

Society for Promotion of Electronics Culture

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LOOK INSIDE

Latest tech developments

Alumni talks

NITH Survey

Future Electronics

and more....

Department of Electronics & Communication
Engineering

About SPEC

SPEC is being run under the aegis of Electronics and Communication Department, NIT Hamirpur and the department itself has collaborating in the various activities conducted by SPEC. It is a self governing body run by the students of Electronics and Communications department.

Students of Electrical and Electronics engineering and Computer science engineering students are also involved as volunteers.

SPEC organises events, workshops and educational tours for the students. It is a non profit society run by allotted funds, funds collected from members and sponsorships from private organisations. The society holds a prominent position among various societies present in college.

The society events can be judged by various events. The national level workshop Robotics stands as major event so far conducted events in 2008.

Other major events include Digital Audio Effects Workshops Visit to radiostation, Telephone exchanges, Placement Chakra etc. The wall events, Specfest, and other competitions conducted at regular period are major hit among the students. WE have been successful till now, and we expect similar participation in the future also.



VISION STATEMENT

"To build a vibrant multicultural learning environment founded on value based academic principles, wherein all involved shall contribute effectively, efficiently and responsibly to the nation and global community."

WHY ANVESHAN ???

What is technology ? Ok fine... leave that, what is information.. ?

Well you will have some definitions for this. But how do you get information info regarding anything, tech as a matter of fact.

Yeah ...I know what you are thinking...THE INTERNET.

So,a curious mind opens the browser & then what,just stare at the blank page. This is a baffling situation thanks to the technology boom. We have information overdose.

You have the internet, the means yet you are not able to.....why ? Just because there are so many things and you have no idea how to start. This is where Anveshan comes. Anveshan means TO EXPLORE.

That is what we want you to. The articles here are just a window to a wider horizon. Maybe at times you do have something in your mind and wiki is there for that. But with so much available, do you have the patience to read all of it, and not just wiki, read everything that is available over the internet.

No right, there is just too much out there. The articles here try to provide things in a concise form, to give what we feel is necessary and enough to evoke interest in you. But these might be available in some websites also. So is gaining knowledge all that is required. What about your future prospects ?

You might want to know them, the prospects that are available to you in your current scenario - the interview section is for this. And of course we want you to know us - team SPEC. Anveshan is our way of giving you a spark so that you can further explore it and make it into a fire.

As Lillian Russell said it's time to open up a new chapter and explore a larger circle.



Er. Desh Raj Rana
Head,
E&CE Department

MESSAGE

The field of electronics is pivotal in all respects of our lives. A student pursuing electronics and communication engineering should possess good knowledge and equip himself/herself with the latest advancements of this field based on sound fundamentals.

They, not only have to serve this stream but also the nation and furthermore the world in the interest of the society. For this very purpose our department has shown decent growth in recent times. We have fully equipped laboratories to match with the highly qualified staff to impart the required knowledge, as per the new curriculum, to the students especially in fields of VLSI, Communication system and Digital electronics.

Our departmental society, SPEC, has taken an innovative step in spreading the electronics culture among those who are unaware of it. It will introduce its readers with the world of tomorrow and encourage them to contribute in its growth.

I congartulate Team SPEC for successful release of the annual magazine **ANVESHAN**.

Er. Philemon Daniel
OIC,SPEC
E&CE Department



Society for Promotion of Electronics Culture (**SPEC**) is a society which should be entirely managed by students. It should flourish like a culture and do a lot of projects. There can be two sets of projects: one, trying out things that students learn in their classroom and the other should be to catch up with the latest technology and trying out something like robotics, computing etc.

For that very purpose, SPEC launching its own e-book is a good innovative step. It will be a source of inspiration for many and would also be a platform to share and to show our departmental activities and growth to the outside world.

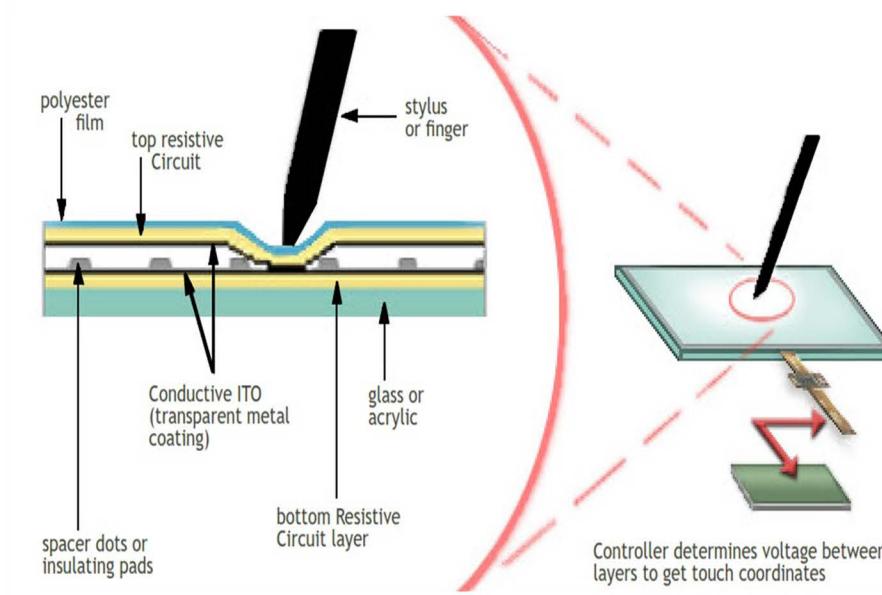
So an advice for its readers: keep reading, keep writing, keep yourself updated, look forward to inspiring stuff and the future because it's just the start. Hopefully this will become a good base for the students to learn electronics and get inspiration to do fruitful things.

Touchscreen

One of the most important technological advances of the past five years is touchscreen technology. Just as the mouse and the first graphical user interfaces revolutionised computing in the 1980s, touchscreen control has continued to break down the barrier between people and technology, making complex devices easy to use.

In the cell phone industry there are two major categories of touchscreen displays: **capacitive touchscreens** and **resistive touchscreens**

RESISTIVE TOUCH-SCREEN



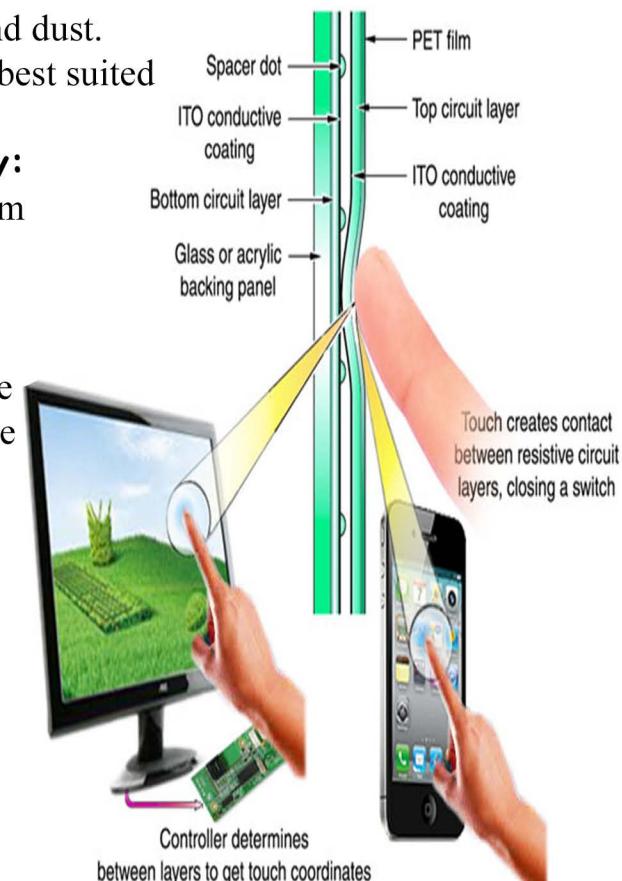
Resistive touchscreens work on the basis of pressure applied to the screen. There's a flexible upper layer of conducting polyester plastic bonded to a rigid lower layer of conducting glass and separated by an insulating membrane. When you press on the screen, you force the polyester to touch the glass and complete a circuit. A chip inside the screen figures out the coordinates of the place you touched.
e.g-Sony Ericsson Vivaz ,Nokia N97 mini , Nokia N97 mini , Nokia N97 mini

Advantages of resistive touch screen technology:

- => Resistive touch screen technology offers relatively low cost.
- => Resistive touch screen provides high resistance to water and dust.
- => For handwriting recognition, Resistive touch screen is the best suited technology.

Disadvantages of Resistive Touchscreen technology:

- => The Resistive Touchscreen transmits only 75% of light from the display monitor
- => Resistive touch screen can be easily damaged by poking, scratching and by any impact.
- => In Resistive Touchscreen, the finger touching required little pressure since the Resistive Touchscreen is not too sensitive
- => Its main drawback is, it sense only one finger at a time.

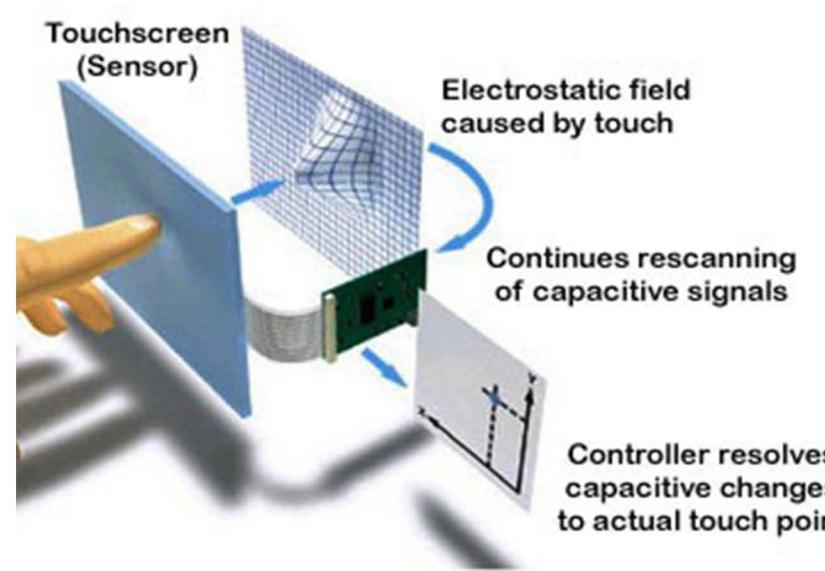


APPLICATION OR USES:

Resistive Touchscreen is commonly used in hospitals, restaurants and factories due to their high resistance to fluids and pollutant.

