Mr. Vincent Jain, Deputy Chief Executive – South Indian Federation of Fisherman societies



The Electronics and Communication Engineering Association – ELECTAS conducted the two day's workshop on "EMBEDDED AND REAL TIME SYSTEM".



Two days hands on training on “Household Electronic appliances” in association with Instruments India, Nagercoil



Industrial Visits



Our Second year and third year students visited Signals and Systems, Chennai on 30/09/2018 and 01/10/2018. Signals and Systems is the manufacture for Synchronous clock and Energy meters. Students get good exposure about Synchronous clock.



Our Third year and Final year students visited Caliber Interconnect Solutions Coimbatore on 24/08/2019. Caliber Interconnect Solutions is the leading IC testing and designing core based company.



The Guest Lecture on “Advancement in Mobile Communication- 1G to 5G followed by Cognitive Radio” was conducted on 15-7-19

A guest lecture on “Arudino Pogramming and project presentation” was conducted on September 2019 by Mr. A. Joel Livin



A guest lecture on “Artificial Intelligence” was conducted on 26-8-19 by .Dr.E.Praynlin AP/ Dept of ECE, VV College of Engineering, Tisayanvilai, Tirunelveli.

LOOK! HAVE A GLANCE



TEACHER'S DAY CELEBRATION



KNOWLEDGE SHARING



Quotes time....

When you are ECE student
People see you as Studious as well as
Disipline student.
Your life become Resistor which is resistive
to fun, Capacitance which is used to
store assignments, seminar, results, exams
in the form of stress and pressure and
Inductance which is used to store
placements, degree, chilling and fun in the
form of hopes and dreams.
People think that you gotta attitude
because they don't know you are so busy
in understanding the network analysis and
signals and systems.
Most importantly if you miss one class then
you miss whole syllabus. 😊😊😊

ARTICLES

ANIMATRONICS

Animatronics is a combination of animation and electronics. What exactly is an animatronics? Basically an animatronics is a mechanized puppet. It maybe preprogrammed or remotely controlled. The animatronics may only perform a limited range of movements or it may be incredibly versatile. The scare created by the Great White coming out of the water in "Jaws" and the tender otherworldliness of "E.T." are cinematic effects that will not be easily forgotten. Later animatronics was used together with digital effects. Through the precision, ingenuity and dedication of their creators, animatronics creatures often seem as real to us as their flesh-and- blood counterparts

Formation of Animatronics:

Step 1: Design Process

During the design process, the client and the company developing the animatronics decide what the character will be, its appearance total number of moves, quality of moves, and what each specific move will be. Budgets, timelines and check points are established.

Step 2: Sculpting

The sculpting department is responsible for converting two-dimensional ideas into three-dimensional forms. This team can work from photos, artwork, videos, models, statuettes and similar likenesses. Typically, the client is asked to approve the sculpting before it goes to the molding department.

Step 3: Mold making

The molding department takes the form created by the sculptor and creates the molds that will ultimately produce the character skins. Molds can be soft or hard, single or multiple pieces, and reusable or non-reusable.

Step 4: Armature Fabrication

Meanwhile, various body armatures are being created and are assembled in the welding metal-fabricating areas.

Step 5: Costuming

The costume, if there is one, is usually tailored to the character and its movements. Animation tailoring can be a very difficult tedious process considering the variables. The outfit has to allow for easy access to the character's operating mechanisms. It must also "look" normal after movement has taken place.

Step 6: Programming

Finally, if it is an animated character the electronic wizard move in to connect the control system into valve assembly in the preparation for programming. Programming is the final step, and for some animations it is the most rewarding. Programming can be done either at the manufacturing facility or at the final installation site. In programming, all the individual moves are coordinated into complex animated actions and nuances that bring the character to "life".

The Jurassic Park:

Long before digital effects appeared, animatronics were making cinematic history. But it was in Jurassic park that the best possible combination of animatronics and digital effects were used together.

In the beginning

The first two steps in creating an animatronics are the sketches and the miniature model.

1) Put in on Paper

The first thing that happens with any animatronics is that an artist creates preliminary sketches of the creature. The Spinosaurus sketches were developed by working closely with expert paleontologists Jack Horner and crew working on "Jurassic Park III".

2) Build a Marquette

From the final paper design, a miniature scale model called a Marquette is created. Fashioned out of clay, the first Marquette SWS made of Spinosaurus was one-sixth scale.

Basically, there are four main categories that the work splits into, with development happening simultaneously across the categories:

Mechanical–

SWS engineers design and build the mechanical systems, which includes everything from basic gears to sophisticated hydraulics. An interesting fact about the Spinosaurus animatronic is that nearly all of the mechanical systems used in it are hydraulic.

Electronic–

Another group develops the electronic control systems needed to operate the animatronic. Typically starting from scratch and creating their own custom circuit boards, these engineers are essentially building giant remote-controlled toys.



All hydraulic systems are installed and checked



The "skeleton" of the Spinosaurus

Conclusion:

Creating a good animatronic figure that is able to perform constantly without fail requires many special skills and lots of technical knowhow. Before assuming the task of creating an animatronic figure, you should have a strong hold on how these things are constructed and be willing to spend a pretty penny on equipment and materials.

M.LAVANYA, II year ECE

DIGITAL SCENT TECHNOLOGY

A lot of research has been going on in the field of olfactory technology, which enables devices (or electronic noses) to sense, transfer and receive scent-enabled media such as audio, video, and web pages. The first odor-releasing system named Smell-O-Vision was invented in the late 1950s. It was capable of emitting odor during the projection of a movie to enhance the experience of viewers. Since then many research facilities have come up with similar devices. One of them was iSmell developed in 1999. It consisted of a 128-odors cartridge from which various mixed odors can be produced. However, due to certain limitations, the product was never commercially launched. At CEATEC 2016, a company introduced a wearable scent device that can be controlled via smart phones and PCs. It still has many hurdles to overcome, including the timing and distribution of scents and the health risks of synthetic odors.



