MALLA REDDY ENGINEERING COLLEGE FOR WOMEN

Autonomous Institution – UGC, Govt. of India

Accredited by NBA & NAAC with 'A' Grade

NIRF Indian Ranking, Accepted by MHRD, Govt. of India

Maisammaguda, Dhulapally, Secunderabad – 500 010, Telangana

A.Y : 2020-21 **VOL.1**

Under

Student Chapter IEEE, IETE & Technical Association Electro Spikes

TECHNITRONIX

HALF YEARLY TECHNICAL MAGAZINE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

E C E

www.mallareddyecw.com

DEPARTMENT VISION

- Our vision is to develop the department in to a full fledged Centre of learning in various fields of Electronics and Communication Engineering keeping in view the latest developments and to invoke enthusiasm among the Students to continually renew their education in rapidly developing technological scenario.

Vision

DEPARTMENT MISION

- Our mission is to inculcate a spirit of scientific temper and analytical thinking & train the students in contemporary technological trends in electronics and communication to meet the challenging needs of the industry by providing versatile sound knowledge in the field of engineering and technology

Mission

ABOUT THE DEPARTMENT

The Department of Electronics and Communication Engineering is accredited by NBA, with an intake of 240 in B.Tech Programme and also offers M.Tech Programme in Embedded Systems. The department has state of the art laboratories with latest softwares like MENTOR GRAPHICS, CADENCE, MATLAB, XILINX, CCSTUDIO, KEIL, RTOS, RT Linux, OSCAD, PSPICE and MULTISIM. The department consists of well equipped Robotics- Centre of Excellence to train the students in specific modules to design and develop innovative projects that extend the state of the art in Robotics. It has well qualified and experienced faculty members. The highly competent and professional faculties, many of them drawn from premise institutions and industry have extensive experience and contribute to the holistic development of academics, research and career building of students. The department established IEEE, IETE & ISTE student chapters under which it organizes Technical Symposiums and various co-curricular activities every Academic Year. The department organized National Conference on Signal Processing Communications and System Design (SPCOMSD) in 2014and is organizing International Conference on Signal Processing Communications and System Design (ICSPCOMSD) every year, from past 5 years. The department also organized Faculty Development Programmes on Analog & Digital Design using CADENCE Tools, Embedded System using 32 bit processor, Programmable System on Chip Mixed Signal Microcontroller, Refresher Courses on Analog and Digital Communications, Digital Signal Processing, VLSI Design using CADENCE Tools and One Week Refresher Course on “VLSI & Embedded Systems”. The department organized AICTE Sponsored Two Week Faculty Development Programme on “Speech, Image & Video Processing Techniques, Analysis & Applications”. The department also publishes the Registered Journal “International Journal of Research in Signal Processing, Computing and Communication-System Design (IJRSCSD)” with an ISSN: 2395-3187.

PO'S

PO1	Engineering knowledge	An ability to apply knowledge of mathematics (including probability, statistics and discrete mathematics), science, and engineering for solving Engineering problems and modeling
PO2	Problem analysis	An ability to design, simulate and conduct experiments, as well as to analyze and interpret data including hardware and software components
PO3	Design / development of solutions	An ability to design a complex electronic system or process to meet desired specifications and needs
PO4	Conduct investigations of complex problems	An ability to identify, formulate, comprehend, analyze, design synthesis of the information to solve complex engineering problems and provide valid conclusions.
PO5	Modern tool usage	An ability to use the techniques, skills and modern engineering tools necessary for engineering practice
PO6	The engineer and society	An understanding of professional, health, safety, legal, cultural and social responsibilities
PO7	Environment and sustainability	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and demonstrate the knowledge need for sustainable development.
PO8	Ethics	Apply ethical principles, responsibility and norms of the engineering practice
PO9	Individual and team work	An ability to function on multi-disciplinary teams.
PO10	Communication	An ability to communicate and present effectively
PO11	Project management and finance	An ability to use the modern engineering tools, techniques, skills and management principles to do work as a member and leader in a team, to manage projects in multi-disciplinary environments
PO12	Life-long learning	A recognition of the need for, and an ability to engage in, to resolve contemporary issues and acquire lifelong learning

PSO'S

The graduates of the department will attain:

PSO1: The ability to analyze, design and implement application specific electronic system for complex engineering problems for analog, digital domain, communications and signal processing applications by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2: The ability to adapt for rapid changes in tools and technology with an understanding of societal and ecological issues relevant to professional engineering practice through life-long learning

PSO3: Excellent adaptability to function in multi-disciplinary work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

PEO'S

PEO1-PROFESSIONAL DEVELOPMENT

To develop in the students the ability to acquire knowledge of Mathematics, Science & Engineering and apply it professionally within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability with due ethical responsibility.