Technology

CAPACITIVE TOUCH-SCREEN

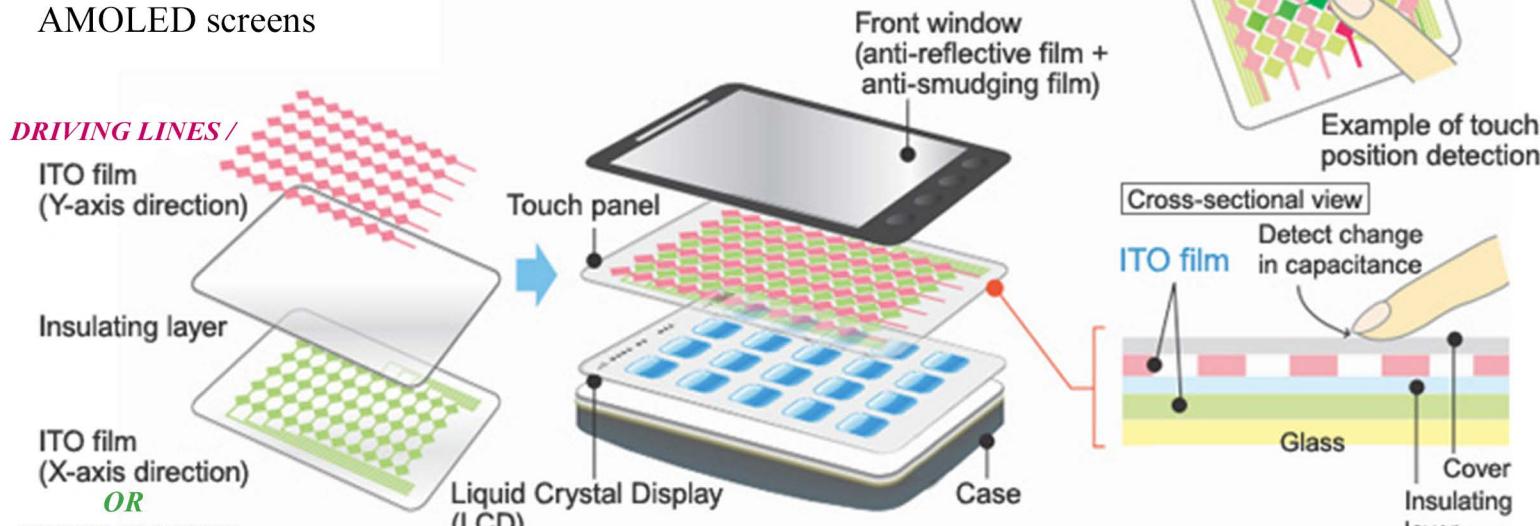


Advantages of Capacitive touch screen technology:

- => Capacitive screens can be touched in more than one place at once.
- => The capacitive touch screen transmits about 90% of light from the display monitor.
- => In capacitive touch screen, we can easily touch the screen without much pressure

Popular Brands that use capacitive touch screen technology:

Used in Samsung, LG and other famous brand smartphones also used in Apple Smartphones & Samsung's Super AMOLED screens



- CONSIST OF CONDUCTIVE LAYER MADE UP OF TWO LAYER : A LAYER OF DRIVING LINES AND A LAYER OF SENSING LINES.
- THESE TWO LAYERS ACT AS A GRID THAT CREATE SENSOR POINTS FOR EVERY POSITION ON TOUCHSCREEN

THE HUMAN BODY IS A CONDUCTOR OF ELECTRICITY WHEN A FINGER TOUCHES THE SCREEN IT DISTORTS THE ELECTROSTATIC FIELD.

THE DISTORTION OR CHANGE IN THE FIELD CHANGE CAPACITANCE WHICH IS MEASURED BY A CONTROLLER TO DETERMINE THE ACTUAL TOUCH POINT

DURING MULTIPLE TOUCH EACH POSITION IS TRIGGERED INDEPENDENTLY. THIS ALLOWS THE DEVICE TO SENSE MORE THAN ONE FINGER AT ONCE AS WELL AS SENSE MOVEMENT OF FINGERS

THE SOFTWARE /PROCESSOR INTERPRETS THIS DATA AS COMMANDS AND GESTURES AND RESPOND INSTANTANEOUSLY.



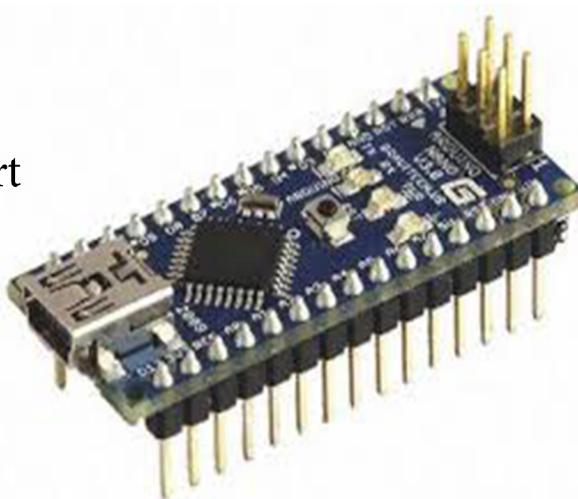
World's Lowest Power SAM

L21 ARM Chip Runs for Decades on a Single Charge

Over the years as the Internet Of Things has burgeoned, the one problem that people have been pondering over is that of energy consumption. How many times have you found yourself to be frustrated over your smartphone or tablet's battery backup? Short battery life has indeed become a thorn (think of the Apple Watch and probably the first thing that automatically comes to your mind is a nagging suspicion over its battery life, isn't it?)

But as technology continues to expand its horizon, Atmel- a company involved in embedded computing, microcontrollers and automotive processors has taken leaps and bounds in this field by launching the new Smart SAM L21 family of processors which operate more than ten years on a single charge.

Based on the Cortex-M0+ MCU (microcontroller) & utilizing sophisticated power gating methods , the SAM L21 managed to get a power consumption level an astounding 35 microamps/MHz whilst the processor is active compared to 120-160 microamps consumed by most low-power controllers. What's even more interesting is that it ends up using only 200 nanoamps when idle- which is so little that it can run off energy drawn from your body.



Flash / SRAM / LP SRAM	SAM L21 family		
256KB / 32KB / 8KB	SAM L21E	SAM L21G	SAM L21J
128KB / 16KB / 8KB	3x 16b T/C 4x SERCOM 10-ch ADC 2-ch DAC 2x An.comp	3x 16b T/C 6x SERCOM 14-ch ADC 2-ch DAC 2x An.comp	5x 16b T/C 6x SERCOM 20-ch ADC 2-ch DAC 2x An.comp
64KB / 8KB / 4KB			
32KB / 4KB / 2KB			
Package	32-pin QFN and TQFP	48-pin QFN and TQFP	64-pin QFN and TQFP

Main Features and Functions in all devices:

ARM Cortex M0+ CPU at 48 MHz, 1.62-3.6V operation, -40°C – 85°C temp grade
Ultra low power analog: 12-bit 1 Msps ADC, 12-bit DAC, 2 analog comparators, **3x op-amp**
 Peripheral Touch Controller, 32-bit RTC with calendar mode, AES, TRNG
 12-ch Event system, and 16-ch DMA controller with **next generation SleepWalking**
 USB host/device, SERCOM supports USART, UART with autobaud,
 SPI, I²C up to 3.4MHz, PM/SMBus, IrDA
 3 Timer/Counters for Control applications, **Ultra low power SERCOM and Timer/Counter**

With over two decades of MCU experience, ultralow power picopower technology is part of Atmel's heritage starting with AVR family the SAM L21 MCUs leverage this low power expertise and are enabling customers to solve their power challenges for battery powered IOT devices.



it also boosts of a 42 MHz Cortex M0+CPU core, 256 kb of flash memory, 32kb of static RAM and 8kb of low power static RAM and could be used for various healthcare, wearable, medical devices and fire alarms.

Still there is a long way to go before the processing power is enough to support say an Ubuntu desktop or an iPhone.



VARIOUS PROSPECTS AFTER B.TECH

What should i do after my engineering graduation? Should i go for MBA or MS, or rather should i directly look for a job? All engineering students at some point of time have this thought in their mind. This article talks about the Various Career Options you can choose from after your B. Tech.

Before we start exploring the options available, let us keep three things in mind:

- Don't leave an option straight forward because it is too mediocre. You don't need to follow others but to follow your heart.
- It's okay if a million other people like you are preparing for an entrance exam, including your friends! If you believe you can crack the exam, YOU CAN.
- Everybody is not born to graduate, do an MBA and get a high paying job. If people like Gandhi, SC Bose and APJ Abdul Kalam thought this way the world would have missed a lot of positive changes. Be the change you want to see in the world.



1. Campus Placement:-

Already bored of studying? Then getting selected in a decent company visiting your campus seems a good option. If you don't have any intentions of studying further, or at least immediately after B. Tech, you can opt for a job. This is considered to be a safer option where you get time to decide which field you want to stick to-Technical or you want to shift your core interest area from technical to management to some other stream.



2.M.S/M. Tech:-

If you studied engineering out of passion and not because you were forced by your parents or just for sake of doing it, then MTech/M.S. is a good option. You can opt for the field of study you aspire to expertise in. If you are ready to go outside India and financially sound you can prefer M.S . You need to appear for GRE/TOEFL for doing M.S in foreign countries.



(a) GRE:

It is an standardized test that's an admission requirement for many graduate schools in English speaking countries . It is created and administrated by the Educational Testing Service and is similar in format and content to the SAT. It is a computer based online test. The percentile scored in this exam will decide your future in doing M.S in foreign nations.

(b) TOEFL:

The test of English as a foreign language (or TOEFL*, pronounced "toe-full" or sometimes "toffle") evaluates the potential success of an individual to use and understand American English at a college level. It is required for non-native applicants at many English-speaking colleges and universities. A TOEFL score is valid for two years and then is deleted from the official database. The TOEFL test is a registered trademark of Educational Testing Service(ETS) and is administered worldwide. The test was first administered 1964 and has since been taken by nearly 2 million students.

3. MBA:-

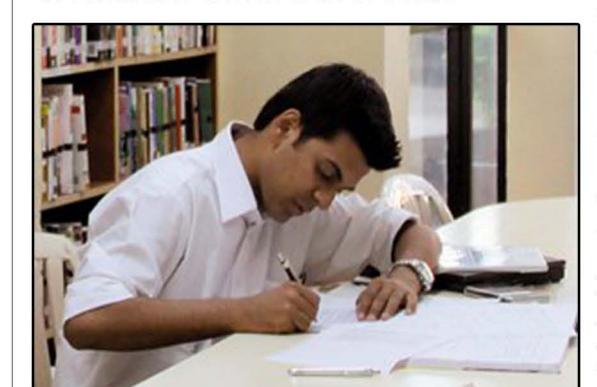
Don't feel you are the technical guy your parents wanted you to be? Always felt like you are a manager and want to see yourself in a business suit in some MNC? Probably you have a fascination for MBA too.



(b) GMAT:

The Graduate Management Admission Test is a standardized test for determining aptitude to succeed academically in graduate business studies. The GMAT is used as one of the selection criteria by most respected business school globally, most commonly for admission in MBA program. The GMAT uses many factors as like in schools, use when reviewing applications for admission; it is typically balanced with work experience, grades in previous schools, recommendation letters and other admissions criteria.

4. Indian Civil Services:-



Civil services examination is a nationwide competitive examination in India conducted by UPSC for recruitment to various Civil Services of the India, including IAS, IFS, IPS, IRS and others. With these jobs it carries great respect and responsibilities. India's best brains vie for entry into the ICS as officers. Even though corporate jobs may offer the best of salaries and perks, a majority of youngsters and their parents still crave entry to the prestigious ICS. The very fact that a big share of every year's top posts in the civil services exams are bagged by professionals

(c) GATE:

Conducted by one of seven IITs in rotation, Graduate Amplitude Test in Engineering is an annual exam for admission to M. Tech and M.S. programmes in most engineering institute in India. It is regarded as a benchmark test for engineering graduates in India. This examination is coordinated by a committee, comprising of Indian Institute of Science, Bangalore and seven IITs on behalf of the national coordinating board- GATE, Department of education , and Government of India. The pattern and syllabus are usually based on a candidate's B.Tech, BE, B. Arch. or Masc. The exam is usually conducted on second Sunday of February.

PSU's like BARC , BHEL, NTPC, IOCL, BPCL, GAIL, CEL, NALCO, HAL etc. give importance to GATE scores for various job positions in their organisations.

Taking the power of digital
to the next level.
Empowering people.
Enriching lives.



LAUNCH OF INNOVATIONS AT #DIGITALINDIAWEEK

e-SERVICES



The Digital India initiative will touch people's lives in several ways. All sections of society will be touched by the Digital India initiatives.

Digital India is an endeavour to empower our demographic dividend with digital strength.

Why must a skilled nation like India import electronic goods?

Let us think of making quality electronic goods that are globally competitive. Similarly, I invite the world to come and 'Design in India'- and take advantage of the opportunities India has to offer for the digital world.

4 BENEFITS OF NATIONAL SCHOLARSHIPS PORTAL



#DIGITALINDIAFIRSTLOOK

There is one more area where Digital India must focus on and that is cyber security. This is something that can everyone - political leaders, business leaders, professionals, students. Earlier a pickpocket could rob you off your money but now, it takes one click and that too from thousands of miles away to rob you off your hard earned money. Similarly, the nature of warfare is changing and cyber warfare is gaining currency. In such circumstances, India must show the way to the world by assuring them that an Indian product can keep the cyber world secure.

'I Dream of Digital India'

PM Narendra Modi

On 1st July 2015, we commenced a special journey, a journey towards a Digital India, where technology will play a pivotal role in India's progress.