Digital Scent Communication:

Digital scent technology refers to the online communication using the human nose. It is a crucial application for e-nose. Digital scent technology enables the transmission of odor over the internet. The technology works with the help of olfactometers and electronic noses. In an attempt to further enhance the virtual reality experience and the growing area of virtual reality from entertainment to e-commerce applications is paving the way for a rise in the need for developing this e-nose technology. Digital scent technology provides the user with the benefit of getting to smell the product before buying it online. For instance, a California-based company, Digiscents Inc. has created a small device called the iSmell, which has its own driver and can be connected through a personal computer via serial ports. The expansion of the digital scents market is augmented by developments in virtual reality. Virtual reality enhances the features of the computers by introducing new concepts such as digi smell, which is a combination of hardware and software. The hardware part produces the smell and the software part helps in generating specific signals for specific smells. Digital scent technology works by coding aromas, which are then downloaded in computers as audible sounds. This technology also enables the user to produce and modify their personal fragrances.

**P.M.Ancy,
II year ECE**

AUTONOMOUS CARS (EMBEDDED SYSTEMS)

As you go about the affair of living, you put your life safe and luxurious with all the available resources .Now a days we all are entrenched with computer and almost all depended on them. Devices with intelligence rule the world intelligence to these devices is through a system called “EMBEDDED SYSTEM”.

The current topic “AUTONOMOUS CARS” that we are going to present is one of fine example of embedded system.

Is Autonomous Car a Myth or Reality?

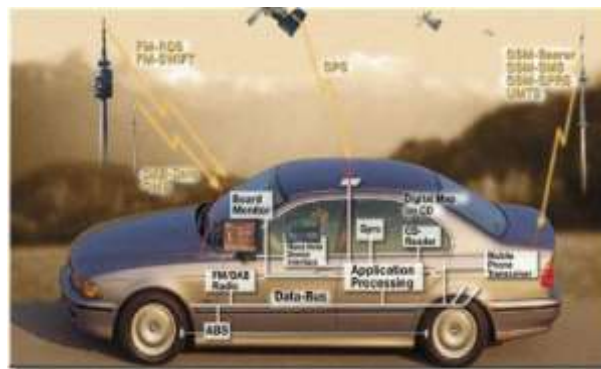
The car which is embedded can simulate the human driver completely and direct the vehicle on the road .autonomous vehicle has been the dream of scientists for long .now the dream has come true as with drastic changes in technical brilliance and developments in different field with EMBEDDED SYSTEM as pioneer.

The term embedded system is quite a complex one. Simply it is a combination of hardware and software that forms the component of a larger system, This in turn is programmed to perform a range of dedicated functions usually with a minimal operator intervention .In embedded system the hardware is normally unique to a given application, computer chips are embedded into the control electronics to the manage the product functionality. Embedded systems are rapidly become in a catalyst for change in computing data communications, telecommunications, industrial control and entertainment sectors.

The Fine Art of Automation:

Just imagine we load the code of our destination in the dashboard computer and turn the car on, while we remain seated carefree on the rare seats ,then it is all the job of the ‘unknown’ to drive it on the roads , bridges , thought the bazaars , past the crossings to the destination , without getting challenged even once for traffic rule violation.

There are trends were the fingerprint technologies are also have been introduced flowing reliabilities. You could one day able to enter and start your car with the touch of a finger .And that same touch, with your fingerprint recognition technology comes with heightened security. Unlike personal identification numbers, passwords and keys each person’s unique fingerprint cannot be duplicated, lost forgotten.



Advantages:

- In advanced system just in the case the driver over speeds are suddenly falls over and guides the car to the safe halt.
- A few advanced car prototypes with embedded system have been tried and tested where even if a smart thief has managed to break in through the car doesn't start up if does the computer eye the wood lock the steering cut of the fuel injection supply.

Indian Efforts in Embedded System Development:

Our India too entered into the field of embedded systems and had great developments in this field. I got marvelous results in the field of "Telematics" which is a part of technology used in cars.

Total telematics experience is what they are looking for simply put telematics is the vehicle capability to communicate with the outside world and are the vehicle operator. It is a combination of telecommunication and computing imagine when you are busy negotiating in through rush the hour traffic, you get a call on your mobile you know the call is form your office but cannot attend to it.

Conclusion:

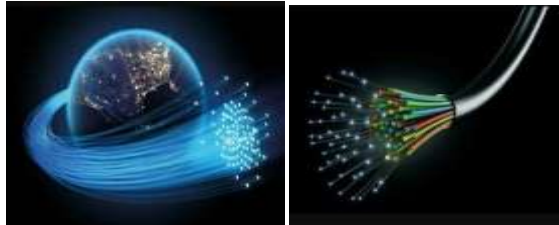
We should like to present that there must be further development in this technology to make autonomous car more common all over the world .This can be happened by making the autonomous easy to operate for the user and the designers should concentrate more in producing autonomous cars, which should not cast a lot they should in vicinity customers budget .

G.SOBIKHA

II year ECE

OPTICAL FIBRE

An optical fiber is a flexible, transparent fiber made by drawing glass or plastic to a diameter slightly thicker than that of a human hair. Optical fibers are used to transmit light between the two ends of the fiber and find wide usage in fiber-optic communications, where they permit transmission over longer distances and at higher bandwidths than wire cables. Fibers are used instead of metal wires because signals travel along them with lesser amounts of loss. Fibers are also used to carry images, specially designed fibers are also used for fiber optic sensors and fiber lasers. Fibers are used for most communication links longer than 1,000 meters (3,300 ft).



Data Security

They don't just generate noise, also let the information on the conductor to be leaked out. Fluctuations in the induced magnetic field outside a conductor carry the same information as the current passing through the conductor. Shielding the wire, as in coaxial cables can reduce the problem. Fiber optics do not radiate electromagnetic energy, emissions cannot be intercepted and physically tapping the fiber takes great skill to do undetected. Thus, the fiber is the most secure medium available for carrying sensitive data.

High Bandwidth over Long Distances

Fiber optics have a large capacity to carry high speed signals over longer distances without repeaters than other types of cables. The information carrying capacity increases with frequency.

Eliminating Spark Hazards

In some cases, transmitting signals electrically can be extremely dangerous. Most electric potentials produce small sparks, one tiny spark can create a big explosion. Potential spark hazards seriously hinder data and communication in such facilities. Fiber optic cables do not produce sparks since they do not carry current.



Ease of Installation

Increasing transmission capacity of wire cables generally makes them thicker and more rigid. Such thick cables can be difficult to install in existing buildings where they must go through walls and cable ducts. Fiber cables are easier to install since they are smaller and more flexible. Since they are smaller and hence require less of the costly fire retardant materials. The small size, lightweight and flexibility of fiber optic cables also make them easier to be used in temporary or portable installations.

