PRAGATI ENGINEERING COLLEGE (AUTONOMOUS)
Approved by AICTE, New Delhi & Permanently Affilicated to JNTUK, Kakinada & Accredited by NAAC with ' A' Grade

SUTANTRA - *Information for Enlightening*

DEPARTMENT OF INFORMATION TECHNOLOGY

"without data, you're just another person with an opinion."

July 2019

About Department

The Department of IT was established in the year 2001 to groom the student of A.P for the requirements of IT industry. The Department has emerged as a reputed center of learning in the coastal districts of Andhra Pradesh. Footprints of the department's students can be found in most of the local and global software majors. Student of this department mainly, brought glory to the college by securing University Rank.The department strives to empower the students, to achieve the demanding standards of IT industry, by bringing about a synergistic academic environment wherein cutting edge technologies, industry experts, faculty and students are engaged in a sustained interaction.

Vision of the Institute

To emerge as a Premier Institution for Technical Education in the Country through Academic Excellence and to be recognized as a Centre for Excellence in Research & Development, catering to the needs of our Country.

Mission of the Institute

To realize a strong Institution by consistently maintaining State-of-art infrastructure and building a cohesive, World Class Team and provide need based Technical Education, Research and Development through enhanced Industry Interaction.

Department Vision

To attain academic excellence in the field of Information Technology and research serving to the needs of the society through technological developments.

Department Mission

M1: To create stimulating learning ambiance by providing state-of-art infrastructure and to induce innovative and problem-solving capabilities to address societal challenges.

M2: To impart quality technical education with professional team to make the graduates globally competent to IT Enabled Services.

M3: To strengthen industry-academia relationship for enhancing research capabilities.

'A wealth of information now available at the click of a finger amazes me.'

PEOs for B.Tech IT Programme

PSO1:

Develop software programs in various programming languages learnt to create the software applications to solve the real life problems of the society.

PSO2:

Excel in emerging software tools and technologies.

PSO3:

Effectively transform their ideas and bring consensus for the transformation of the idea into a usable software product / application.

PEOs for B.Tech IT Program

PEO 1:

To have a successful career in IT as researchers, entrepreneurs and IT professionals satisfying the needs of the society.

PEO 2:

To motivate students towards higher education and incline them towards continuous learning process.

PEO 3:

To inculcate professional ethics of IT industry and prepare them with effective soft skills essential to work in teams.

"My best successes came on the heels of failures"

PROGRAM OUTCOMES

1. *Engineering knowledge:*
Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineerinproblems.

2. *Problem analysis:*
Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. *Design/development of solutions:*
Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. *Conduct investigations of complex problems:*
Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. *Modern tool usage:*
Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. *The engineer and society:*
Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. *Environment and sustainability:*
Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

"Inforation is the switch of technology"

DEPARTMENT OF IT

10. Communication:

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning:

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

CHARLES BABBAGE

Babbage was a British mathematician, an original and innovative thinker and a pioneer of computing. Charles Babbage was born on 26 December 1791, probably in London, the son of a banker. He was often unwell as a child and was educated mainly at home. By the time he went to Cambridge University in 1810 he was very interested in mathematics. After graduation Babbage was hired by the Royal In stitution to lecture on calculus. Within two years he had been elected a member of the Royal Society and with his Cambridge friends, was instrumental in set ting up the Astronomical Society in 1820, the first to challenge the dominance of the Royal Society. From 1828 to 1839, Babbage was Lucasian Professor of Mathematics at Cambridge.

The 1820s saw Babbage work on his 'Difference Engine', a machine which could perform mathematical calculations. A six-wheeled model was initially constructed and demonstrated to a number of audiences. He then developed plans for a bigger, better, machine - Difference Engine 2. He also worked on as a computer pioneer now largely rests. It was intended to be able to perform any arithmetical calculation using punched cards that would deliver the instructions, as well as a memory unit to store numbers and many other fundamental components of today's computers. The remarkable British mathematician Ada Lovelace completed a program for the Analytical Engine but neither it, nor Difference Engine 2, were finished in Babbage's lifetime.

ACHIEVEMENTS OF CHARLES BABBAGE:

1. Babbage also worked in the fields of philosophy and code-breaking, as well as campaigning for reform

2. In British science. He died at his home in London on 18 October 1871.

3. In 1824, Babbage was awarded the Gold Medal of the Royal Astronomical Society.

4. From 1828 to 1839 Babbage was Lucasian Professor of Mathematics at Cambridge.

5. In 1832, Charles was elected a Foreign Honorary Member of the American Academy of Arts and Sciences.

6. Charles has also written books on Natural Theology.

7. Charles also was interested a lot in cryptography and has tried many experiments with it.

8. In 1838, Charles invented the Pilot – the metal frame attached to the front of locomotives that clears the tracks of obstacles. Charles also invented ophthalmoscope and dynamometer car.