We are doing everything possible to encourage the already vibrant start-up ecosystem in India so that this is the land from where the next big idea emerges.

At the programme to launch Digital India I met several youngsters, who were very upbeat about the initiative. Captains of industry were present and they committed their support and active participation in the Digital India programme. I see this as an encouraging sign. I invite all of you to support us in this quest and together, we can fulfil this dream of a Digital India!

PM Dreams of Digital India where :

1. 1.2 billion Connected Indians drive Innovation
2. Knowledge is strength and empowers the People
3. Access to Information knows no barriers

4. Technology ensures the Citizen-Government Interface is Incorruptible
5. Quality Education reaches the most inaccessible corners driven by Digital Learning
6. Government proactively engages with the people through Social Media
7. Quality Healthcare percolates right up to the remotest regions powered by e-Healthcare
8. Farmers are empowered with Real-time Information to be connected with Global Markets
9. e-Commerce drives Entrepreneurship
10. The Netizen is an Empowered Citizen

3 KEY SERVICES OF E-HOSPITAL



ONLINE APPOINTMENT



LAB REPORTS



BLOOD AVAILABILITY

#DIGITALINDIAFIRSTLOOK

4 BENEFITS OF E-SIGN

SAVES COST AND TIME

TAMPER-PROOF DIGITAL SIGNATURE

LEGALLY RECOGNIZED

PRIVACY MAINTAINED



#DIGITALINDIAFIRSTLOOK

5 EASY STEPS TO USE A DIGITAL LOCKER



LOGIN USING AADHAAR CARD



UPLOAD YOUR DOCUMENTS



VIEW DOCUMENTS ISSUED BY DEPARTMENTS



DIGITALLY SIGNED DOCUMENTS



SHARE YOUR DOCUMENTS

#DIGITALINDIAFIRSTLOOK

ALUMNI-TALK

Rajat Agarwal, ECE-D, Batch 2013



Tell us about yourself & your time after college?

I majored in Electronics & Communication Engineering in 2013 and then joined Samsung Research Institute, Bangalore as a Multimedia Hardware Designer. I am a full time sports enthusiast and a part time sports blogger.

SAMSUNG



What do you think is preferable after graduation, job or higher studies?

I feel no one can answer this question for you. It has to be your decision and your choice. It is advisable that one should not go for higher studies without knowing his/her interest. Projects can surely help you find your choices. They are golden opportunities to get in close with the real thing and help you build up your pragmatic approach to all the studies you do. That would act as an emulation of what you would do in the industry when you come out of your college. It would help you all to find your field of interest. If you really find your interest and get convinced in which field you want to work in and don't find a job opportunity in that field, go for Masters. Post-graduation would do a world of good both in increasing your expertise and creating more job opportunities. If you don't find your interest then try for jobs and start exploring things. Eventually you will know where you want to go. Just remember that it's never too late. There may even be some students who couldn't build up their interest in any technical field and want to do something else, maybe go for Management studies or Administrative Services. So just go for it, you will definitely excel where your interest lies.

What measures can be taken to improve the placements at our college?

Addressing the issue of placements, there are 2 types of companies which enter a college. One which has a good past experience with the college and the alumni did a good job in their company. These are sure shot companies who will definitely visit the campus unless they stop placements due to some internal crisis, where you can't do anything. The others are the new companies which you would try to directly contact or through some alumni. It is really difficult to convince new companies to visit our college, considering the location and accessibility of our college. But you always have to try. If they come, be prepared and perform well so that those companies start falling in the first category next year. Stay in contact with the placement cells of other colleges in North India and allure companies which come there. It is easier for a company to add one more stoppage in its schedule then to individually come to every college. But I feel the placement status is at par with all other NITs, there is not much disparity. Talking about just the ECE department, there are not many hardware oriented companies in India. The ones which are there are located at Bangalore, Hyderabad, Chennai and Pune. It becomes nearly impossible to call these companies to our college, considering the options of engineering colleges they have in these cities. So if you really are interested in going for a hardware profile, don't worry, you can surely try off campus. There is no paucity of jobs for talented and intellectual students. And NIT Hamirpur has no dearth of such students.

Please tell us one thing where students of NIT-H can improve?

After joining my company, I felt that we all lack in some kind of practical knowledge about all the subjects we study. We study Analog, Digital, Embedded, Communications and so many other subjects but most of us do not realize how they are used at various fields in the current technology.

It is not even necessary to master all subjects if you think you can't. Choose some subjects of your interest and start broadening your knowledge in those. Pursue projects (even beyond your minor and major projects) in them by which you can enter into the practicality aspect of it. You all will surely enjoy it and if you don't, then that is not your real interest. Try experimenting with your interests till you find the right one and then venture into that field whole heartedly.

Can you tell us any worth sharing experience for your juniors?

College time would be one of the most precious and memorable phases of your life. So make full use of it. Try to come out of your hostels and participate in things happening around you. It's a place where you can build up your personality. Try to create a balance in your studies, sports and cultural activities. Enjoy every moment with your friends at a wonderful place. Our college has surely the most aesthetic campus in the country.



What else we should do apart from studies? And what projects will be helpful to us for future?

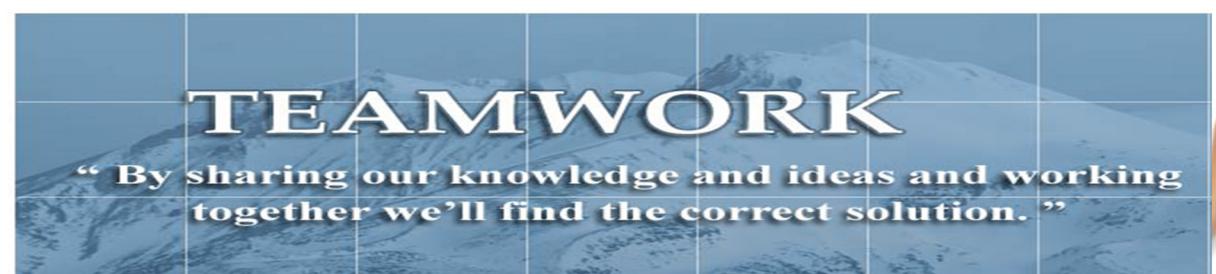
Start doing projects of your interest, study state of art things, think about them, and even try for paper presentations. Do discuss your ideas with your buddies and seniors. Bug your teachers and even your alumni for that matter whenever you are struck and try to gather information. Everyone would be very keen to help you. Surely you all would have come across some wild ideas but would have let them go. Its better you realize them in real world and even if it fails, at least you would not repent that you did not try. Do not take easy options for your minor and major projects. Be updated with the latest technologies and try to take up projects related to them, which would really help you in future.

What were the challenges that you face when you were in SPEC?

Spreading electronics culture is by no means a simple task, considering the inputs required in terms of hardware components which are not easily available at our place. Comparing with let's say CSE department where there is no such obstacle. During our time, to make some projects or even conducting some events, we had to go to Chandigarh to buy the components. Is the same situation prevalent? The other major challenge we faced while conducting some event was to get the hostel ridden students out to participate. Unless the participation is there, the whole purpose of the event is just blown away.

What are your views about SPEC? Are you satisfied with the work that team spec prefers every year?

First of all Kudos to Team VIBHAV for winning the coveted "Best Departmental Team" Award in NIMBUS 2015. It is definitely a great achievement. Congratulations to all the SPECians too, for continuing this club in the right spirit. Hope you all are doing fine! I got to know that you had a very successful SPEC fest and came out with a magazine. That is a great development. A message for all the SPEC members would be to create a more research oriented environment in the college. It is one area where we do lack behind other colleges. SPEC is a great place to learn, interact and enjoy. All like-minded people of all the 4 years come together and share their thoughts. Try to make full use of it.



sixthsense

integrating information with the real world

Sixth Sense is a gesture-based wearable computer system developed at MIT Media Lab by Steve Mann in 1994 and further developed by Pranav Mistry in 2009 both of whom developed hardware and software for both headworn and neckworn versions of it. It comprises a headworn or neckworn pendant that contains a data projector and camera.

It combines cameras and illumination systems for interactive photographic art and also includes a gesture recognition eg, finger-tracking using coloured tape on the fingers.

Sixth Sense is considered to be one of the most desired technology to be used in future. It is meant to ease up every task we perform in our daily lives thus increasing the efficiency of our generation.

ORIGIN OF THE NAME

The Sixth Sense name for this work was not coined and published until 2001, when Mann coined the term “Sixth Sense” to describe such devices., believing that wearable computing and digital information could act in addition to the five traditional senses. Similarly, other inventors have used the term sixth-sense technology to describe new capabilities that augment the traditional five human senses. The coined term became more common when Pranav Mistry used this tech on a wide scale in 2009.



Sixth Sense could use a gestural camera, taking a picture within the framed corners marked by the user's hands.



CONSTRUCTION & WORKINGS

It contains a pocket projector, a mirror and a camera contained in a head-mounted, hand held or pendant like, wearable device. Both the projector and the camera are connected to a mobile computing device in the user's pocket.

The projector projects visual information enabling physical objects around us to be used as interfaces and the camera recognises the users' hand gestures. The software program processes the video stream data captured by the camera and tracks the locations of the coloured markers (visual tracking fiducials) at the tips of the user's fingers. The movements of these fiducials are interpreted into gestures that act as interaction instructions for the projected application interfaces. If the user attaches coloured tape to his or her fingertips, of a colour distinct from the background, the software tracks the position of those fingers.

Example Applications Of Sixth Sense

>>Four colored cursors are controlled by four fingers wearing different colored markers in real time. The projector displays video feedback to the user on a vertical wall.

>>The projector displaying a map on the wall, and the user controlling it using zoom and pan gestures.

>>The user can make a frame gesture to instruct the camera take a picture.

>>The user can draw a circle on his or her wrist, and the system will project a clock on it!



An augmented reality newspaper with Sixth Sense projection.

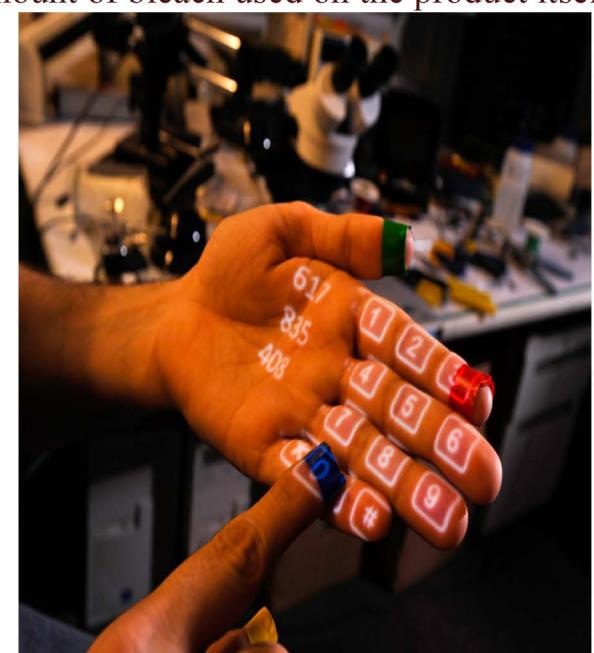


Sixth Sense tells you the info about the things you see eg, an air ticket.

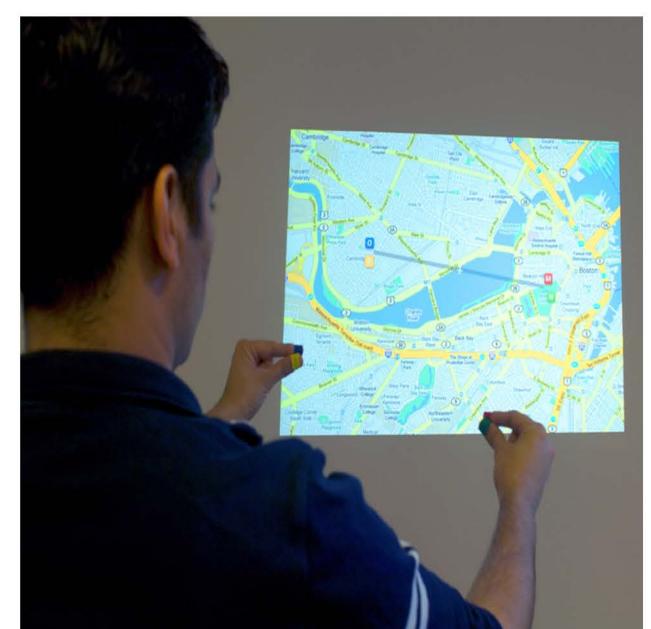
>>The system could project multiple photos on a wall, and the user could sort, re-size and organize them with gestures.