Advantage

Higher bandwidth support. High carrying capacity. Immunity to electromagnetic interference and tapping. Optical fiber are so flexible .Optical fiber cables take up less space. Less signal attenuation. Resistance to corrosive materials.

Conclusion

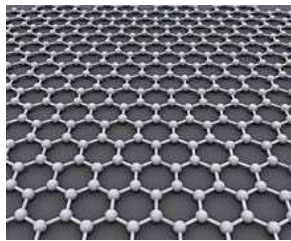
Technology has been used in many countries of telecommunication photonics, medical and engineering. It has attracted many researchers due to its performance, lowcost, no interference, higher bandwidth and his inherit high data loss carrying capacity.

BADHRA RAJ

II year ECE

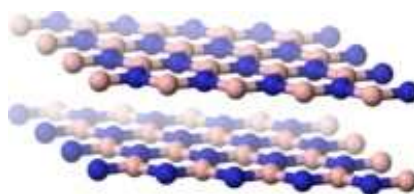
TWO DIMENSIONAL SEMICONDUCTOR

A two-dimensional semiconductor is a type of natural semiconductor with thicknesses on the atomic scale. The rising research attention towards 2D semiconductors started with a discovery by Geim and Novoselov et al. in 2004, when they reported a new semiconducting material graphene, a flat monolayer of carbon atoms arranged in a 2D honeycomb lattice. A 2D monolayer semiconductor is significant because it exhibits stronger piezoelectric coupling than traditionally employed bulk forms, which enables 2D materials applications in new electronic components used for sensing and actuating. In this emergent field of research in solid-state physics, the main focus is currently on designing nanoelectronic components by the use of graphene as electrical conductor, hexagonal boron nitride as electrical insulator, and a transition metal dichalcogenide as semiconductor.



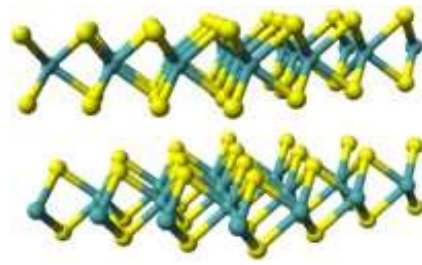
Graphene:

Graphene's two surfaces are single sheets of carbon atoms arranged in a hexagonal honeycomb lattice. Having two surfaces and lacking bulk makes it the thinnest possible material but also 5 times stronger than steel due to pi and sigma orbital bonds. Graphene has high electron mobility and high thermal conductivity. Although graphene can be used in different applications, one issue regarding graphene is its lack of a band gap, which poses a problem in particular with digital electronics because it is unable to switch off field-effect transistors (FETs). Nanosheets of other group-IV elements (Si, Ge and Sn) present structural and electronic properties similar to graphene.



Hexagonal Boron Nitride:

Monolayer hexagonal boron nitride (h-BN), also known as ‘white graphene’, is structurally similar to graphite and features a honeycomb arrangement with alternating boron and nitrogen atoms in place of carbon. h-BN has a higher energy gap (5.97 eV) than



graphene, thus functions as an insulator instead of a semimetal.[6] However, it can also function as a semiconductor with enhanced conductivity due to its zigzag sharp edges and vacancies. h-BN is often used as substrate and barrier due to its insulating property. Furthermore, h-BN also has a large thermal conductivity and mechanical strength. Thus, it can be employed as a support for metal catalyst due to its chemical, thermal, acid-base stability and high thermal conductance.

Transition Metal Dichalcogenides:

Transition metal dichalcogenides (TMDCs) are a class of two-dimensional materials, which have the chemical formula MX_2 , where M represents transition metals from group VI, V and VI, and X represents a chalcogen such as sulfur, selenium or tellurium. TMDCs have layered structure with a plane of metal atoms in between two planes of chalcogen atoms as shown in Figure 1. Each layer is bonded strongly in plane, but weakly in interlayers. Therefore, TMDCs can be easily exfoliated into atomically thin layers through various methods. TMDCs show layer-dependent optical and electrical properties. When exfoliated into monolayers, the band gaps of several TMDCs change from indirect to direct, which lead to broad applications in nanoelectronics and optoelectronics.

Synthesis:

2D semiconductor materials are often synthesized using a chemical vapor deposition (CVD) method. Because CVD can provide large-area, high-quality, and well-controlled layered growth of 2D semiconductor materials, it also allows synthesis of two-dimensional hetero junctions.[11] When building devices by stacking different 2D materials, mechanical exfoliation followed by transferring is often used. Other possible synthesis methods include chemical exfoliation, hydrothermal synthesis, and thermal decomposition.

Device Application:

Some devices applications include electronic devices, photonic and energy harvesting devices, and flexible and transparent substrates.

Electronic Device:

2D Semiconductors can be used as transistors for digital electronics. The impure charges at the interfaces that are free of dangling bonds, allow for 2D semiconductors to run low-power devices. The 2D semiconductor interface has future potential in nano circuits due to its ability to optimize and regulate thermal transfer. Proposed TMDC-based high-electron-mobility transistor device with top-gated Schottky contact and TMDC layers with different doping levels.

Energy and Harvesting Devices:

2D semiconductors have potential for application in the harvesting of solar energy. The atomically thin structure allows for lower surface recombination velocity, which leads to better photocurrent conduction. An improvement on solar cell performance has been shown, while stacking 2D semiconductors with multilayers of graphene.

Flexible and Transparent Substrates:

The thin layer of 2D materials can be used for flexible electronics. In particular, 2D MoS₂ can be used to create thin displays and wearable electronics due to its out of plane flexibility, strong covalent bonds, and diverse electronic properties.

BRUNTHA
II Year ECE

6G MOBILE COMMUNICATIONS TECHNOLOGY

Even before the 5G mobile communications standard was fully deployed, the eyes of many started to turn towards the next generation: the 6G wireless communications system. Although the 5G mobile communications standard is still in the early days of its deployment, ideas are starting to come to the fore to consider what the next generation, i.e. 6G mobile communications might look like.

6G is to be able to meet the needs of the mobile communications when it is launched and for some while afterwards, then it will need to use up to the minute technology - technology which is not available at the moment.

6G, or the sixth-generation wireless communications system is the successor to 5G cellular technology. It is anticipated that 6G networks will be able to use higher frequencies than 5G networks and this will enable higher data rates to be achieved and for the 6G network to have a much greater overall capacity. A much lower latency levels will almost certainly be a requirement.