PEO2-CORE PROFICIENCY

To provide ability to identify, formulate and solve engineering problems with hands on experience in various technologies using modern tools necessary for engineering practice to satisfy the needs of society and the industry.

PEO3- TECHNICAL ACCOMPLISHMENTS

To equip the students with the ability to design, experiment, analyze and interpret in their core applications through multi disciplinary concepts and contemporary learning to build them into industry ready graduates.

PEO4- PROFESSIONALISM

To provide training, exposure and awareness on importance of soft skills for better career and holistic personality development as well as professional attitude towards ethical issues, team work, multidisciplinary approach and capability to relate engineering issues to broader social context.

PEO5- LEARNING ENVIRONMENT

To provide students with an academic environment and make them aware of excellence, leadership, written ethical codes and guidelines and the life-long learning to become a successful professional in Electronics and Communication Engineering

MESSAGES

Founder Chairman's Message

Ch. Malla Reddy

Founder Chairman, MRGI
Hon'ble Minister, Govt. of Telangana State

MRECW has made tremendous progress in all areas and now crossing several milestones within a very short span of time and now I feel very happy to know that the students and faculty of the ECE department of MRECW are bringing out the Volume-1 of the Technical magazine Technitronix in A.Y 2020-21. As I understand this magazine is intended to bring out the inherent literary talents in the students and the teachers and also to inculcate leadership skills among them. I am confident that this issue will send a positive signal to the staff, students and the persons who are interested in the educational and literary activities

Principal's Message

I congratulate the department of ECE, MRECW for bringing out the prestigious half yearly department technical Magazine Technitronix under A.Y: 2020-21, I am sure that the magazine will provide a platform to the students and faculty members to expand their technical knowledge and 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 endeavor.

Dr. Y. Madhavee Latha

Principal

HOD'S MESSAGE

It is an occasion of great pride and satisfaction for the department of ECE, MRECW to bring out the half yearly of the Technical magazine Technitronix under A.Y:2020-21, it gives me immense pleasure to note that the response to the magazine has been over whelming. 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. Each article is entertaining interesting and absorbing.

I applaud the contributors for their stimulated thoughts and varied hues in articles contributed by them.

Dr. N. Sreekanth

HOD

SCIENTIST OF THE HALF YEAR

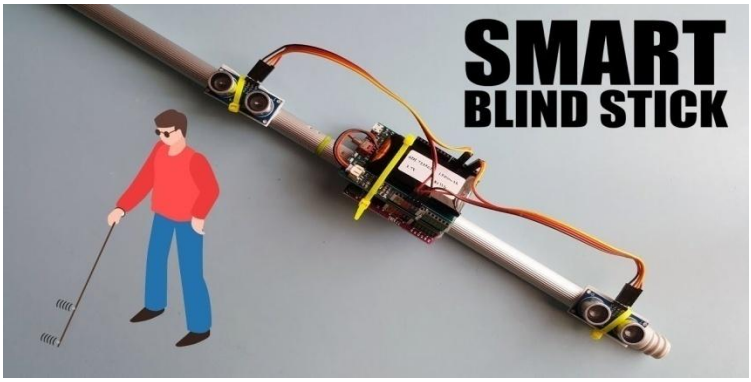
JOSEPH FOURIER

Joseph Fourier, in full Jean-Baptiste-Joseph, Baron Fourier, (born March 21, 1768, Auxerre, France—died May 16, 1830, Paris), French mathematician, known also as an Egyptologist and administrator, who exerted strong influence on mathematical physics through his Théorie analytique de la chaleur (1822; The Analytical Theory of Heat). He showed how the conduction of heat in solid bodies may be analyzed in terms of infinite mathematical series now called by his name, the Fourier series. Far transcending the particular subject of heat conduction, his work stimulated research in mathematical physics, which has since been often identified with the solution of boundary-value problems, encompassing many natural occurrences such as sunspots, tides, and the weather. His work also had a great influence on the theory of functions of a real variable, one of the main branches of modern mathematics.