>>A number pad is projected onto the user's palm, and the user can dial a phone number by touching his palm with a finger.

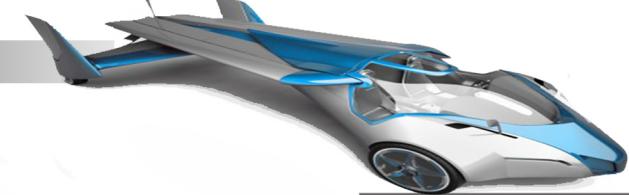
>>The user can pick up a product in market and the system could display related info eg, amount of bleach used on the product itself.



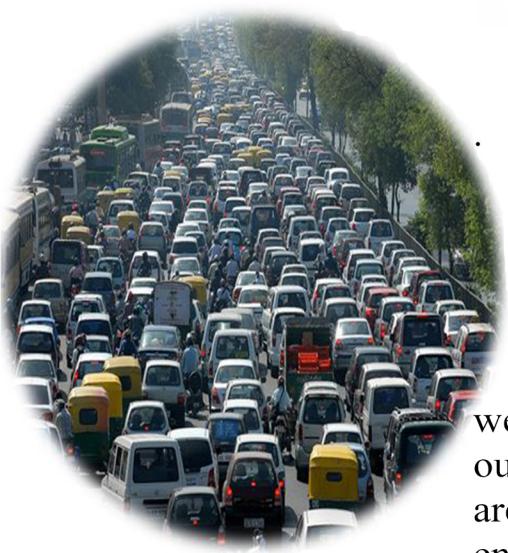
Sixth Sense is the basic idea behind a weightless phone.



Use any physical object eg, a wall around you as a screen.



Flying Cars



Sitting amidst a sea of cars in bumper-to-bumper traffic on an endless expressway, have you ever daydreamed about your car taking off and flying over the road?

Imagine if you could just flip a switch and unshackle yourself from the pavement!

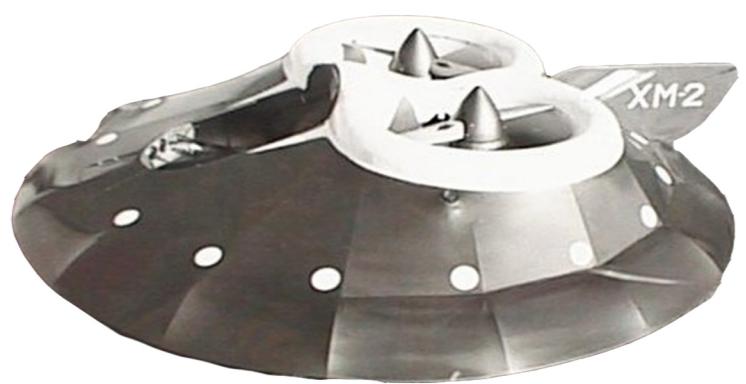
Traffic jams are the bane of any commuter. Many of us spend an hour or so stuck in traffic every week. The growing population is partly to blame for our congested roads, but the main problem is that we are not expanding our transportation systems fast enough to meet ever increasing demands.

One solution is to create a new type of transportation that doesn't rely on roads, which could one day make traffic jams a 20th century relic. To do this, we must look to the sky.

Lets take a look at some of the attempts to build a flying car, and examine some of the flying vehicles that you may be able to park in your garage in the next decade!

XM2

Canadian Paul Moller has spent 40 years and millions of dollars for developing it in 1965. It hovered off the ground but didn't go anywhere



M200X

In 1989, Moller International unveiled the M200X, which has now flown 200 flights and can hover as high as 15 m off the ground.



SKYRIDER-X2R

MACRO Industries in the United States is developing a flying car called the Sky Rider X2R. This aero-car will be able to take off and land vertically. The SkyRider incorporates the interior design of a two-seat sports car with the mobility of a helicopter or airplane.



TERRAFUGIA'S CAR/PLANE HYBRID

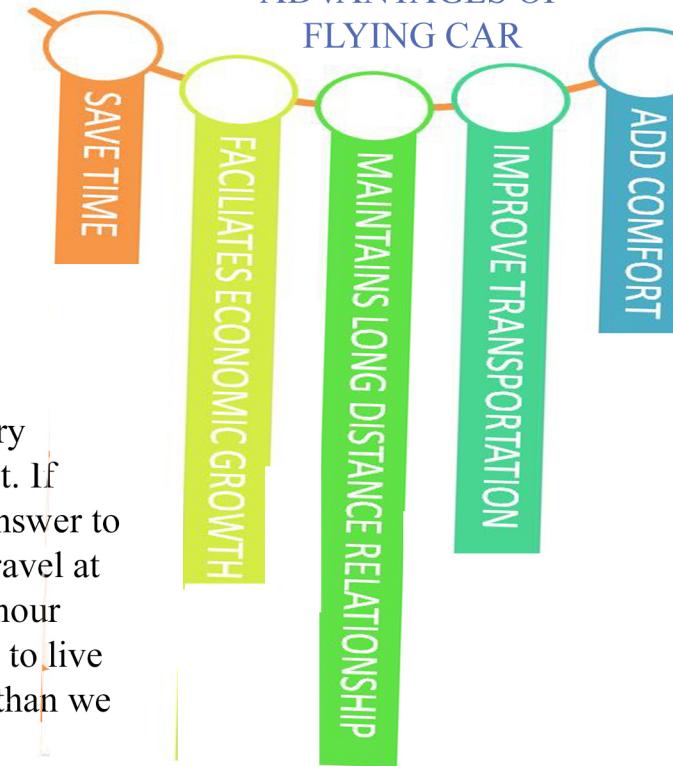
It first took flight in 2013 and have racked up over 100 hours in the air already. To keep weight down Terrafugia opted for a belt-driven CVT, hooked up to a 4-stroke 4 cylinder, 100hp, 140lb engine that runs on premium unleaded gasoline, not aviation fuel.

The future mass availability of flying cars could be very exciting or very scary, depending on how you look at it. If proper safeguards are put in place, they could be the answer to our ever-worsening traffic jams. Flying cars that can travel at hundreds of kilometres per hour would cut most rush-hour commutes to a few minutes. They would also allow us to live farther from work and still make it to the office faster than we do in our road-bound cars of today .

SKYCAR-M400

.Paul's latest design, the Skycar M400, It is designed to take off and land vertically in small spaces. It can reach speeds of 644 km/h and can travel 1449 km on one tank of gas. Gasoline, diesel, alcohol , kerosene, and propane can be used to fuel the Skycar.

ADVANTAGES OF FLYING CAR



ARM Design

Contest - 2015



Voice Recognition System

To implement voice recognition system that facilitates user to communicate with machine using commands. In particular the system is implemented to drive a smart chair prototype so as to assist physically. It can be used in controlling the wheelchair for handicapped.

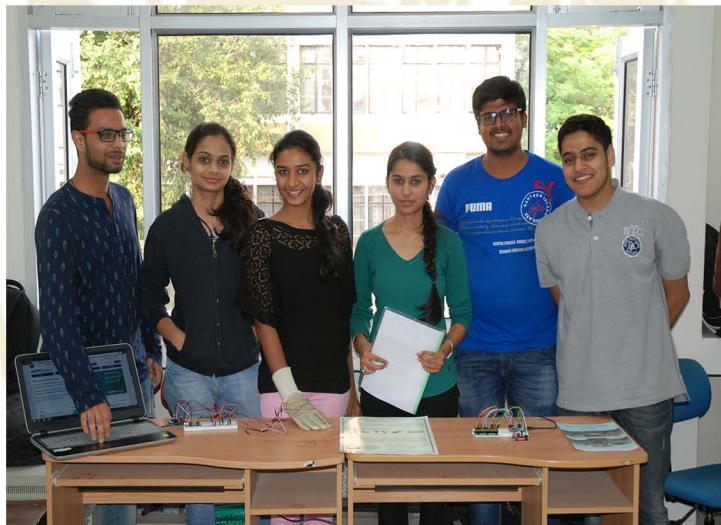
Look at Me

Targeting the problem faced visitors on tourist when. An android application and internet server based wireless communication. As soon as you reach specific area your mobile will be automatically send to ARM based internet server and you will receive advertisement.



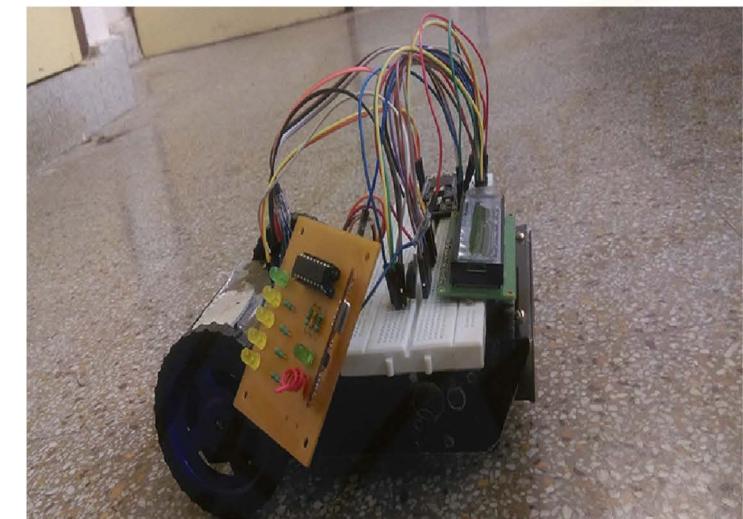
Sign Language Translator Glove

To translate the normal sign language into text and to make easy contact with dumb people. Microcontroller received data from glove consisting of flex sensor



Multi Layered Security System

To design three layered gesture based password based and OTP based security system. Accelerometer used for detecting gestures. Keyboard interfaced with LCD display and MBED. GSM module registered with sim card is used for OTP security.



Gesture Controlled Robot

A gesture controlled robot is a kind of a robot which can be controlled by your hand gestures not by old buttons. You just need to wear a small transmitting device in your hand which includes an accelerometer. Accelerometer will transmit an appropriate command to the robot so that it

NFS Game Controller

To design an interactive multimedia for entertainment using ARM microcontroller. The console is used to control NFS. With slight modifications in the source code, it can be used for simulation games and controls. Very cost effective, provides a way to learn electronics and have fun.



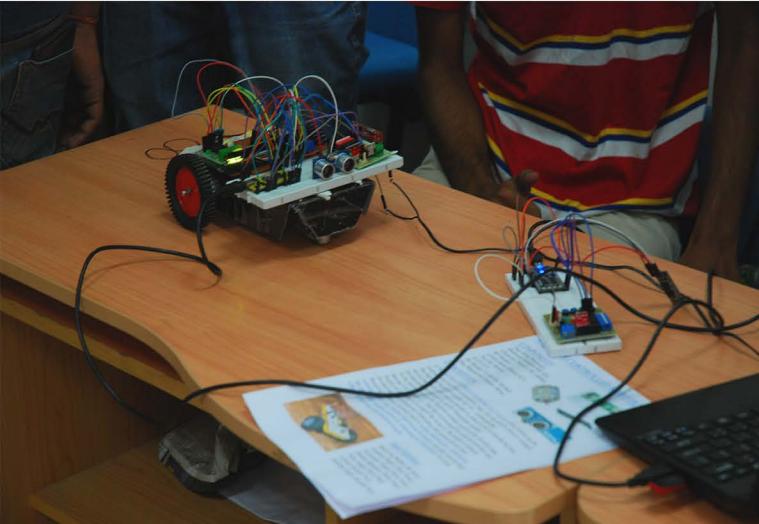
Joystick Controlled Robotic Arm

This project describes a remote controlled robotic arm which is able to pick up an object with specific weight and can place them in desired location. It allows user to manipulate the packet using robotic arm.