There are already a number of 6G technology projects, South Korea is well ahead and this institute is conducting research on Terahertz band technology for 6G. They are hoping to make 6G 100 times faster than 4G LTE and 5 times faster than 5G networks. With China investing large amounts into technology, they are keen to gain a lead in 6G. Accordingly MIIT is directly investing and monitoring the research and development process.

Using frequencies much higher in the frequency spectrum opens up more spectrum and also provides the possibility of having much wide channel bandwidth. With huge data speeds and bandwidths required for 6G, the millimetre wave technologies will be further developed, possibly extending into the TeraHertz region of the spectrum. Reducing the size of cells provides a much more overall effective use of the available spectrum. Many new technologies will also be introduced.

There are several candidate forms of duplex that could be considered for the new 6G wireless communications system. Currently systems use either frequency division duplex, FDD or time division duplex, TDD. New possibilities are opening up for 6G including flexible duplex, where the time or frequencies allocated are variable according to the load in either direction or a new scheme called division free duplex or single channel full duplex. This scheme for 6G would enable simultaneous transmission and reception on the same channel.

Although 6G mobile communications is a very long way off, research and development as well as some thought of what 6G might look like is already starting, and the pace will only continue to increase.

M. Anusha Devi

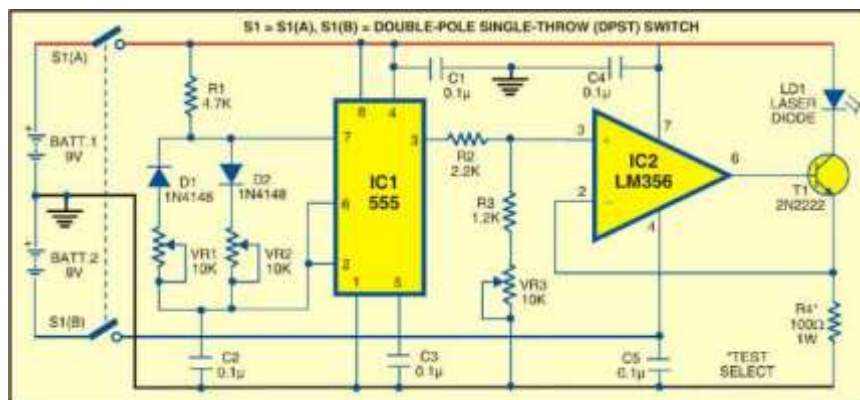
II year ECE

LASER COMMUNICATION SYSTEM

Communicating with laser is not new. In this laser communication system, a laser beam is used as carrier, which is modulated by the signal to be transmitted. On the receiver end, the desired signal is separated from the carrier. A wireless laser link (through a laser diode) is used to transmit information from one end to another in its line of sight. In this circuit, an electrical signal is transmitted from one place to another riding over the laser beam. If you vary some parameters of the transmitted signal (such as amplitude and frequency), the received signal changes accordingly.

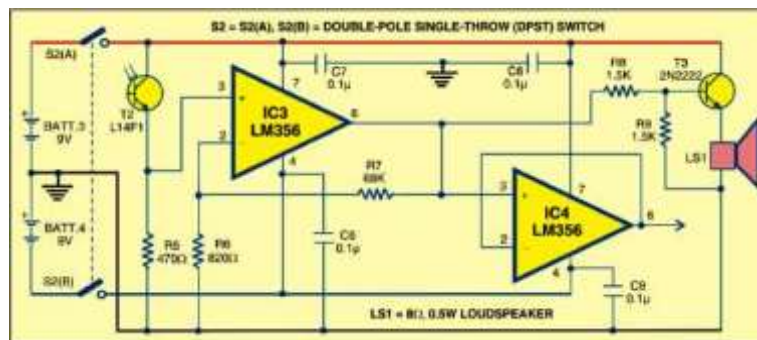
The entire circuit can be divided into two parts: transmitter and receiver.

The transmitter circuit is built around timer 555 (IC1). IC1 is wired as an astable multivibrator generating a pulse train at its pin 3 that serves as the modulation input for the laser diode. Set the frequency of this pulse train to around 1 kHz using presets VR1 and VR2



Transmitter circuit

The potential divider arrangement of resistors R2, R3 and pre-set VR3 is used to reduce the peak amplitude of the pulse train. The driver circuit for the laser diode is built around IC LM356 (IC2), transistor T1 and a few discrete components. The transmitter circuit is powered by two 9V batteries that provide +9V, -9V and ground supplies. These voltages are provided to the transmitter circuit through DPST switch S1.



Receiver circuit

The receiver circuit (shown above) is built around IC3, IC4 and a few discrete components. The gain stage is built around IC LM356 (IC3) with gain value of $(R6+R7)/R6$. The output of IC3 drives a speaker through the emitter-follower arrangement configured around transistor T3. The unity-gain buffer stage built around IC4 facilitates viewing of the received signal on an oscilloscope if so desired. The receiver circuit too is powered by two 9V batteries that provide +9V, -9V and ground supplies. These voltages are provided to the receiver circuit through DPST switch S2.

Circuit operation

Working of the circuit is simple. Align the transmitter and the receiver so that the laser light directly falls on the phototransistor. The speaker connected between the emitter of T3 and ground beeps to indicate that laser communication is taking place. You can change the pitch of the audio beep by changing the frequency of the transmitted signal through presets VR1 and VR2 in the transmitter.

Construction & testing

Assemble the transmitter and receiver circuits on separate general-purpose PCBs. Now adjust presets VR1 and VR2 to get approximately 1kHz pulse signal at pin 3 of IC1. Adjust preset VR3 to ensure that the desired current flows through the laser diode during the transmission.

Conclusion

Laser communication systems are wireless connections through the atmosphere. The light speed is the fastest speed than anything can travel, so laser communication and laser sensing are important in motor defense and other crucial aerospace and defense applications. Lasers are able to see through the dense foliage, and they can allow for space communication from distances measured in millions of miles, we use lasers everywhere such as in the military systems, the avionics and in submarines.

S.Sahaya Prathima

II year ECE

VIRTUAL REALITY

Virtual reality is a **three-dimensional, computer generated environment** which can be explored and interacted with by a person. That person becomes part of this virtual world or is immersed within this environment and whilst there, is able to manipulate objects or perform a series of actions.