Fourier, the son of a tailor, first attended the local military school conducted by Benedictine monks. He showed such proficiency in mathematics in his early years that he later became a teacher in mathematics at the same school. The ideals of the French Revolution then swept him into politics, and more than once his life was in danger. When the École Normale was founded in 1794 in Paris, he was among its first students, and, in 1795, he became a teacher there. The same year, after the École Polytechnique was opened, he joined its faculty and became a colleague of Gaspard Monge and other mathematicians.

FACULTY ARTICLES

SMART BLIND STICK



Smart blind stick describes the use of Arduino on ultrasonic blind walking stick. 30 million people are permanently blind and 285 billion are visually impaired, according to the WHO. When you consider them, you will realize very well that without the aid of others they can't walk To reach your destination one has to ask for directions. During their daily lives, they have to face more challenges. The blind handle is safer for a person to walk. The bar senses the item before the individual and provides the consumer with a vibrational answer or on demand. And, the human being can travel without anxiety. This app is the best solution to solve the problems

The main aim of this initiative is to enable the blind navigate with confidence and to be alert if their walking route becomes obstructed with other things, people or related odds. In the circuit, a buzzer is attached as a warning signal, whose beep frequency changes depending on the distance of the target. The smaller the obstacle gap, the more frequent the beep buzzer is. We can say the length of the beep is inversely proportional to the size. The ultrasonic sensor is the main feature of this device. The ultrasonic sensor transmits a sound pulse at high frequency, and then measures the period to obtain the sound echo signal to mirror back. There are 2 circles inside the sensor. One of them transmits the ultrasonic waves and serves as the transmitter. The other each serves as a receiver and collects the repeated sound signal (mostly a small microphone). The sensor is adjusted according to air velocity of the echo. With that measured information, the time difference between sound pulse propagation and detection is determined by calculation of the distance to the target. This circuit is powered through a switch by a 9 volt battery.

Mr. S. Mahesh Reddy
Department of ECE

INTERNET OF THINGS (IOT) AND AGRICULTURAL UNMANNED AERIAL VEHICLES (UAVS) IN SMART FARMING

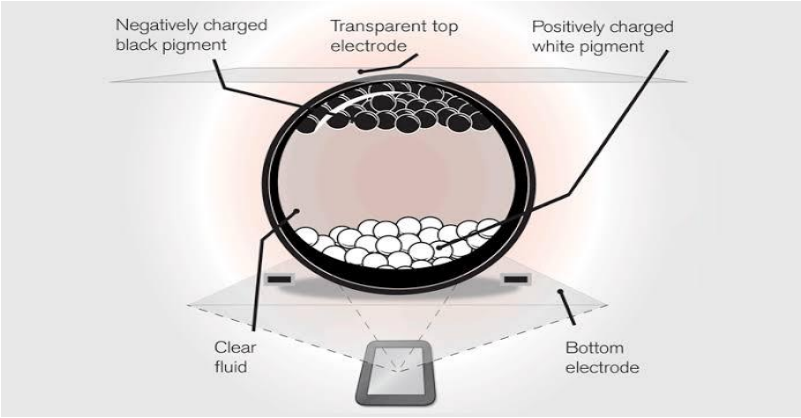
Internet of Things (IoT) and Unmanned Aerial Vehicles (UAVs) are two hot technologies utilized in cultivation fields, which transform traditional farming practices into a new era of precision agriculture. In this paper, we perform a survey of the last research on IoT and UAV technology applied in agriculture. We describe the main principles of IoT technology, including intelligent sensors, IoT sensor types, networks and protocols used in agriculture, as well as IoT applications and solutions in smart farming.