Obstacle Detector

To detect the presence of an obstacle and take further action using IR sensor robot. LDR attached to microcontroller helping in determining the position of the sun so that maximum solar energy can be trapped. It is capable of lowering adverse impact on environment as well.



TOP 3 STARTUPS

OF INDIA

1. flipkart.com

A quick look into any success story shows a path breaking idea at the heart of tale. Flipkart is not exception. It is not the idea but the conviction to convert ideas into action. Flipkart was launched by two IIT Graduates in year 2007.Those two were SACHIN BANSAL and BINNY BANSAL. Both were graduated from IIT DELHI from Computer Science & Engineering. Though both share same surname but they're from different families.

They both are from Chandigarh. They completed their schooling from same school i.e; St.Annes Convent School in Chandigarh, but they were not knowing to each other even if they share common things. Binny was twice rejected by Google, then he was selected by Amazon. Sachin and Binny both worked for Amazon for about 7 months before launching Flipkart. They started flipkart from a small house at rent in Bangalore.

aloe. They started selling products by starting with a book named " LEAVING MICRO-SOFT TO CHANGE WORLD " on a scooter to a customer in Hyderabad.

They started their company from Rs.400,000 only. Later they raised fund from Accel India, Tiger Global, Naspers Group and ICONIQ Capital. In 2015 the turnover of Flipkart was US\$1.3 Billion. Flipkart sells nearly 10 products per minutes. They acquired many companies like Myntra, Chakpak.com etc. DIGIFLIP is Flipkart own electronic brand.

Sachin and Binny both were awarded 86th richest persons in the world by FORBES. Sachin was also awarded as Enterpreneur of the year in 2012-2013.



2.snapdeal

Snapdeal was started in year 2010 but expanded as online market place in September 2011 by KUNAL BAHL and ROHIT BANSAL.

Kunal was born in New Delhi, completed his schooling from D.P.S New Delhi and B.Tech from University of Pennsylvania on his consecutive failures to get admission in IIT. He also completed his MBA from Wharton School in USA..Kunal also started a detergent company in USA while studying.Kunal also worked for Microsoft.



Firstly they started offline couponing service and named it Moneysaver.15000 coupons were sold in 3 months. When they met an investor Vani Kola ,venture really took off. The first meeting didn't go well but after another round of discussion Vani Kola venture capital firm decided to invest in Snapdeal. Initially started offline, Snapdeal went online in 2010. It's year after year growth is almost 600%. Other investors were Ru-Net holdings, Intel Capital etc. Snapdeal annual income was about US\$1 Billion in 2012-2013.

Kunal and Rohit both won Next Generation Enterpreneur Award in 2014 , ET Top 50 Enterpreneur of India in 2014 and many more.....

3. micromax

Micromax was founded in 2000 by 4 peoples named RAHUL SHARMA his friends VIKAS JAIN , SUMEET ARORA and neighbour RAJESH AGGARWAL. Micromax is an Indian consumer electronic company. It was established as an IT Software company, it later entered mobile handset business by 2010. It is one of the largest domestic company making handset at low cost feature phone segment in India. Micromax is 10th largest smartphone vendor in the world. Micromax became the first Indian Company to start its sale in Russia. Micromax started manufacturing LED TVs and Tablet ai its factory in SIDCUL Uttarakhand.

Rahul Sharma holds a B.Com degree from University of Saskatchewan and B.Tech in Mechanical Engineering from Rashtrasant Tukadoji Maharaj Nagpur University. Vikas is an alumni of Jamia Millia University from where he completed his engineering. He was associated with many famous companies like TELCO , GE and Daewoo. Rajesh Agarwal is an Electrical Engineer with an enriching experience of 10 years. Micromax got its investment of about 400 Crores from Companies like TA Associates , Sequoia Capital and Sendstone Capital.

Micromax annual turnover in year 2014 was US\$ 7 Billion. Micromax was awarded as Emerging Company of the Year in 2012 Rahul Sharma was awarded as Forbes person of year in 2010 and GQ Man of the year in 2013.



Micromax Canvas Juice 4



Micromax 1st 4K LED TV

DIKSHA ADTANI
ECE FIRST YEAR

Ride A Cycle, Power a House

Who doesn't need electricity? Electricity is one of the basic needs of our life. Is it easy to produce electricity? Now it is.....

Because now it is possible to produce electricity just by exercising. One hour of paddling can meet a rural household electricity requirements for 24 hours and that includes bulbs, an electric fan to charge a cell phone and a tablet.

After doing a little research, Manoj Bhargava found that an efficient bike generator pedaled by a reasonably fit person can produce about 100 watts of continuous output. An experienced biker can produce a peak of more than 400 watts.



Assuming an ambitious exercise period of one hour, a person could produce about 100 watt-hours of electricity. That is one-tenth of a kilowatt-hour (1 kilowatt-hour = 1,000 watts for 1 hour).

When an individual pedals the bike, the action drives a flywheel, which turns a generator and charges a battery. This means from just one hour of pedaling, a rural household can be supplied with energy for 24 hours.

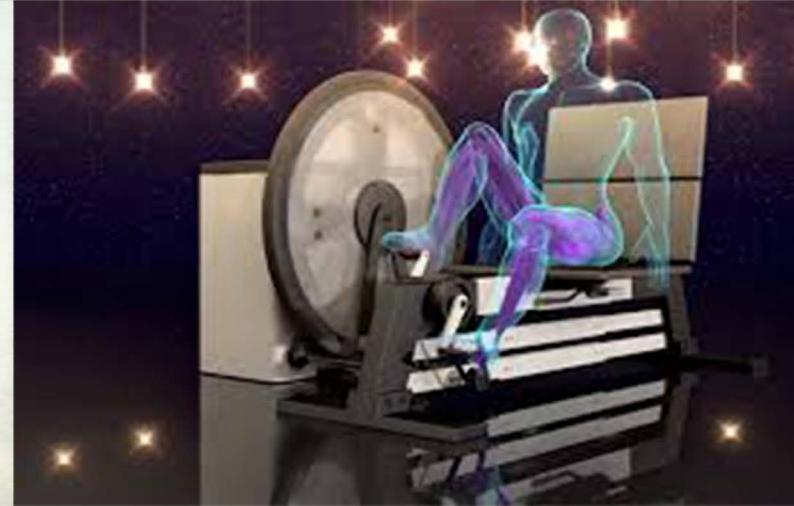
The billionaire and his team developed the bicycle to take advantage of mechanical energy created by humans to solve one of the world's most pervasive problems.



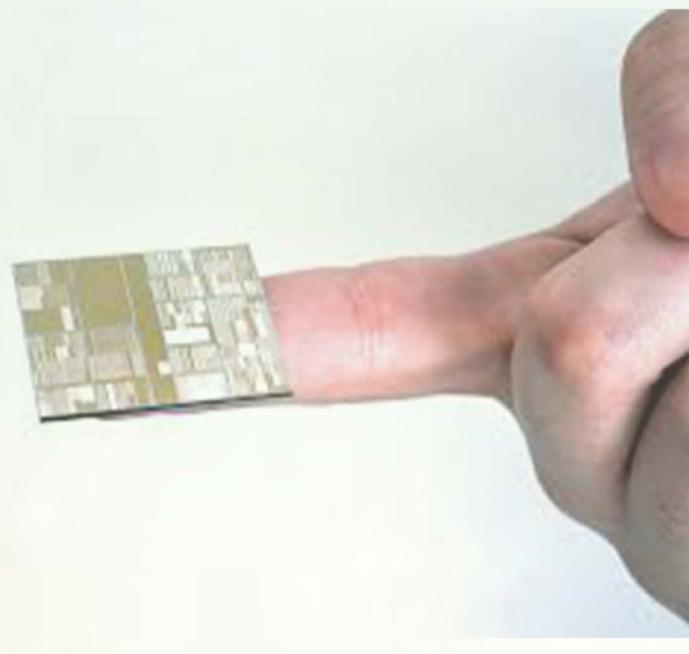
In developed nations, the bike could also be utilized to cut energy costs and remedy the obesity crisis.

The bicycle is also a clean way to generate power. As Bhargava says himself, if half of the world uses a Free Electric bike, half of the world would be using eco-friendly energy.

"Everything requires energy. Energy is the great equaliser," says Bhargava.

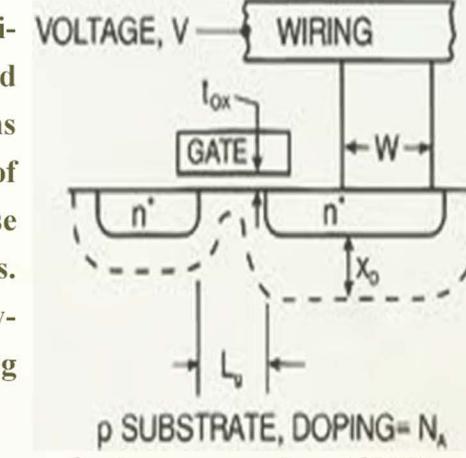


Semiconductor Transistor Scaling Limitation & Future Scope

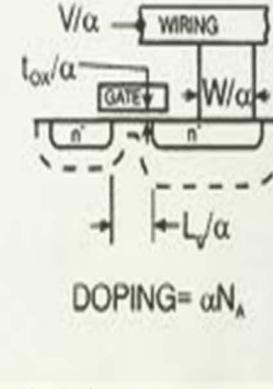


Currently, we are using 14 nm technology in transistor fabrication and we will reach to 7nm in 2020 Commercially. Transistors at the 7 nm scale were first produced by researchers in the first decade of the 21st century – the process scale may represent the end of Moore's Law scaling for electronic devices. Transistors smaller than 7 nm will experience quantum tunnelling through their logic gates. Quantum tunnelling or tunneling refers to the quantum mechanical phenomenon where a particle tunnels through a barrier that it classically could not surmount. So, transistor can't act as switch.

ORIGINAL DEVICE

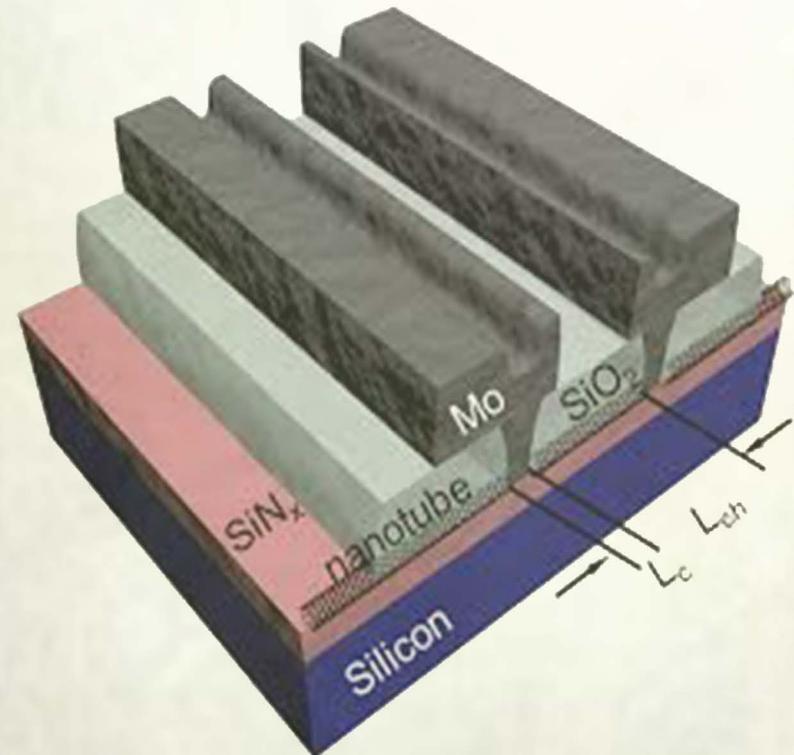


SCALDED DEVICE



ρ SUBSTRATE, DOPING = N_A

Carbon nanotubes (CNT) are cylindrical structures made of carbon with unique mechanical and electronic properties. A CNT can be thought of as a sheet of graphene (a hexagonal lattice of carbon) rolled into a cylinder. These are large mesoscopic molecules with high aspect ratios. They could be as long as millimeters with sub-nanometer diameters. These intriguing nanostructures have sparked a lot of excitement in the last two decades.