Currently standard virtual reality systems use either virtual reality headsets or multi-projected environments to generate realistic images, sounds and other sensations that simulate a user's physical presence in a virtual environment. A person using virtual reality equipment is able to look around the artificial world, move around in it, and interact with virtual features or items. The effect is commonly created by VR headsets consisting of a head-mounted display with a small screen in front of the eyes, but can also be created through specially designed rooms with multiple large screens. Virtual reality typically incorporates auditory and video feedback, but may also allow other types of sensory and force feedback through haptic technology.

The deceased child, seven-year-old Nayeon fell ill and died suddenly of a rare and incurable hereditary disease known as hemophagocytic lymphohistiocytosis three years ago. The child had died within a month of being taken ill. The mother, Jang Ji-sung was able to “reunite” with her daughter in virtual reality thanks to the work of a production team that recreated a virtual Nayeon over a period of 8 months by using photos, videos, family stories as well as 3D scans from her younger sister. The virtual reunion was broadcast in a TV documentary called “Meeting You”. The team worked with a group of 7-year olds to best portrays Nayeon as she had looked in real life. The motion capture used was based on Nayeon’s past videos.

Through voice recognition technology, the daughter’s avatar was able to react to the mother’s voice and even engage in simple dialogue. The mother, in turn, is able to see her own hands in virtual reality: she wears haptic gloves that give her some rudimentary feeling of touch. The developers recreated, in VR, the actual park where both mother and daughter met in real life. These environments were digital replicas of the places both mother and daughter had visited together when the daughter was still alive.



The virtual reunion was a moving one. The mother was equipped with virtual reality goggles as well as a pair of haptic gloves. As she was searching for her daughter, a small virtual voice called out “Umma” (Korean for “mum”). A small girl who looks and sounds like her departed daughter then approaches the mother. The mother uncontrollably breaks into tears when she comes face-to-face with the virtual avatar of her daughter. Now the technology is slowly transcending death.

In the future, it would even be possible for kids to talk to long dead historical figures in the classroom by using their virtual reality, augmented reality or mixed reality devices.

J. MERLIN PRIDA

IV year ECE

SATELLITE TV

Satellite TV is a type of television programming that is wirelessly delivered to TV sets across the world via a network of radio signals, communications satellites, broadcast centers and outdoor antennas. Broadcast signals are transmitted from satellites orbiting the Earth and received by local and regional satellite TV systems.

How Satellite TV service works



Satellite TV technology makes use of specialized antennas known as satellite dishes. These satellite dishes transmit signals to a satellite receiver such as a set-top box or satellite tuner module within a TV set. The programming source transmits signals to a satellite provider broadcast center and these waves are then picked up by a compact satellite dish and broadcast onto television sets.

Overview of Satellite TV Video Content Delivery

Satellite TV service can also be referred to as Direct Broadcast Satellite (DBS or DBSTV) service. A DBS provider will select programming—often a wide range of channels and services—and will then broadcast this content to satellite TV subscribers as part of a larger TV package. DBS programming can either be sent to a digital satellite receiver or an analog satellite receiver. Analog satellite television is slowly being replaced by digital satellite programming. Digital satellite television has become increasingly available in better quality known as HD TV (high-definition television). Digitally-broadcast content is characterized by greater picture and sound quality. Satellite stations and broadcast television stations both transmit TV programming through radio signals. Years ago, the first satellite television TV technologies were broadcast in the C-band radio frequency range. Today, digital satellite TV content is transmitted in the Ku frequency range.

To further understand the technology behind direct-broadcast satellite systems, it is important to review the top features and elements involved in direct-broadcast satellite TV video content delivery: programming sources, satellite provider broadcast centers, satellites, satellite dishes and the satellite receivers. Programming sources refer to networks or channels that offer TV shows and movies for the enjoyment of subscribers. A broadcast center plays an integral role in video content delivery. At broadcast centers, TV providers receive and send broadcast signals to satellites orbiting the Earth.

Before sending out a signal, a broadcast center will convert programming into a digital stream of content. Once satellites have received and processed all of these uncompressed signals, they ultimately rebroadcast them to satellite dishes on Earth. Next, a subscriber's outdoor satellite dish will pick up the broadcast signal and transmit it to the satellite receiver located inside of a home. A satellite receiver then completes the information transmission by

processing the signal and passing it on to a viewer's television set.

Reliability and Reception and Bundle services

If a satellite dish or antenna is knocked out of place by inclement weather, homeowners may need to climb a roof to adjust these setting. Bundling services like television, Internet, phone and home security is often a very convenient option for customers. One advantage of bundled service is a single bill. While cable TV providers frequently offer bundles, satellite TV companies may need to partner up with other carriers in order to provide Internet, phone and other services to their customers.

Direct broadcast via satellite

Direct broadcast satellite, (DBS) also known as "Direct-To Home" can either refer to the communications satellites themselves that deliver DBS service or the actual television service. Most satellite television customers in developed television markets get their programming through a direct broadcast satellite provider. Signals are transmitted using Ku band and are completely digital which means it has high picture and stereo sound quality.

Programming for satellite television channels comes from multiple sources and may include live studio feeds. The broadcast centre assembles and packages programming into channels for transmission and, where necessary, encrypts the channels. The signal is then sent to the uplink where it is transmitted to the satellite. With some broadcast centres, the studios, administration and uplink are all part of the same campus. The satellite then translates and broadcasts the channels.

Most of the DBS systems use the DVB-S standard for transmission. With pay television services, the data stream is encrypted and requires proprietary reception equipment. While the underlying reception technology is similar, the pay television technology is proprietary, often consisting of a conditional-access module and smart card. This measure assures satellite television providers that only authorised, paying subscribers have access to pay television content but at the same time can allow free-to-air (FTA) channels to be viewed even by the people with standard equipment (DBS receivers without the conditional-access modules) available in the market.

T.M.MATHU BHARATHI

IV Year ECE

SMART HOME AUTOMATION

Home automation or domotics is building automation for a home, called a smart home or smart house. A home automation system will control lighting, climate, entertainment systems, and appliances. It may also include home security such as access control and alarm systems. When connected with the Internet, home devices are an important constituent of the Internet of Things ("IoT"). A home automation system typically connects controlled devices to a central hub or "gateway". The user interface for control of the system uses either wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface, that may also be accessible off-site through the Internet.