'Errors using inadequate data are much less than those using no data at all.'

ARTIFICIAL INTELLIGENCE
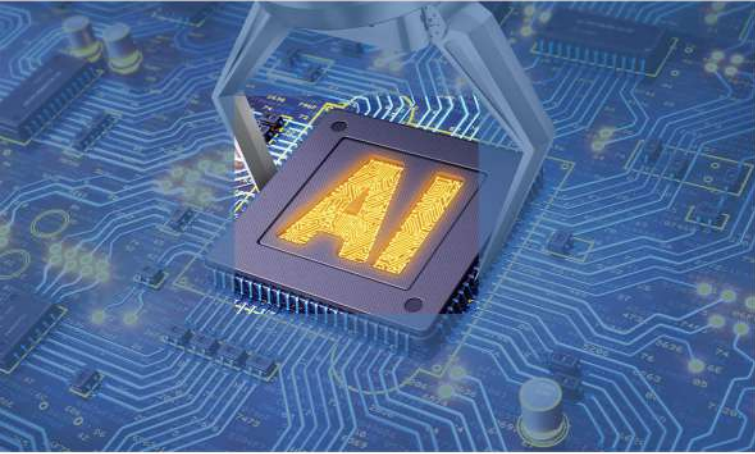
In computer science, artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans.Colloquially, the term "artificial intelligence" is used to describe machines/computers that mimic "cognitive" functions that humans associate with other human minds, such as "learning" and "problem solving".

The study of mechanical or "formal" reasoning began with philosophers and mathematicians in antiquity.The study of mathematical logic led directly to Alan Turing's theory of computation, which suggested that a machine, by shuffling symbols as simple as "0" and "1", could simulate any conceivable act of mathematical deduction. This insight, that digital computers can simulate any process of formal reasoning, is known as the Church–Turing thesis. Along with concurrent discoveries in neurobiology, information theory and cybernetics, this led researchers to consider the possibility of building an electronic brain. Turing proposed that "if a human could not distinguish between responses from a machine and a human, the machine could be considered "intelligent". The first work that is now generally recognized as AI was McCullouch and Pitts' 1943 formal design for Turing-complete "artificial neurons". The field of AI research was born at a workshop at Dartmouth College in 1956. Attendees Allen Newell (CMU), Herbert Simon (CMU), John McCarthy (MIT), Marvin Minsky (MIT) and Arthur Sam-uel (IBM) became the founders and leaders of AI research.

Machine learning (ML), a fundamental concept of AI research since the field's inception,is the study of computer algorithms that improve automatically through experience. Unsupervised learning is the ability to find patterns in a stream of input, without requiring a human to label the inputs first. Supervised learning includes both classification and numerical regression, which requires a human to label the input data first. Classification is used to determine what category something belongs in, and occurs after a program sees a number of examples of thing from several categories. Regression is the attempt to produce a function that describes the relationship between inputs and outputs and predicts how the outputs should change as the inputs change. Computational learning theory can assess learners by computational complexity, by sample complexity (how much data is required), or by other notions of optimization. In reinforcement learning the agent is rewarded for good responses and punished for bad ones. The agent uses this sequence of rewards and punishments to form a strategy for operating in its problem space.

The overall research goal of artificial intelligence is to create technology that allows computers and machines to function in an intelligent manner. The general problem of simulating (or creating) intelligence has been broken down into sub-problems. These consist of particular traits or capabilities that researchers expect an intelligent system to display.

Mrs. D Sirisha

Assoc Professor & HOD

BLOCKCHAIN
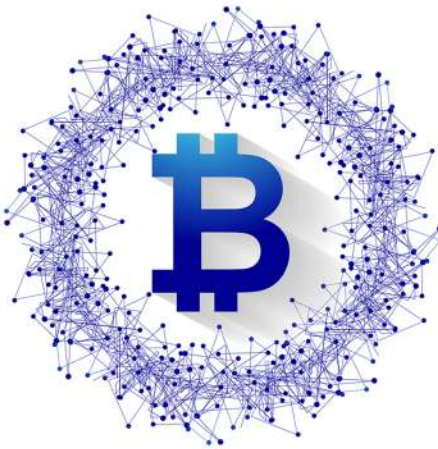
Blockchain was invented by a person(OR group of persons)using the name Satoshi Nakamoto in 2008 to serve as the public transaction ledger of the cryptocurrency bitcoin. The first work on a cryptographically secured chain of blocks was described in 1991 by Stuart Haber and W. Scott Stornetta.They wanted to implement a system where document timestamps could not be tampered with. In 1992, Bayer, Haber and Stornetta incorporated Merkle trees to the design, which improved its efficiency by allowing several document certificateto be collected into one block.