Moreover, we present the role of UAV technology in smart agriculture, by analyzing the applications of UAVs in various scenarios, including irrigation, fertilization, use of pesticides, weed management, plant growth monitoring, crop disease management, and field-level phenotyping. Furthermore, the utilization of UAV systems in complex agricultural environments is also analyzed. Our conclusion is that IoT and UAV are two of the most important technologies that transform traditional cultivation practices into a new perspective of intelligence in precision agriculture.

Prof. S. Babu Rao
Department of ECE

STUDENT ARTICLES

ELECTRONIC PAPER DISPLAY

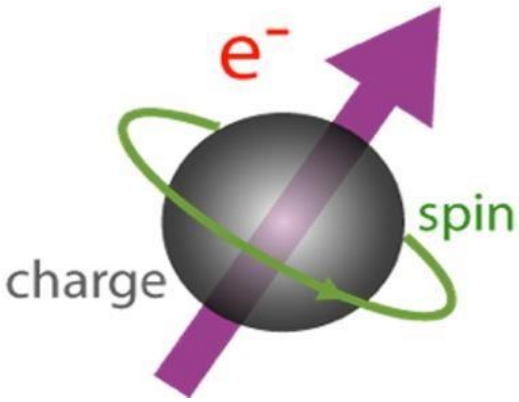


Electronic paper, also sometimes electronic ink, e-ink or electrophoretic display, are display devices that mimic the appearance of ordinary ink on paper. Unlike conventional flat panel displays that emit light, an electronic paper display reflects ambient light like paper. This may make them more comfortable to read, and provide a wider viewing angle than most light-emitting displays. The contrast ratio in electronic displays available as of 2008 approaches newspaper, and newly (2008) developed displays are slightly better. An ideal e-paper display can be read in direct sunlight without the image appearing to fade.

Many electronic paper technologies hold static text and images indefinitely without electricity. Flexible electronic paper uses plastic substrates and plastic electronics for the display backplane. Applications of electronic visual displays include electronic shelf labels and digital signage, time tables at bus stations, electronic billboards, smartphone displays, and e-readers able to display digital versions of books and magazines

M.Sowmya
18RH1A04D1
III ECE C

SPINTRONICS

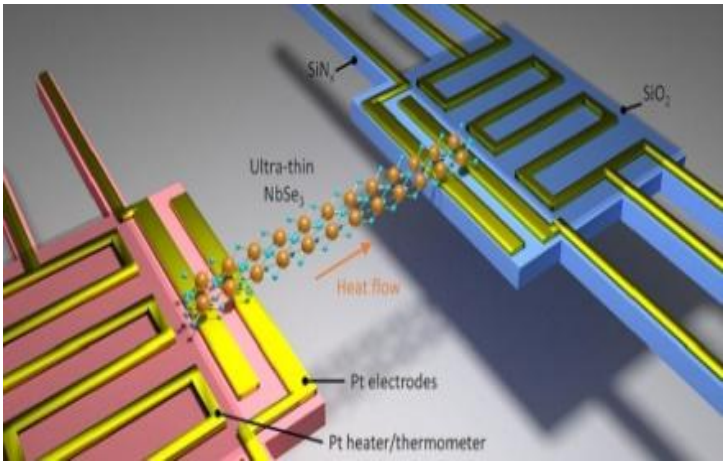


Nanoelectronics is an always developing field of study with many developments in devices and advancements in the concepts time and again. One such emerging field for the next generation nanoelectronics is "**Spintronics**". A solution for the high-power consumption in devices is provided by the concept of spin electronics. It not only reduces the power consumption but also increases the memory and processing capabilities. The very principle around the working of such devices in the proper utilization of spin degree of freedom of electrons and/or holes which also have an interaction with their orbital moments. Spin polarization in these devices is controlled in three ways which are magnetic layers used as spin-polarisers, analysers, via spin–orbit coupling. Any one of the mentioned ways can be used. Spin waves can also be used to carry the spin current.