History

Early home automation began with labor-saving machines. Self-contained electric or gas powered home appliances became viable in the 1900s with the introduction of electric power distribution and led to the introduction of washing machines (1904), water heaters (1889), refrigerators, sewing machines, dishwashers, and clothes dryers. In 1975, the first general purpose home automation network technology, X10, was developed. It is a communication protocol for electronic devices. It primarily uses electric power transmission wiring for signalling and control, where the signals involve brief radio frequency bursts of digital data, and remains the most widely available. By 1978, X10 products included a 16 channel command console, a lamp module, and an appliance module. Soon after came the wall switch module and the first X10 timer. By 2012, in the United States, according to ABI Research, 1.5 million home automation systems were installed. As per research firm Statista more than 45 million smart home devices will be installed in U.S. homes by the end of the year 2018.

Applications and technologies

Heating, ventilation and air conditioning (HVAC): it is possible to have remote control of all home energy monitors over the internet incorporating a simple and friendly user interface. Lighting control system: a "smart" network that incorporates communication between various lighting system inputs and outputs, using one or more central computing devices. Occupancy-aware control system: it is possible to sense the occupancy of the home using smart meter and environmental sensors like CO2 sensors, which can be integrated into the building automation system to trigger automatic responses for energy efficiency and building comfort applications.

Appliance control and integration with the smart grid and a smart meter, taking advantage, for instance, of high solar panel output in the middle of the day to run washing machines. Home robots and security: a household security system integrated with a home automation system can provide additional services such as remote surveillance of security cameras over the Internet, or access control and central locking of all perimeter doors and windows. Leak detection, smoke and CO detectors Indoor positioning systems (IPS). Home automation for the elderly and disabled. Pet and Baby Care, for example tracking the pets and babies' movements and controlling pet access rights. Air quality control. For example, Air Quality Egg is used by people at home to monitor the air quality and pollution level in the city and create a map of the pollution. Smart Kitchen and Connected Cooking.

In 2011, Microsoft Research found that home automation could involve high cost of ownership, inflexibility of interconnected devices, and poor manageability. Historically, systems have been sold as complete systems where the consumer relies on one vendor for the entire system including the hardware, the communications protocol, the central hub, and the user interface. However, there are now open hardware and open source software systems which can be used instead of or with proprietary hardware.

P. Padmini,
IV year ECE

BLUE BRAIN TECHNOLOGY

The BLUE BRAIN project was developed to gain a complete understanding of the brain and to enable better and faster development of brain disease treatments. The research involves studying slices of living brain tissue using microscopes and patch clamp electrodes. Data is collected about all the many different neuron types this data is used to build biologically realistic models of neurons and networks of neurons in the cerebral cortex. The simulations are carried out on a Blue Gene supercomputer built by IBM, hence the name "Blue Brain".

Need of Blue Brain:

Human society is always in need of such intelligence and such an intelligent brain to have with. But the intelligence is lost along with the body after the death. The virtual brain is a solution to it. The brain and intelligence will be alive even after the death. We often face difficulties in remembering things such as people names, their birthdays, and the spellings of words, proper grammar, important dates, history facts, and etcetera. In the busy life everyone wants to be relaxed. Virtual brain may be a better solution for it. Steps for building Blue Brain are **A. Data collection, B. Data simulation, C. Visualization**

A. Data collection:

It involves collecting brain portions, taking them under a microscope, and gauging the shape and electrical behaviour of neurons individually. This method of studying and cataloguing neurons is very familiar and worldwide. The neurons are captured by their shape, electrical and physiological activity, site within the cerebral cortex, and their population density. These observations are translated into precise algorithms which describe the process, function, and positioning methods of neurons. Then, the algorithms are used to generate biologically-real looking virtual neurons ready for simulation.

B. Data simulation:

It concerns with two major aspects: a. Simulation speed b. Simulation workflow
Simulation speed Simulations of one cortical column (more than 10,100 neurons) run about two hundred times slower than real time. It takes about five minutes to complete one second of stimulated time. Each one of the protein is simulated. Note: there are hundreds of millions of proteins in one cell.

BBP-SDK:

The Blue Brain Project - Software Development Kit, a set of Application Programming Interfaces allows the researchers to use and audit prototypes and simulations. The Blue Brain Project SDK is a C++ library wrapped in Java and Python. The primary software used by this for neural simulations is NEURON. Michael Hines of Yale University and John Moore at Duke University developed this in the starting of the 1990s. It uses C, C++, and FORTRAN. It is freely available open source software.

C. Visualization:

It is coded using C++ and OpenGL. RT Neuron is ad-hoc software written specifically for neural simulations, i.e. it can't generalize to other kinds of simulation. RT Neuron takes the output from Hodgkin-Huxley simulations as input in NEURON and delivers them in 3D. This allows the programmers and researchers to view as activation potentials propagate through or between neurons.).

Advantages of Blue Brain:

1. Blue brain is an approach to store and utilize human intelligence and information present in the mind even after human demise.
2. It is an important move towards self-decision making by the computer or machine that holds a Blue brain.
3. Business analysis, attending conferences, reporting, etc. are very significant functions that an intelligent machine can do consistently.
4. It can be used as an interface between human and animal minds. The BBP has become successful in rat and some other animals which is a sign of success.

Disadvantages of Blue Brain:

1. It increases the risk of human dependency on Blue Brain every time.
2. Once a Blue Brain related to a particular person's neural schema is hacked, the brain could be used against the very person.
3. Since it an approach to make machines intelligent and thoughtful it increases the risk of machines conducting war against human (like we have been watching in the movies like Terminator, Universal soldier, etc.)

Computer Hardware/ Super Computers:

1. 4,096 quad-core nodes
2. Each core is a PowerPC 450, 850 MHz
3. Total: 56 teraflops, 16 terabytes of memory
4. 4 racks, one row, wired as a 16x16x16 3D tour
5. 1 PB of disk space, GPFS parallel file system

Uploading Human Brain:

These robots are small enough to travel throughout our circulatory system. Traveling into the spine and brain, they will be able to monitor the activity and structure of our central nervous system. They will be able to provide an interface with computers that is as close as our mind can be while we still reside in our biological form. This information, when entered into a computer, could then continue to function as us. Thus the data stored in the entire brain will be uploaded into the computer.