A blockchain,originally block chain,is a growing list of records, called blocks, which are linked using cryptography. Each block contains a cryptographic hash of the previous block,a timestamp, and transactiondata. By design, a blockchain is resistant to modification of the data.It is "an open,distribu-ted ledger that can record transaction between two parties efficiently and in a verifiable and permanent way". For use as a distributed ledger, a blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for inter-node communication and validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks, which requires consensus of the network majority.

A blockchain is simply a chain of blocks that contains information. Each block has a cryptographic hash of the previous block, a timestamp, and transaction data. Although the design is simple, it is this design that makes Blockchain invulnerable to data tampering.Blockchain technology is an open distributed ledger that can record transactions of two parties securely and efficiently. As it is distributed, Blockchain is typically managed by a peer-to-peer network working simultaneously together to solve complex mathematical problems in order to validate new blocks. Once recorded, the data in any given block cannot be updated retroactively without changing all subsequent blocks, which requires the confirmation of the majority in the network. This is the main reason why blockchain technology is secure and not susceptible to hacking.

Blocks on the blockchain store data about monetary transactions — we've got that out of the way. But it turns out that blockchain is actually a pretty reliable way of storing data about other types of transactions, as well. In fact, blockchain technology can be used to store data about property exchanges, stops in a supply chain, and even votes for a candidate. Professional services network Deloitte recently surveyed 1,000 companies across seven countries about integrating blockchain into their business operations. Their survey found that 34% already had a blockchain system in production today, while another 41% expected to deploy a blockchain application within the next 12 months. In addition, nearly 40% of the surveyed companies reported they would invest $5 million or more in blockchain in the coming year. Here are some of the most popular applications of blockchain being explored today.Blockchain forms the bedrock for cryptocurrencies like Bitcoin. As we explored earlier, currencies like the U.S. dollar are regulated and verified by a central authority, usually a bank or government. Under the central authority system, a user's data and currency are technically at the whim of their bank or government. If a user's bank collapses or they live in a country with an unstable government, the value of their currency may be at risk. These are the worries out of which Bitcoin was borne. By spreading its operations across a network of computers, blockchain allows Bitcoin and other cryptocurrencies to operate without the need for a central authority. This not only reduces risk but also eliminates many of the processing and transaction fees. It also gives those in countries with unstable currencies a more stable currency with more application and a wider network of individuals and institutions they can do business with, both domestically and internationally (at least, this is the goal.)

Mr. Ch Venkata Ramana
Assistant Professor

MACHINE LEARNING

Machine learning is one of those buzz words that gets thrown around as a synonym for AI (Artificial Intelligence). But this really is not accurate. Note that machine learning is a subset of AI. This field has also been around for quite some time, with the roots going back to the late 1950s. It was during this period that IBM's Arthur L. Samuel created the first machine learning application, which played chess.

So how was this different from any other program? Well, according to Venkat Venkataramani, who is the co-founder and CEO of Rockset, machine learning is "the craft of having computers make decisions without providing explicit instructions, thereby allowing the computers to pattern match complex situations and predict what will happen."

To pull this off, there needs to be large amounts of quality data as well as sophisticated algorithms and high-powered computers. Consider that when Samuel built his program such factors were severely limited. So it was not until the 1990s that machine learning became commercially viable. But machine learning – supercharged by deep learning neural networks -- is also making strides in the enterprise Mist has built a virtual assistant, called Marvis, that is based on machine learning algorithms that mine insights from Wireless LANs.

A network administrator can just ask it questions like "How are the wi-fi access points in the Baker-Berry Library performing?" and Marvis will provide answers based on the data. More importantly, the system gets smarter and smarter over time.

Barracuda Networks is a top player in the cybersecurity market and machine learning is a critical part of the company's technology. "We've found that this technology is exponentially better at stopping personalized social engineering attacks," said Asaf Cidon, who is the VP of Email Security for Barracuda Networks. "The biggest advantage of this technology is that it effectively allows us to create a 'custom' rule set that is unique to each customer's environment. In other words, we can use the historical communication patterns of each organization to create a statistical model of what a normal email looks like in that organization.