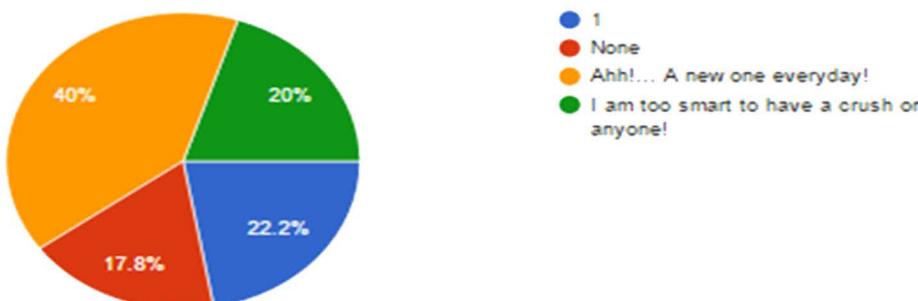


Carbon nanotubes for electronics applications are still a strong focus for research and printable carbon nanotube inks are beginning to hit the market. CNTs are used for making transistors and are applied as conductive layers for the rapidly growing touch screen market. CNTs are considered a viable replacement for ITO transparent conductors in some applications.

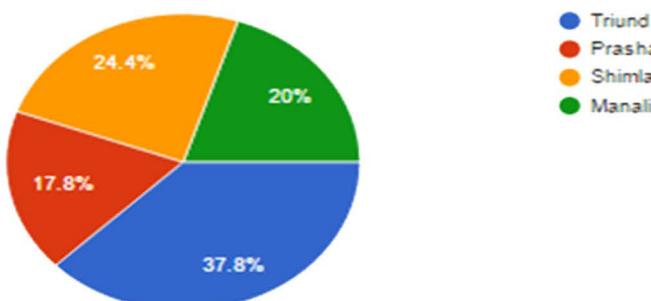
Ayush Gupta
ECE 3rd Year

SPEC Survey - 2016

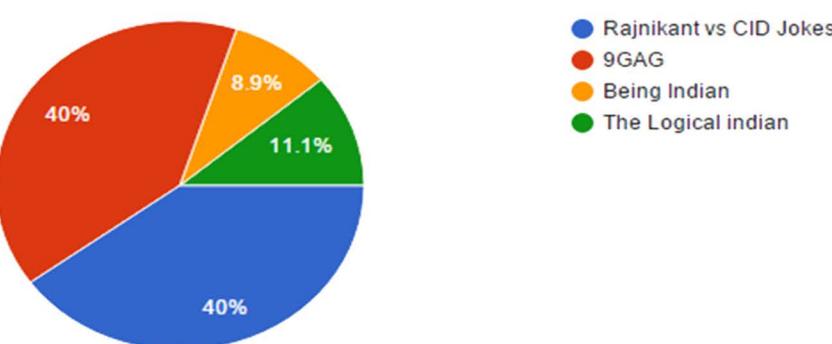
How many crushes have you had so far in college?



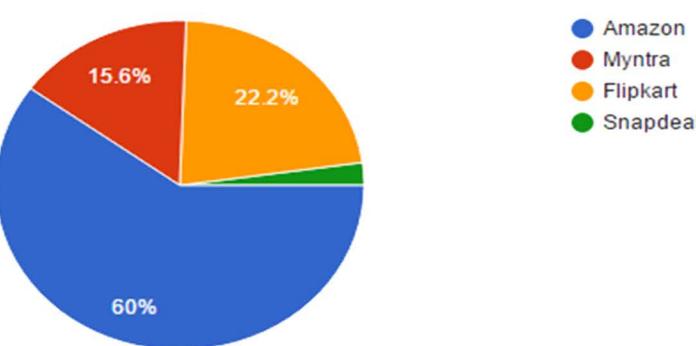
Most popular holiday destination?



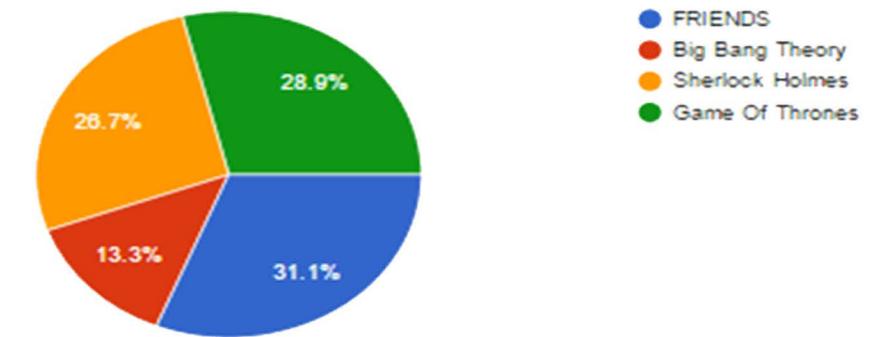
Favorite troll page on Facebook?



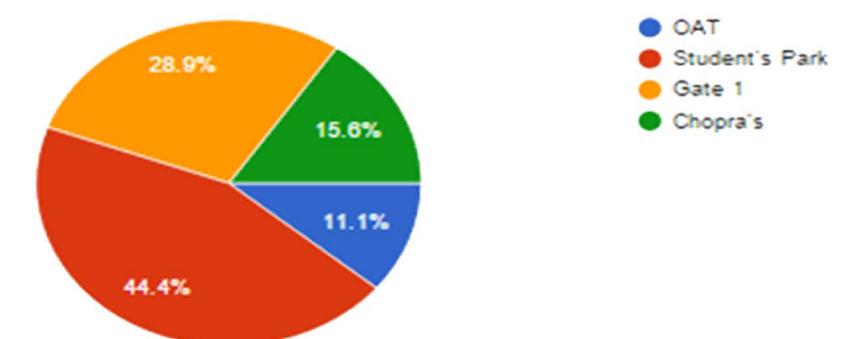
Favorite online shopping site?



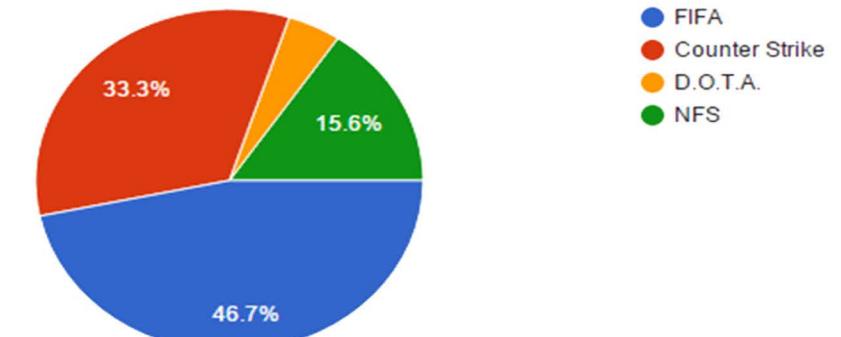
Favorite TV Series?



Coolest place to hang out with friends?



Favorite PC Game?





MISSION MARS

exploring the Earth's Twin.....

Mars Rover (2020)

Mars 2020 is a mars rover mission by NASA's Mars Exploration Program with a planned launch in 2020. It is intended to investigate an astrobiologically relevant ancient environment on Mars, investigate its surface geological processes and history, including the assessment of its past habitability, the possibility of life on Mars, and potential for preservation of biosignatures with accessible geological materials. The proposed landing site for the mission is Jezero Crater, located in the Syrtis Major Quadrangle.

Mars 2020 was announced by NASA on 4th December 2012 at the meeting of the American Geophysical Union in San Francisco. The rover's design is being derived from the Curiosity rover and will carry a different scientific payload. The launch mission is being managed by the Jet Propulsion Laboratory.

design :

The rover will be car-sized, about 10 feet long, 9 feet wide and about 7 feet tall. In some sense, the rover parts for this mission will be similar to what any living creature would need to keep it "alive" and able to "explore". It would have a

Body : a structure that protects the rovers vital parts.

Brains : computers to process important information.

Temperature Control : internal heaters, a layer of insulation.

Neck and Head : A mast for the cameras to give the rover a human scale view.

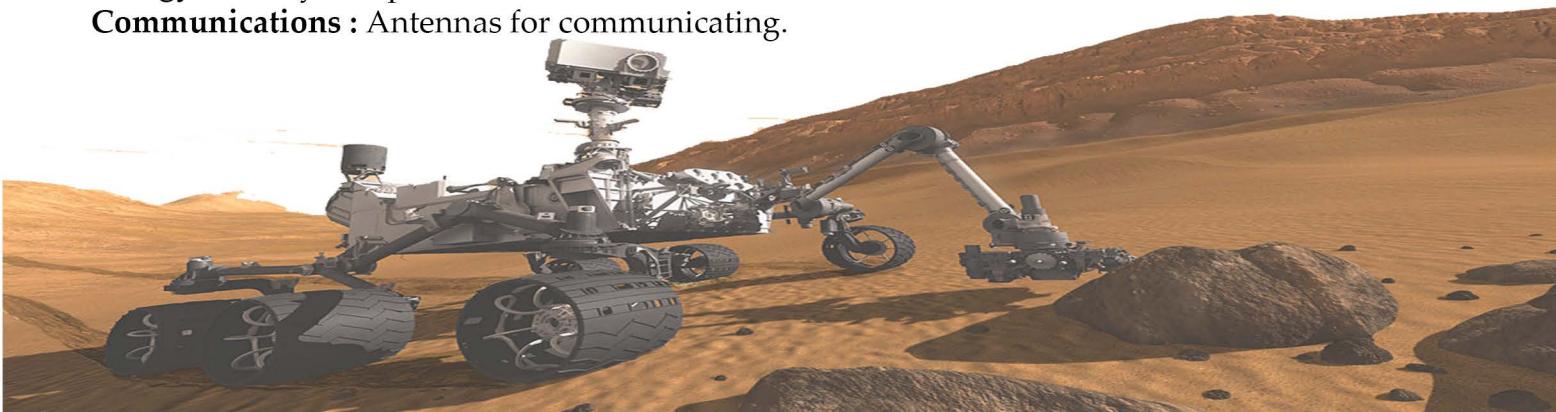
Senses : Cameras and instruments which give information about the environment.

Arms and Hands : A way to extend its reach and collect rock samples for study.

Wheels and Legs : Parts for mobility.

Energy : battery and power.

Communications : Antennas for communicating.



The ORION Multi-Purpose Crew Vehicle (Orion MPCV) is an American spacecraft intended to carry a crew of four astronauts to destinations at or beyond the Low Earth Orbit (LEO). Currently under development by NASA for launch on the Space Launch System, Orion is intended to facilitate human exploration of asteroids and of Mars.

The Orion MPCV is currently under development. It was announced by the NASA on May 24, 2011. Its design is based on the Orion Crew Exploration Vehicle. The MPCVs first test flight was launched atop a Delta IV Heavy rocket on December 5, 2014.



orion ground test article in Colorado

It takes its basic design elements from the Apollo Command Module that took astronauts to the moon, but its technology and capabilities are more advanced. It is designed to support long duration deep space missions with up to 21 days active crew time plus up to 6 months quiescent.

During the quiescent period, crew life support would be provided by another module such as a deep space habitat.

The spacecraft's life support, propulsion, thermal protection and avionic systems are designed to be upgradable as new technologies become available.

The next mission is the Space Launch system 1/Exploration Mission 1 which will send an uncrewed Orion on a trip around the moon in November 2014.



orion's ground test vehicle on a work stand in operations and checkout facility.

The Bermuda Triangle

Bermuda Triangle is a strange triangular area on the Atlantic ocean where many ships sailing through it or planes passing over it have disappeared without a trace. In few of such cases where wrecks could be found, the crew had vanished. And such incidents have been happening since centuries. More than 1000 ships and planes have disappeared in the triangle area over the past five centuries and continue to do so. And all these happen when apparently there are no human errors, equipment failures or even natural disasters. Strangely, the ships and aircraft just vanish when everything seems to be okay. Many believe that Devil is at play here and therefore call the area also as Devil's Triangle.