Applications:

1. Gathering and Testing 100 Years of Data.
2. Cracking the Neural Code
3. Understanding Neocortical Information Processing
4. A Novel Tool for Drug Discovery for Brain Disorders
5. A Global Facility

Conclusion:

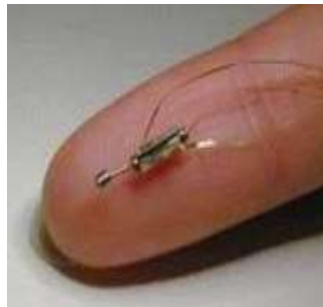
In conclusion, we will be able to transfer ourselves into computers at some point. Most arguments against this outcome are seemingly easy to circumvent. They are either simple minded, or simply require further time for technology to increase. The only serious threats raised are also overcome as we note the combination of biological and digital technologies. While the road ahead is long, already researches have been gaining great insights from their model.

N.SREE RENGAYAKI

II year ECE

NANOBOTS

Nanobots are robots that carry out a very specific function and are ~50–100 nm wide. They can be used very effectively for drug delivery. Normally, drugs work through the entire body before they reach the disease-affected area. Using nanotechnology, the drug can be targeted to a precise location which would make the drug much more effective and reduce the chances of possible side effects. Below figure shows a device that uses nanobots to monitor the sugar level in the blood. Special sensor nanobots can be inserted into the blood under the skin where microchips, coated with human molecules and designed to emit an electrical impulse signal, monitor the sugar level in the blood.



The drug carriers have walls that are just 5–10 atoms thick and the inner drug-filled cell is usually 50–100 nm wide. When they detect signs of the disease, thin wires in their walls emit an electrical pulse which causes the walls to dissolve and the drug to be released. A great advantage of using nanobots for drug delivery is that the amount and time of drug release can be easily controlled by controlling the electrical pulse. Furthermore, the walls dissolve easily and are therefore harmless to the body. Elan Pharmaceuticals has already started using this technology in their drugs Merck's Emend and Wyeth's Rapamune. Nanomedicine could make use of these nanorobots (e.g., computational genes), introduced into the body, to repair or detect damages and infections. Using nanotechnology, the drug can be targeted to a precise location which would make the drug much more effective and reduce the chances of possible side effects. In the future, these nanorobots could actually be programmed to repair specific diseased cells, functioning in a similar way to antibodies in our natural healing processes.

S.SRILEKHA

IV year ECE

BARCODES AND BARCODE SCANNERS

A **barcode reader** (or **barcode scanner**) is an optical scanner that can read printed barcodes, decode the data contained in the barcode and send the data to a computer. Like a flatbed scanner, it consists of a light source, a lens and a light sensor translating for optical impulses into electrical signals. Additionally, nearly all barcode readers contain decoder circuitry that can analyze the barcode's image data provided by the sensor and sending the barcode's content to the scanner's output port. Remember those black and white bars on every other manufactured product. Shampoos, cereal boxes and on every beauty product, these intermediate black, and white lines are called "Barcodes". This pattern of white and black lines carry in themselves information through which you can track the item, they also have the price etched in them along with the stock level. So if you have to reprice all the items you can do so easily by simply varying the information regarding the barcode.

Hardware Required For Barcode Reader:

To run a barcode-based system you need three parts. First is the central computer which keeps the record of your sold items, the price of all products and a number of items you have left and how many you have run out on. Second are the barcodes you already have on the products and third the most important is the barcode scanner present at every check out point.

Working of the Barcode-Scanner:

Most important is to be able to read the barcodes. The barcode scanners quickly read the white and black lines and feed them to a computer which quickly displays the coded information. There are three parts to a barcode scanner:

Illumination System: The scanner shines a red LED light or laser light onto the code. Keep in mind that the white areas of the barcode will reflect more light and the black areas will reflect the least.

Sensor/Converter: The sensor will achieve the reflected light in the form of an analog signal. Which will be a set of on-off pulses corresponding to illumination (white stripes) and lack of illumination (black stripes). This signal will be further detected by a converter which will convert it to the form of binary digits of 1's and 0's (e.g. 1011001).

Decoder: A decoder will decipher these binary digits to the ASCII text format. This decoded information is finally perceived by the computer in decimal format.

G.L.ASWINI

IV YEAR,ECE

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. The term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving".

The traditional problems of AI research include reasoning, knowledge representation, planning, learning, natural language processing, perception and the ability to move and manipulate objects. General intelligence is among the field's long-term goals. Approaches include statistical methods, computational intelligence, and traditional symbolic AI. Many tools are used in AI, including versions of search and mathematical optimisation, artificial neural networks, and methods based on statistics, probability and economics. The AI field draws upon computer science, information engineering, mathematics, psychology, linguistics, philosophy, and many other fields.

AI is relevant to any intellectual task. Modern artificial intelligence techniques are pervasive and are too numerous to list here. Frequently, when a technique reaches mainstream use, it is no longer considered artificial intelligence; this phenomenon is described as the AI effect.

High-profile examples of AI include autonomous vehicles (such as drones and self-driving cars), medical diagnosis, creating art (such as poetry), proving mathematical theorems, playing games (such as Chess or Go), search engines (such as Google search), online assistants (such as Siri), image recognition in photographs, spam filtering, predicting flight delays ,prediction of judicial decisions, targeting online advertisements, and energy storage.

With social media sites overtaking TV as a source for news for young people and news organisations increasingly reliant on social media platforms for generating distribution, major publishers now use artificial intelligence (AI) technology to post stories more effectively and generate higher volumes of traffic.

AI in healthcare is often used for classification, whether to automate initial evaluation of a CT scan or EKG or to identify high risk patients for population health. Artificial intelligence is assisting doctors. According to Bloomberg Technology, Microsoft has developed AI to help doctors find the right treatments for cancer. There is a great amount of research and drugs developed relating to cancer. In detail, there are more than 800 medicines and vaccines to treat cancer.

Advancements in AI have contributed to the growth of the automotive industry through the creation and evolution of self-driving vehicles. As of 2016, there are over 30 companies utilising AI into the creation of self-driving cars. A few companies involved with AI include Tesla, Google, and Apple.

Financial institutions have long used artificial neural network systems to detect charges or claims outside of the norm, flagging these for human investigation. The use of AI in banking can be traced back to 1987 when Security Pacific National Bank in US set-up a Fraud Prevention Task force to counter the unauthorised use of debit cards. Programs like Kasisto and Money-stream are using AI in financial streams.

The cyber security arena faces significant challenges in the form of large scale hacking attacks of different types which harm organisations of all kinds and create billions of dollars in business damage. Artificial intelligence and Natural Language Processing (NLP) has begun to be used by security companies - for example SIEM (Security Information and Event Management) solutions. The more advanced of these solutions use AI and NLP to automatically sort the data in networks into high risk and low risk information. This enables security teams to focus on the attacks that have the potential to do real harm to the organisation, and not become victims of attacks such as Denial of Service (DoS), Malware and others.