Of course, machine learning has drawbacks – and the technology is far from achieving true AI. It cannot understand causation or engage in conceptual thinking. There are also potential risks of bias and overfitting of the models (which means that the algorithms determine that mere noise represents real patterns).

Ms. B Preethi Devi
Assistant Professor

CLOUD COMPUTING

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet. Large clouds, predominant today, often have functions distributed over multiple locations from central servers. If the connection to the user is relatively close, it may be designated an edge server.

"Cloud computing" was popularized with Amazon.com releasing its Elastic Compute Cloud product in 2006, references to the phrase "cloud computing" appeared as early as 1996, with the first known mention in a Compaq internal document.

The goal of cloud computing is to allow users to take benefit from all of these technologies, without the need for deep knowledge about or expertise with each one of them. The cloud aims to cut costs, and helps the users focus on their core business instead of being impeded by IT obstacles. The main enabling technology for cloud computing is virtualization. Virtualization software separates a physical computing device into one or more "virtual" devices, each of which can be easily used and managed to perform computing tasks. With operating system–level virtualization essentially creating a scalable system of multiple independent computing devices, idle computing resources can be allocated and used more efficiently. Virtualization provides the agility required to speed up IT operations, and reduces cost by increasing infrastructure utilization. Autonomic computing automates the process through which the user can provision resources on-demand. By minimizing user involvement, automation speeds up the process, reduces labor costs and reduces the possibility of human errors.

Three types of clouds service

Infrastructure as a service (IaaS): "Infrastructure as a service" (IaaS) refers to online services that provide high-level APIs used to dereference various low-level details of underlying network infrastructure like physical computing resources, location, data partitioning, scaling, security, backup etc

Platform as a service (PaaS): The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.

Software as a service (SaaS): The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

Mrs. N V S Sowjanya
Assistant Professor

BIG DATA

"Big data" is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software. Data with many cases (rows) offer greater statistical power, while data with higher complexity more attributes or columns may lead to a higher false discovery rate. Big data challenges include capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating, information privacy and data source. Big data was originally associated with three key concepts: volume, variety, and velocity.Other concepts later attributed with big data are veracity (i.e., how much noise is in the data)and value.

Big data usually includes data sets with sizes beyond the ability of commonly used software tools to capture, curate, manage, and process data within a tolerable elapsed time. Big data repositories have existed in many forms, often built by corporations with a special need. Commercial vendors historically offered parallel database management systems for big data beginning in the 1990s.

Teradata Corporation in 1984 marketed the parallel processing DBC 1012 system. Teradata systems were the first to store and analyze 1 terabyte of data in 1992. Hard disk drives were 2.5 GB in 1991 so the definition of big data continuously evolves according to Kryder's Law. In 2000, Seisint Inc. (now LexisNexis Group) developed a C++-based distributed file sharing framework for data storage and query. The system stores and distributes structure semi structured, and unstructured data across multiple servers. In 2004, Google published a paper on a process called MapReduce that uses a similar architecture. The MapReduce concept provides a parallel processing model, and an associated implementation was released to process huge amounts of data.

Big data analytics for manufacturing applications is marketed as a "5C architecture" connection, conversion, cyber, cognition, and configuration. Factory work and Cyber-physical systems may have an extended "6C system". Connection (sensor and networks), Cloud (computing and data on demand), Cyber (model and memory), Content/context (meaning and correlation), Community (sharing and collaboration), Customization (personalization and value).

2011 McKinsey Global Institute report characterizes the main components and ecosystem of big data as follows. Techniques for analyzing data, such as A/B testing, machine learning and natural language processing Big data technologies, like business intelligence, cloud computing and databases Visualization, such as charts, graphs and other displays of the data.

Big data has increased the demand of information management specialists so much so that Software AG, Oracle Corporation, IBM, Microsoft, SAP, EMC, HP and Dell have spent $15 billion In 2010, this industry was worth more than $100 billion and was growing at almost 10 percent a year about twice as fast as the software business as a whole