Advantages of spintronics over electronics is that it has low power consumption, the heat dissipation is very low and it is compact in size. The read and write operations are at greater speed because of the faster spin manipulations.Electronics now depend on various semiconductors but whereascommon metals like Iron (Fe), Aluminium (Al), etc., can be used to build the spintronic units. The applications of spintronics are extended from military applications to medical and biomedical applications. From Missile Guidance, Key-hole surgeries, post-operative care to automotive sensors, navigation and robotics spintronics can bring a massive change by replacing or upscaling the current electronics and semiconductors. While the demand for nanoelectronics in future keeps increasing, there is a need for certain limelight on spintronics might change the phase of nanoelectronics.

M. Naimisha
18RH1A04D4
III ECE C

NANO ELECTRONICS



The application of nanotechnology in the field of electronics and electronic components is known as nanoelectronics. Although the word Nanoelectronics can be used to refer to all electrical components, transistors receive specific attention. The size of these transistors is less than 100 nanometres. Because they are so small, independent research are required to learn about quantum mechanical properties and interatomic design. As a result, even though transistors are nanometre-sized, they are created using nanotechnology. Their design differs significantly from standard transistors, and they are commonly classified as one-dimensional nanotubes/nanowires, hybrid molecular electronics, or advanced molecular electronics. This technology is considered to be the next big thing, yet it's very impossible to put into practise.Researchers are using the technology to create bio-nano generators, which are generators that produce energy in vivo.

The generator is essentially an electrochemical device with a nanoscale architecture. It functions similarly to a fuel cell, generating power by absorbing blood glucose in a living body. With the help of an enzyme, the glucose will be removed from the body. This enzyme separates the glucose from the electrons, allowing them to be used to generate electricity

M.Aishwarya
18RH1A04E1
III ECE C

HOLOGRAM TECHNOLOGY

As technology advances, we are able to experiment with new and more exotic types of programming, software, hardware, and systems. Hologram technology is an example of a fast-growing breakthrough.

3D holograms are making their way into our daily lives. A 3D hologram is a virtual object that appears to be "there" but isn't, floating in mid-air or standing on a nearby surface. This "augmented reality" (AR) revolution is already underway. 3D hologram displays are the next step in more human-compatible digital content. The applications for the new technology are limitless.

A laser beam is used to record an item (or someone) in a clean environment, and the information is then transmitted to a recording medium that cleans up and clarifies the image. The laser beam is split into two pieces and redirected with the use of mirrors. One of the beams is aimed directly at the target. The object reflects the light, which is caught on the medium. The reference beam, which is pointed at the recording medium, is the second beam. This means that the beams work together in the hologram to create a precise image. These two laser beams cross paths and cause interference. The interference pattern is imprinted on the recording media to recreate the 3D image.

P. Geethika Samarani
18RH1A04L6
III ECE D

ARTIFICIAL ORGANS

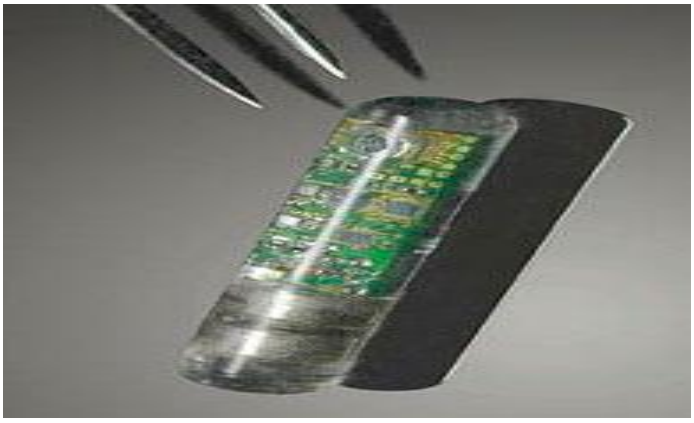
An Artificial organ may be defined as a human made device designed to replace, duplicate or argument, functionally or cosmetically a missing, diseased or otherwise incompetent part of the body.It requires a non-biologic material interface with the living tissue.All the development leads to the 21st century inventions of modern artificial organs used in the body.

Artificial organs can replace diseased or damaged organs, thereby, providing the ailing patient with an opportunity to lead a healthy and normal life.Artificial organs can meet the huge demand of healthy donor organs.There is a huge list of patients who are in urgent need of healthy organs but are unable to find a suitable willing donor.With the help of regenerative medicine or artificial organ therapy, burn victims can even have a new skin.