The facts however are quite far from what is generally known or believed to be true. There are many stories and myths created through sheer imagination by writers who have used them rampantly to draw publicity to their books. In many cases, the facts got blurred. Bermuda Triangle is located off the South-Eastern coast of the United States and in the Atlantic Ocean. The three corners of the triangle are:

Miami (in Florida); San Juan (Puerto Rico); & Bermuda .

The disappearances have mostly taken place near the southern boundary of the triangle between Florida and Puerto Rico. There is no fixed boundary to it and its region of existence and its effect is observed upto kms away..Bermuda was then also known as the "Isle of the Devils" which fitted to triangle concept quite well and therefore the final name Bermuda Triangle was coined.



Lost Planes & Ships in Bermuda Triangle

- Flight 19
- PBM Martin Mariner
- Tudor Star Tiger
- Fight DC-3
- Flight 44
- C-54 Skymaster:
- Mary Celeste
- Carroll A. Deering
- Marine Sulphur Queen
- Ellen Austin
- USS Scorpion

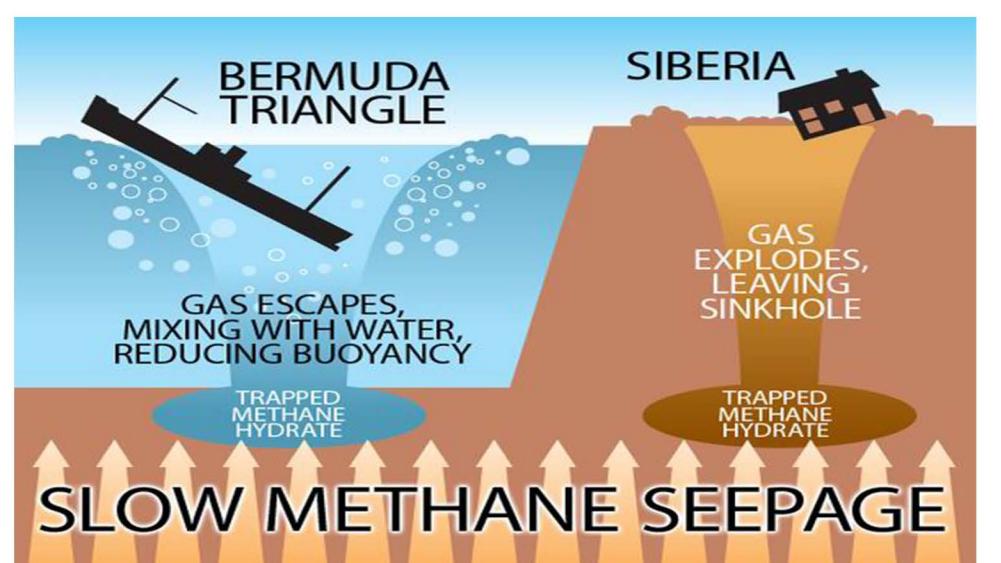


Fig. Methane Gas theory behind the Bermuda Triangle

Methane Gas Theory

Large amount of methane gas is known to exist below the ocean floor trapped in the sediments in form of methane hydrates. If such gas finds its way out and starts rising through the water, it can significantly reduce the density of water in that area. And ships passing over that area can sink in no time. Such gas release can also create explosions and saturate the atmosphere with methane gas causing planes to crash.

The Sargasso Sea

Sargasso sea is a strange area within Bermuda Triangle that has no shores but bounded by ocean currents on all sides. This has been the trap for many sailing vessels in the past. Many sailing boats and ships are believed to have become completely motionless while passing through this area and later found in derelict conditions without a soul on them. Dense seaweed on water surface and exceptionally low winds have been the main cause of making vessels motionless in this area.



Gulf Stream

The Gulf Stream is an ocean current that originates in the Gulf of Mexico, and then moves through the Straits of Florida, into the North Atlantic and passes through Bermuda Triangle area. It is like a river within an ocean and can easily carry floating objects along its flow. A small plane making a water landing or a boat having engine trouble will be easily carried away. It happened to the cabin cruiser Witchcraft on December 22, 1967, when it reported engine trouble near the Miami buoy marker one mile from shore, but was not there when a Coast Guard cutter arrived.

Popular theories solving the mystery

Electronic Fog: A Hutchison effect

It has been heard several times that ships and aircraft get engulfed in some kind of electronic fog and the fog keeps moving along with the ship or the plane. And eventually, all the electronic equipment and other instruments start malfunctioning. Then the ships and airplanes either disintegrate or disappear without a trace.

Vancouver based scientist John Hutchison through his experiments has shown occurrence of Electronic Fog that causes some strange phenomena.

Compass Variation

Do you know that magnetic and absolute North are not the same. Which means that the north where a compass points and the absolute geographic north which is the north pole are different. So ships need to make adjustment for this difference to keep to the right direction.

But in Bermuda Triangle, there is a narrow strip where both these North's become the same. Some claim that such Compass Variation could have been the cause for fatal accidents as ships failed to determine the correct direction.

Supernatural Theories

There are also explanations based on some supernatural theories like the lost city of Atlantis, UFOs and Aliens. Check out Supernatural Theories to know about such explanations that try to explain the disappearances. The legend says that the city of Atlantis heavily depended on some special energy crystals which were extremely powerful. Those crystals radiated huge amounts of energy (also known as death rays) and caused the naviga-

ECE : Evergreen Branch

The word **ENGINEER** comes from a Latin word meaning 'cleverness'

Engineering is the scientific, economic, also build structures

science, skill, and profession of acquiring and applying social, and practical knowledge, in order to design and machines, devices, systems, materials and processes.

WHY ENGINEERING ROCKS!!

Prestige
Professionalism
Flexibility
Development
Entrepreneurship
Challenge
Creativity
Discovery
Helping Society

Working Fields for

ECEians:

- In medical field-
Almost all medical equipments are electronic and hence for the installation and maintenance of equipments

- In automobile-
The speed dial, air bag systems etc are all based on electronics.

- In modern equipments- For the production, maintenance and repair of computers, laptops, tabs, mobile phones.

- In communication- Radio telephones etc.

- In government and private companies- Installation,operation & maintenance of electronics equipment's and systems

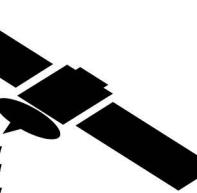
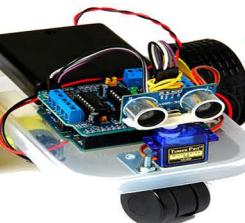
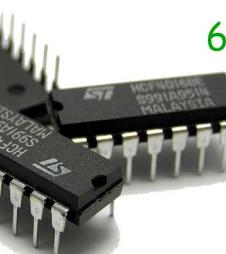
- Defense- For design and development of complex devices and systems for signal processing and telecommunication.

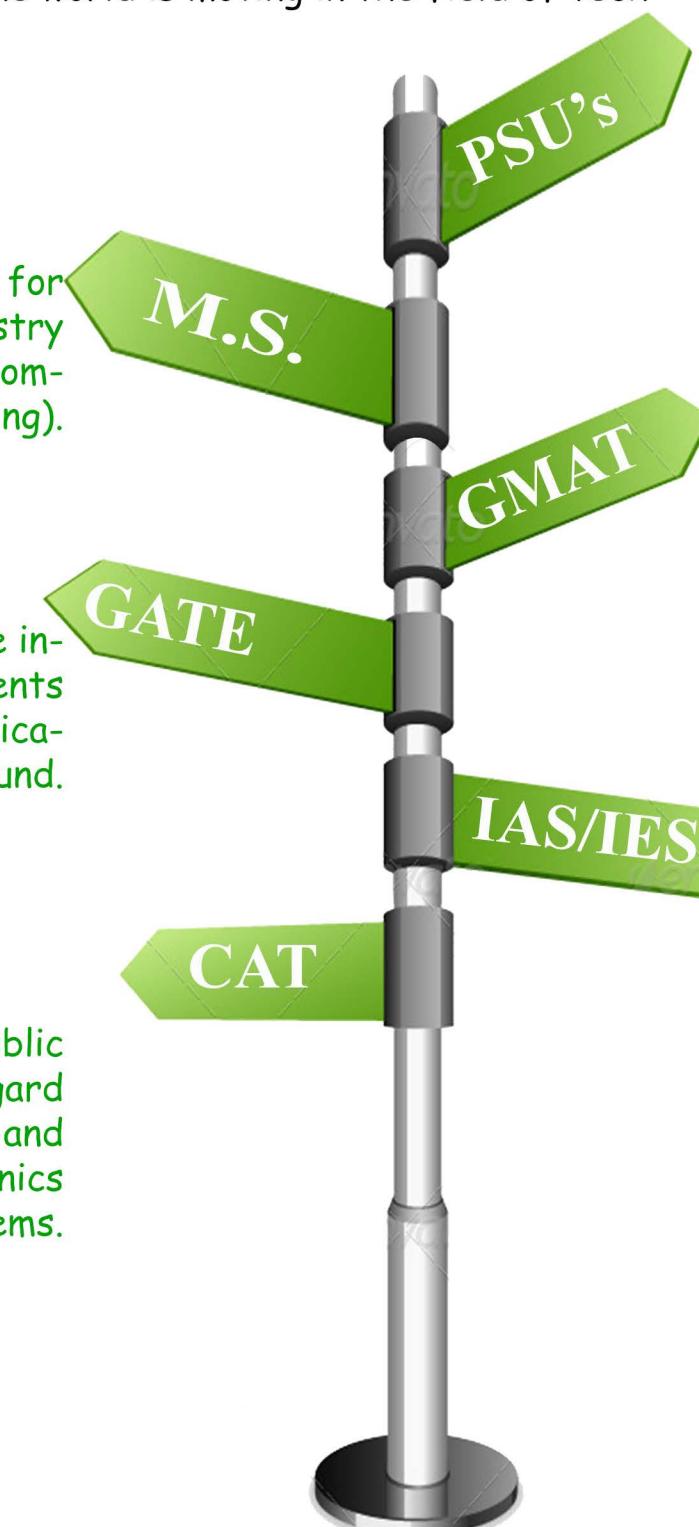
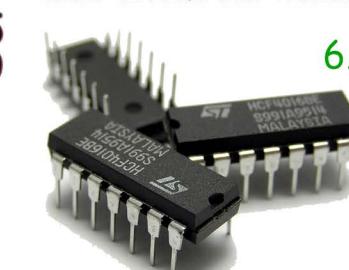
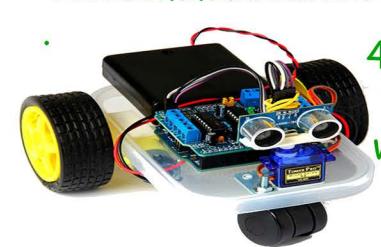
- Space and other research organizations- For design and development of complex devices and systems for signal processing and telecommunication.

- Electronic industries- Design and fabrication of devices, embedded systems, electronic



Electronics and communication engineering course give enormous job opportunities in electronics and software companies. Electronics industry being a labor intensive industry provides many job opportunities for the skilled job seekers. Increased production and demand by government and businesses for communication equipment, computers and military electronics along with consumer demand and increased research and development on robots and other types of automation contributes to the growth of employment opportunities in the field. There is a good scope for ECE engineers. The Scope is very wide open because the world is moving in the field of technology and developments.

1. It has scope in almost every industry as every industry deal with electronics and computers.
 2. There is a huge scope for Radio and Television industry after B Tech (Electronics & Communication Engineering).
 3. They can also find jobs with both private and public Telecommunication companies.
 4. Software companies more interested to employ students with Electronics & Communication background.
 5. They can find job in power sector, steel plants petroleum and chemical industry also.
 6. They have scope in both public and private sector with regard to installation, operation and maintenance of electronics equipments and systems.
 7. Defense, space and other organizations, which undertake research on a large scale basis, employ electronics engineers in developing and designing systems and devices for telecommunication and signal processing.



AFTER GRADUATION



e-Governance Reaching the Unreached



"Make all Government services accessible to the common man in his locality, through common service delivery outlets, and ensure efficiency, transparency, and reliability of such services at affordable costs to realise the basic needs of the common man"

Over the years, a large number of initiatives have been undertaken by various State Governments and Central Ministries to usher in an era of e-Government. Sustained efforts have been made at multiple levels to improve the delivery of public services and simplify the process of accessing them.

e-Governance in India

e-Governance in India has steadily evolved from computerization of Government Departments to initiatives that encapsulate the finer points of Governance, such as citizen centricity, service orientation and transparency. Lessons from previous e-Governance initiatives have played an important role in shaping the progressive e-Governance strategy of the country.