Artificial intelligence paired with facial recognition systems may be used for mass surveillance. This is already the case in some parts of China. An artificial intelligence has also competed in the Tama City mayoral elections in 2018. In 2019, the tech city of Bangalore in India is set to deploy AI managed traffic signal systems across the 387 traffic signals in the city. This system will involve use of cameras to ascertain traffic density and accordingly calculate the time needed to clear the traffic volume which will determine the signal duration for vehicular traffic across streets.

The main military applications of Artificial Intelligence and Machine Learning are to enhance C2, Communications, Sensors, Integration and Interoperability. Artificial Intelligence technologies enable coordination of sensors and effectors, threat detection and identification, marking of enemy positions, target acquisition, coordination and deconfliction of distributed Join Fires between networked combat vehicles and tanks also inside Manned and Unmanned Teams (MUM-T).

Thus AI today is properly known as narrow AI (or weak AI), in that it is designed to perform a narrow task (e.g. only facial recognition or only internet searches or only driving a car). However, the long-term goal of many researchers is to create general AI (AGI or strong AI). While narrow AI may outperform humans at whatever its specific task is, like playing chess or solving equations, AGI would outperform humans at nearly every cognitive task.

S.R.BEAUNA ASHMI

IV YEAR ECE

AUGMENTED REALITY

ABSTRACT

Augmented Reality is a breakthrough technology that could considerably ease execution of complex operations. Augmented Reality mixes virtual and actual reality, making available to the user new tools to ensure efficiency in the transfer of knowledge for several processes and in several environments.

DEFINITION

Augmented reality is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory and olfactory.

TYPES OF AR

- Markerless AR
- Marker based AR
- projection-based AR
- superimposition based AR

How does Augmented Reality work?

For AR a certain range of data (images, animations, videos, 3D models) may be used and people will see the result in both natural and synthetic light. Also, users are aware of being in the real world which is advanced by computer vision, unlike in VR.

AR can be displayed on various devices: screens, glasses, handheld devices, mobile phones, head-mounted displays. It involves technologies like S.L.A.M. (simultaneous localization and mapping), depth tracking (briefly, a sensor data calculating the distance to the objects), and the following components:

- Cameras and sensors Collecting data about user's interactions and sending it for processing. Cameras on devices are scanning the surroundings and with this info, a device locates physical objects and generates 3D models. It may be special duty cameras, like in Microsoft Hololens, or common smartphone cameras to take pictures/videos.
- Processing AR devices eventually should act like little computers, something modern smartphones already do. In the same manner, they require a CPU, a GPU, flash memory, RAM, Bluetooth/WiFi, a GPS, etc. to be able to measure speed, angle, direction, orientation in space, and so on.
- Projection This refers to a miniature projector on AR headsets, which takes data from sensors and projects digital content (result of processing) onto a surface to view. In fact, the use of projections in AR has not been fully invented yet to use it in commercial products or services.

- Reflection Some AR devices have mirrors to assist human eyes to view virtual images. Some have an “array of small curved mirrors” and some have a double-sided mirror to reflect light to a camera and to a user’s eye. The goal of such reflection paths is to perform a proper image alignment.

CONCLUSION

When the quality of the output or task efficiency of an experience is improved for the user, there is no doubt that the future will belong to AR. Augmented Reality (AR) has evolved from pipe dream (dreams of tech enthusiasts) to a substantial reality in just within a century.

PRIYANKA M

III year ECE

3D BIOPRINTING OF TISSUES AND ORGANS

Bioprinting is an additive manufacturing process where biomaterials such as cells and growth factors are combined to create tissue-like structures that imitate natural tissues. The technology uses a material known as bioink to create these structures in a layer-by-layer manner. The technique is widely applicable to the fields of medicine and bioengineering. Recently, the technology has even made advancements in the production of cartilage tissue for use in reconstruction and regeneration.

In essence, bioprinting works in a similar way to conventional 3D printing. A digital model becomes a physical 3D object layer-by-layer. In this instance, however, a living cell suspension is utilized instead of a thermoplastic or a resin. For this reason, in order to optimize cell viability and achieve a printing resolution adequate for a correct cell-matrix structure, it's necessary to maintain sterile printing conditions. This ensures accuracy in complex tissues, requisite cell-to-cell distances, and correct output.

Biopolymers can be encapsulated with cells and printed into lattice structures for the analysis for cardiac function. A technique that can potentially combine the advantages of the hydrogel approach with ease in tailoring tissue shape and size is inkjet printing. Cardiac constructs based on feline cardiomyocytes were created by printing cell solutions onto alginate and using calcium as a cross-linking agent. This approach may be particularly useful for coculture because it enables precise control over cell location in the tissue construct. Decellularized ECM bioink capable of printing various tissues. The ink, which consists of decellularized heart tissue, had a positive effect on cardiac tissue maturation. They demonstrated that there was an upregulation of fast myosin heavy chain and α -sarcomeric actinin compared with the control gel. Alternatively, a gelatin-based bioink encapsulated with gold nanoparticles was developed. The conductive bioink was loaded with neonatal rat cardiomyocytes and was printed into a lattice structure. The **3D bioprinting market** is projected to rise at a promising pace over the forecast period of 2017–2025. The growth of the market is propelled by the rising demand for high-throughput 3D-bioprinted tissue models for research and drug discovery. The constant pace of technological advances in the pharmaceutical and biotechnology sectors is underpinning the growth of the market. The need for advanced drug screening tests has led 3D bioprinting act as a promising candidate in toxicology. This is catalyzing the growth of the 3D bioprinting market. The vast potential of 3D printing process in regenerative therapies, such as for generation and transplantation of tissues, accounts for the lucrativeness of the market in the medical sector.

The reduction in the cost of 3D printers in recent years had helped in the rapid expansion of the 3D bioprinting market.



However, the equipment used for 3D bioprinting is still unaffordable to emerging economies at large.

Relentless research to bring improvements in 3D bioprinting are Unlocking promising prospects in the market. Furthermore, rapid advances made in biotechnology in developed nations is also supporting the expansion of the 3D bioprinting market. The trend of personalized medicine will also impart a remarkable momentum to the growth of the market.

Y.AKSHAL JASMINE,
III Year ECE





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