A major concern is the possible presence of the disease in the base tissue which is used to create the organ. Sometimes, even a foreign body tissue is used to regenerate or reconstruct the organ.The entire cost of growing and transplanting an artificial organ is prohibitive, and thus, limit the scope of its application to the general public.There are high chances of organ chances of organ failure, and the body may even take some time to adapt to the new organ. Hoe the body reacts to the new organ may vary from person to person

E. Pranitha
18RH1A04H6
III ECE C

BIO CHIP TECHNOLOGY



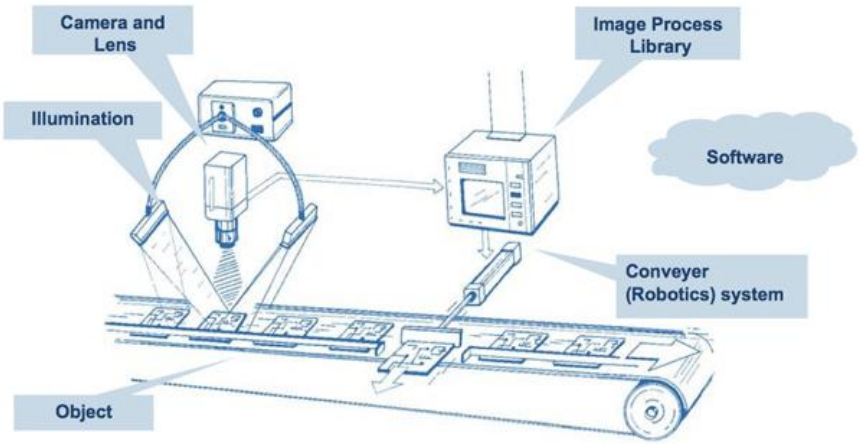
A biochip is a collection of miniaturized test sites (microarrays) arranged on a solid substrate that permits many tests to be performed at the same time in order to achieve higher throughput and speed. Typically, a biochip's surface area is no larger than a fingernail.

Like a computer chip that can perform millions of mathematical operations in one second, a biochip can perform thousands of biological reactions, such as decoding genes, in a few seconds.

A Biochip comprises of two components, **a transponder, and a reader**.Biochips can also be used to rapidly detect chemical agents used in biological warfare so that defensive measures can be taken.This biochip system is a RFID based, using low frequency radio signals to communicate between the biochip and reader.The size of biochip is as small as an uncooked rice grain size. It ranges from 2 inches to 12 inches.

R. Manisha
18RH1A04J1
III ECE D

MACHINE VISION TECHNOLOGY

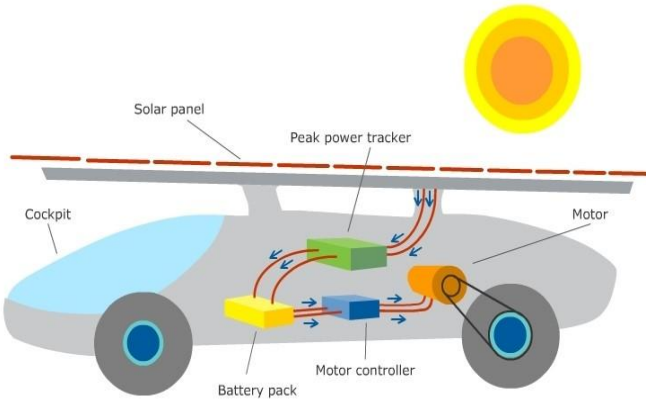


One of the simplest ways to comprehend a machine vision system is to think of it as a machine's "eyes." To determine action, the system leverages digital input recorded by a camera. Machine vision systems are used by businesses to improve quality, efficiency, and operations in a variety of ways.