Milestone for e-governance: Govt issues 22,000 online visas in one month

India's e-governance initiative Mobile Seva wins UN award

Digital India – Making villages 'Smart'

Government Approves National E-Governance Plan

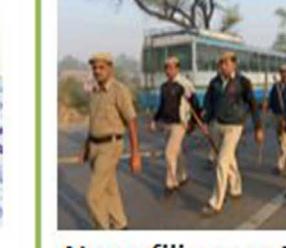
Could mobile apps be e-governance game changers

Biometricpur: An e-governance project reshapes rural districts

The year of e-governance: 9 things you didn't have to stand in a queue for in 2014

"Youth belonging to the IT profession have paved the way for establishing India's new identity in the world. Digital India is our dream for the nation. When I say 'digital India' it is not meant for the rich but for those who are poor," Prime Minister Modi had said during his first Independence Day speech as PM.

Here is a look at some of the significant e-governance programmes which made life easier the people in 2015:

MobileOne  <p>MobileOne scheme was launched to make facilities on cellphones better</p>	Pensioners' Portal  <p>Now, checking details on your pension has become easier</p>	Digital Skills for India  <p>Government began a programme to educate people on digital skills</p>	PRISMS  <p>Prison management went digital in Maharashtra</p>
Passport seva  <p>provides online submission and real time status tracking through internet facility</p>	eFIR system  <p>Now, filing an FIR with the police went digital with eFIRs introduced in Odisha</p>	eCabinet  <p>ministers can access all the data and the agenda for the meeting digitally</p>	Digital locker  <p>Now, a locker or a safe might not be needed to keep sensitive files secure</p>

Digital India

A programme to transform India into digital empowered society and knowledge economy

india.gov.in

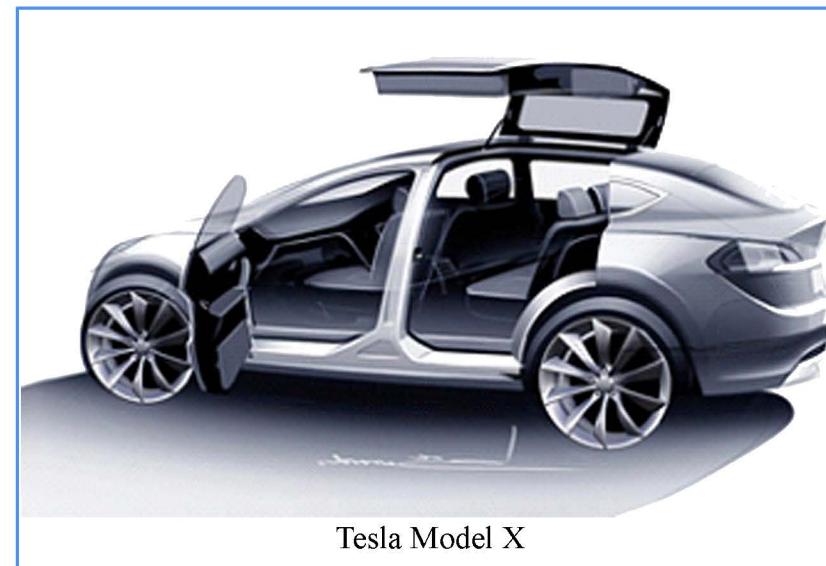
The Autopilot

-Ankit Sharma(13435)

Are electric cars the next big thing? Yes of course. Who on earth does not want to have such an electric vehicle in their house. This is not the end of all it the next generation seems to be The Autopilot Auto drive, speed control, auto-parking, lane changing these are the characteristics of this technology. The Tesla Motors is one such company working on this Autopilot technology. Tesla Motors, Inc. is an American automotive and energy storage company that designs, manufactures, and sells luxury electric cars, electric vehicle powertrain components, and battery products. Their dream to have a safer cars by implementing this autodrive technology is on its way. This technology has successfully been implemented on their Model S and Model X.

The Model S and Tesla's newer Model are unquestionably engineering marvels. And in the vision of Tesla CEO Elon Musk, they are nothing less than agents of this change. Rivalling the best-performing internal-combustion automobiles, these green supercars are designed to reconcile comfort, power, and convenience with environmental sustainability, an ethos encapsulated in the current marketing slogan for the Model S: "Zero Emissions. Zero Compromises."

The Short History of EVs (Pic from IEEE Spectrum February 2016 edition)



Tesla Model X



Tesla Model S.



WHAT ELECTRONICS SAYS...

Hey, listen to what I say...
I'm your present, I'm your future
I'm your friend, I'm your entertainer
I'm all around you and making your life easy
You're exploring me and I'm making you more technical
You've made Robot, Computer, TV, Radio etc, all because of me
I'm your present, I'm your future
I'm your friend, I'm your entertainer
You can't live without me, like a fish without water
You're nothing without me, like an infant without mother
Yes, I've brought a revolution in the world
But, I'm your present, I'm your future
I'm your friend, I'm your entertainer
Resistors, Capacitors, BJT's, LED's, IC's, etc all are my body parts
Digital, Analogue, Micro, Conventional, etc all are my family members
All these have sir name 'Electronics' like Digital Electronics,
Micro Electronics, etc

ELECTRONICS
I can help you anywhere you need, but if you start using me in irrelevant way

Then I'll become violent and make you silent
But, I'm your present, I'm your future
I'm your friend, I'm your entertainer



**"Logic will get you from A to B,
Imagination will take you Everywhere"**

: Albert Einstein



MEET OUR TEAM

AJAY SINGH

"Strong is thy hand and high is thy right hand"- this truly defines Ajay. Sweet , simple, kind, a dedicated and hardworking soul, truly a worthy mentor.



AKANKSHA KALIA

Hardworking and consistent.

With ever-bright smile on her face, she is always engaged in learning new things and loves internet surfing.



AMAN BHARDWAJ

The "GADGET GEEK" & philanthropist with the expertise in team work, enjoys photography & exploring new places, lives with the motto-"Stay hungry stay foolish".



KUMUD JINDAL

"A bubble of enthusiasm", confident , versatile, an 'ever ready' attitude to shoulder responsibilities, actively involved in many co-curricular activities.



MANISH VISHNOI

"The man of codes " .

A perennial source of new ideas and suggestions and always motivating others to do more and better .



SRINATH MADHU

Though looks quiet at sight ,his brain is always busy in the effort to yield something creative; does not only think 'hatke' but also has all the craziness it takes to make it happen.



VARTIKA VERMA

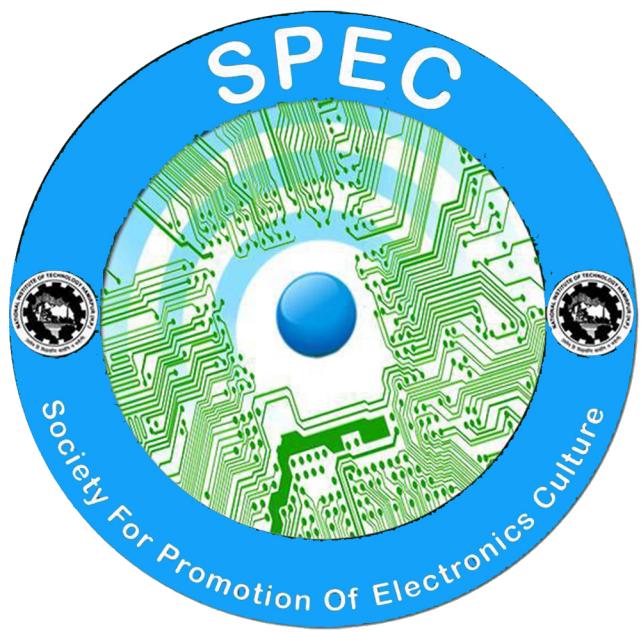
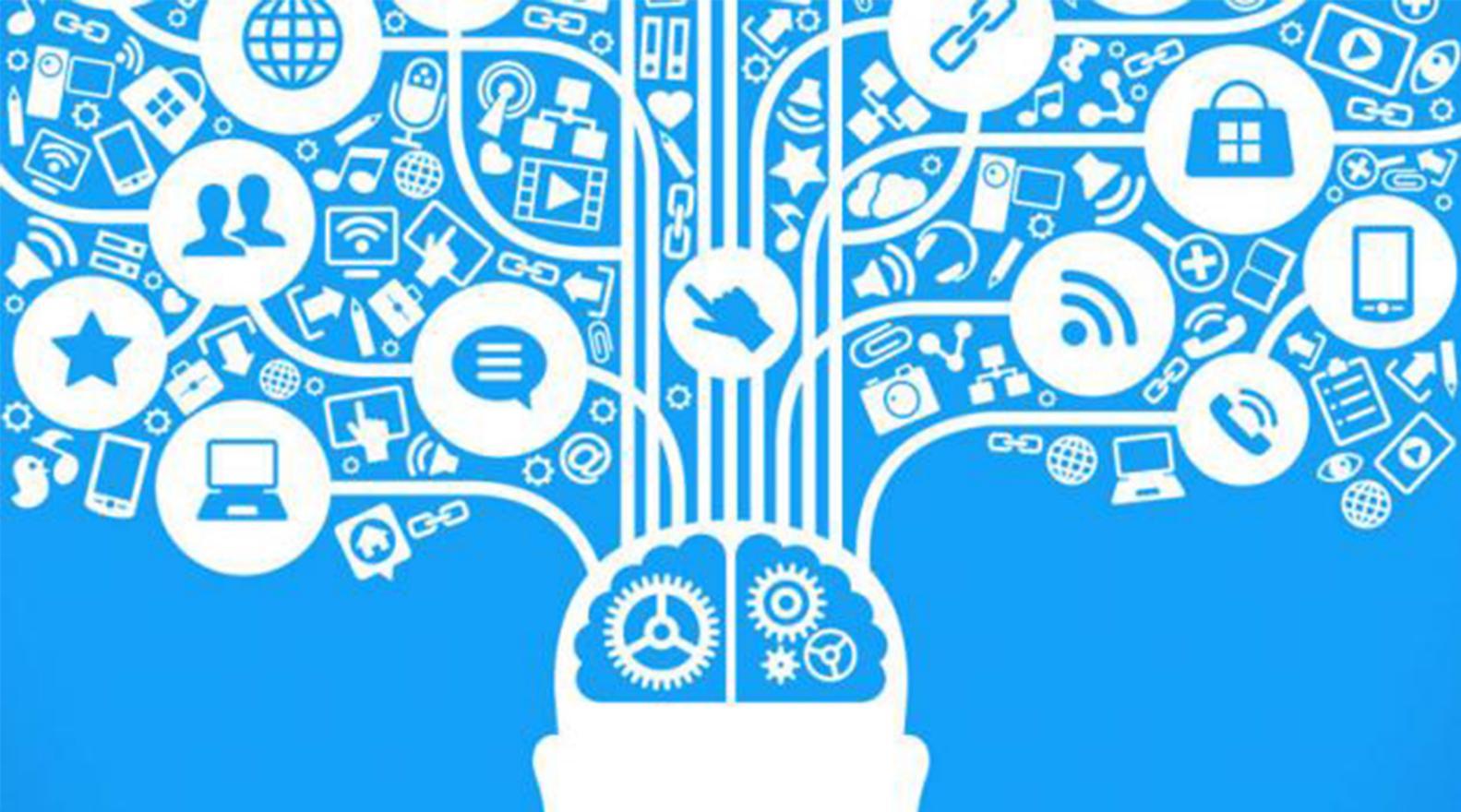
Blessed with the ability to create beauty out of thin air, an amazing artist with an optimistic outlook towards life . Adorable *Nati* dancer.



VISHAL RAI

The one who believes in "Learn and implement"; with his innovative ideas and sincere efforts ,he always attempts in direction to use the technology for betterment of society.





Society For Promotion Of Electronics Culture

“Innovation is the
only way to win”

-Steve Jobs