When a sensor identifies the presence of a product, the process begins. The sensor then activates a light source to illuminate the region and a camera to take a picture of the product or one of its components. The frame-grabber (a digitalizing device) converts the image captured by the camera into digital data. The digital file is kept on a computer so that the system software may evaluate it. To find flaws, the software analyses the file to a set of specified criteria. The product will fail inspection if a flaw is discovered

P. Prathyusha
18RH1A04F7
III ECE C

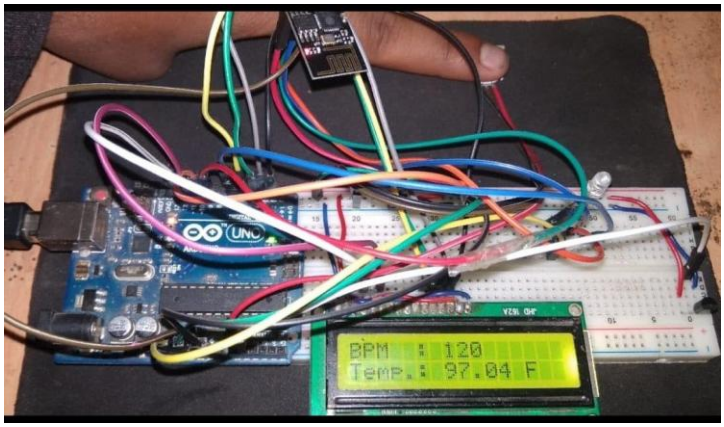
SOLAR CAR TECHNOLOGY: A REVOLUTION IN AUTOMOTIVE DESIGN



Solar cars are self-sufficient, non-polluting vehicles that could lessen our dependence on foreign oil and minimize the environmental impact of the automobile. The propulsion system in a solar car is entirely electric. Photovoltaic solar cells convert sunlight directly into electricity, silently and with no moving parts. The electricity is used to power a variable-speed electric motor. Batteries store electricity and allow the car to accelerate and travel at higher speeds when necessary. The paper reviews the present solar car technology by discussing solar car race results

B. Dhanuja
19RH1A0423
II ECE A

IoT Based Patient Health Monitoring using ESP8266 & Arduino



With tons of new healthcare technology start-ups, IoT is rapidly revolutionizing the healthcare industry. In this project, we have designed the IoT Based Patient Health Monitoring System using ESP8266 & Arduino. The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range

The Arduino Sketch running over the device implements the various functionalities of the project like reading sensor data, converting them into strings, passing them to the IoT platform, and displaying measured pulse rate and temperature on character LCD.

B.Swetha
19RH1A0426
II ECE A

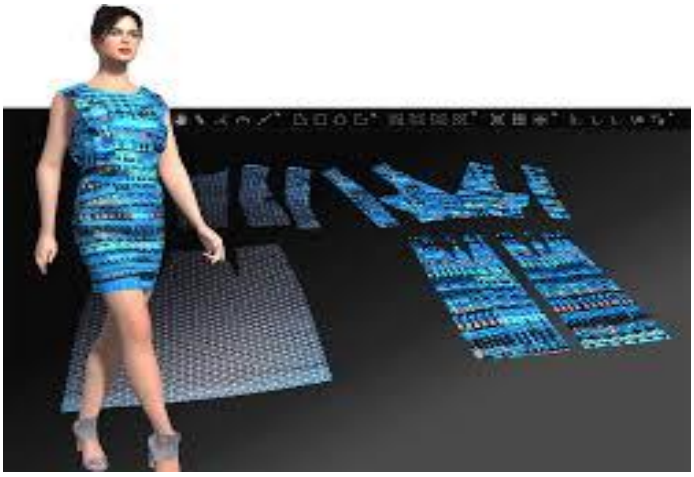
LICKABLE TELEVISION

The lickable television concept developed in Japan will allow viewers to taste food right from the screen. The lickableTV comes with a supposedly hygienic film that is laid over the screen on which flavors are sprayed.Thedevice is called “Taste the TV” and was developed by a Japanese professor.Thelickable television is developed by Meiji University professor Homei Miyashita who says that the television was built to help people experience food flavors from across the world while sitting in the comfort of their own home.

The professor who works with a team of 30 students has developed multiple flavor related products including a fork that is supposed to help make the food taste better. He has also offered technology firms to use his spraying technique and develop products that can make toasted bread taste like a slice of pizza or chocolate. While this is just the prototype, this technology when commercially available can provide a unique sensory experience to its users. It can be used by culinary shows to teach students from across the world remotely.

B. Yashaswini
19RH1A0432
II ECE A

AUGMENTED CLOTHING

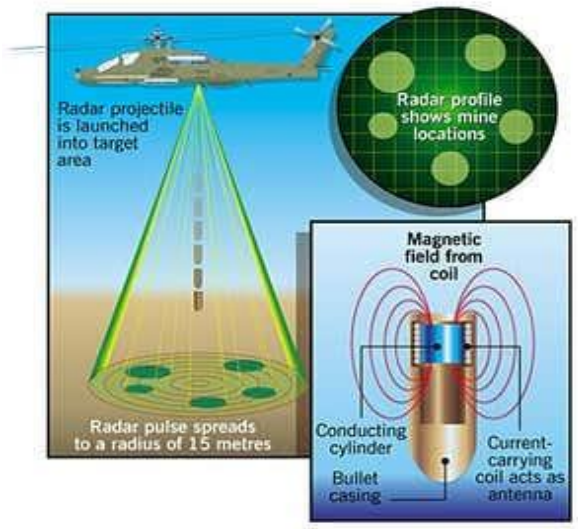


AR clothing refers the ability for 3D digital clothing. This features AI models, virtual catwalks, reality and gravity defying outfits. As we all are habituated to online shopping this augmented reality clothing that is virtual dresses can be modeled on social media platforms. Many also can buy and dress up their avatars in virtual games and worlds. The outfits also don't discriminate on the basis of body, size, gender. People are so enthusiastic in order to push fashion boundaries by using the technology. This is the point of owning the outfits that aren't real.

" GETREADY TO ADD PIXELLATED AND AGUMENTED CLOTHING TO YOUR WARDROBE."

Ch. Nihitha
19RH1A0438
II ECE A

RADAR BULLET



Radar bullet is a special type of bullet the main use of radar bullet is to find landmines without setting foot into the ground.Thisconsists of firing a special bullet into ground from a helicopter which could pinpoint buried landmines. Anti -personal mines claims seventy new victims every day. This weapon is particularly cruel on children whose bodies being smaller and closer to the blast are more likely to sustain serious injury.

The severe disabilities and psychological trauma that follow the blast mean these children will have to be looked after for many years. Technologies are used for landmine detection are: Metal detectors--- capable of finding even low-metal content mines in mineralized soils. Nuclear magnetic resonance, fast neutron activation and thermal neutron activation. Thermal imaging and electro-optical sensors--- detect evidence of buried objects. Biological sensors such as dogs, pigs, bees and birds. Chemical sensors such as thermal fluorescence detect airborne and waterborne presence of explosive vapors.

Ch. Bhavishya
19RH1A0446
II ECE A

ROBOTIC ARM FOR INDUSTRIAL PURPOSE

Imagine without any technological help how the complex tasks that are done in Industries? This would be very tragic to imagine its always better when we get a helping hand to solve tasks. To simplify work as well to increase their operational efficiency.

This robotic arm is mainly designed as an embedded system. The main function of this robotic arm is similar to a human arm. This robotic arm uses a microcontroller and also it includes motors. This robot also avoids accidents by using an obstacle sensor and this arm robot is also used for welding, surgery, gripper, painting, etc.

Robots have to be monitored at all times to ensure that they do not get any mechanical faults which would cause them to stall.

D. Keerthi Reddy
19RH1A0453
II ECE A

IMPORTANT WEBSITES

www.ieee.org/india

www.engineering.careers360

www.technologyreview.com

www.mathworks.in/products/matlab/

www.microwaves101.com/

www.ece.utoronto.ca/student-life-links

https://www.ece.org/

Science Commons.org

MathGV.com:

http://www.engineeringchallenges.org/

http://engineering.stanford.edu/announcement/stanford-announces-16-online-courses-fall-quart

http://www.tryengineering.org/

http://www.engineergirl.org/

http://www.discoverengineering.org/

http://www.eng-tips.com/

http://efymag.com

http://efymagonline.com/

http://electronicsforu.com

www.dspguide.com

www.howstuffworks.com

http://nptel.iitm.ac.in

http://www.opencircuitdesign.com/

http://www.futuresinengineering.com/

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