Mrs. Y Srilatha
Assistant Professor

ARTICLE

AUTOMATIC STREET LIGHTNING SYSTEM
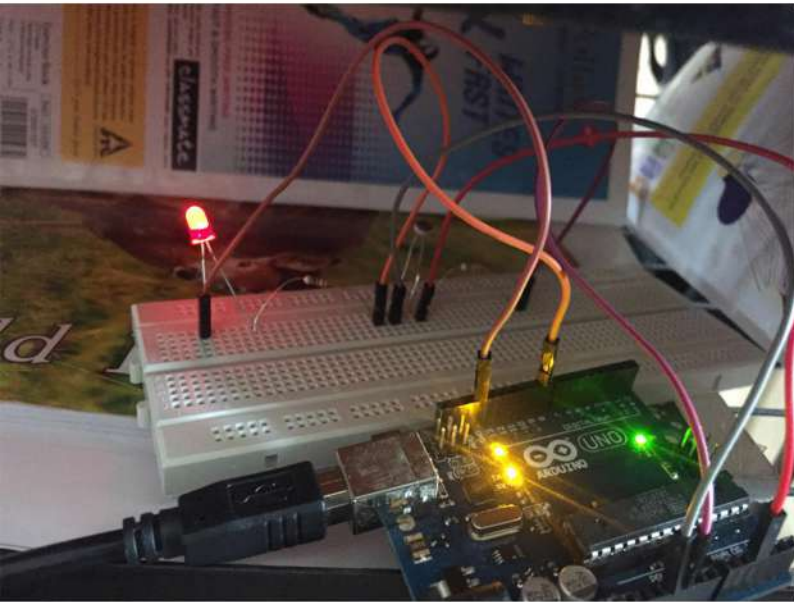
Nowadays, human has become too busy, and is unable to find timeto \switch the lights wherever not necessary. The present system is like the lights will be switched on in the evening before the sun sets and they are switched off the next day morning after there is sufficient light on the out side. But the actual timing for these lights to be switched on is when there is absolute darkness. With this, the power will be wasted up to some extent. This paper gives the best solution for electrical power wastage. Also the manual operation of the lighting system is completely eliminated.

Objective:

To avoid unnecessary Waste of light.
The bulb has longer life expectancy.

Working:

Automatic Street Lightning system is mainly used for smart and adaptive lightning in street lights. The project is implemented with smart IOT system. During the night time the street light gets automatically ON and during the day time, it gets automatically OFF. Thus the system is mainly designed to prevent energy wastage.

Conclusion:

Automatic control using LDR helps to save a large amount of electric power which is wasted in conventional street lighting system. This is to save the Power. We want to save power automatically instead of doing it manually. So it is easy to make it cost effective. This saved power can be used in some other cases like in villages, towns etc. We can design intelligent systems for serving this purpose.

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B. Ramya
(16A31A1205)

P. Rambabu
(12A31A1255)

FUEL LEVEL DETECTION IN VEHICLES
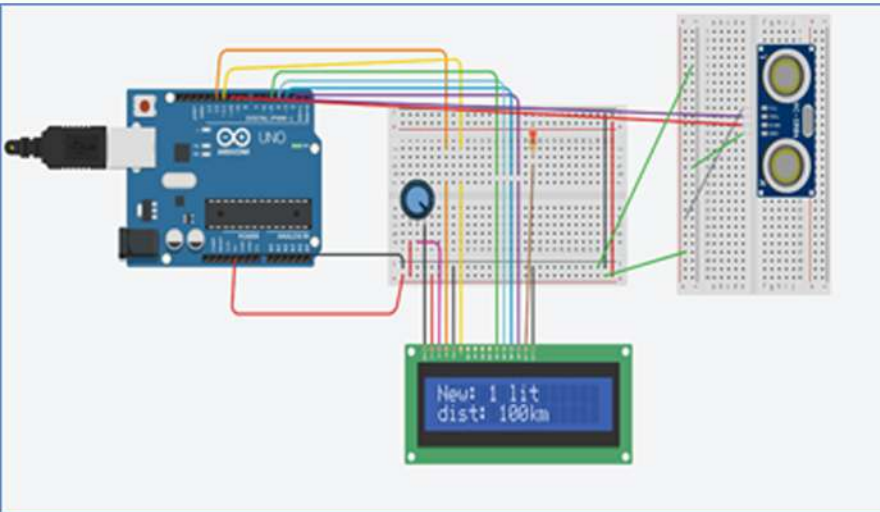
A fuel level detection in vehicle is a product which will show the number of liters of fuel entered in fuel tank in vehicles and it will also tell us how much distance we can travel with the fuel that is currently available in our tank This will only show the reading of the fuel that is newly entered into the fuel tank but not the entire fuel that is present in the fuel tank but the distance shown is for the entire fuel present in the fuel tank

Features:

The features of this project includes the following:
• Number of liters of fuel in fuel tank is displayed
• Showing the distance that can be travelled

Working:

We can calculate this by first calculateing the amount of fuel in the fuel tank with the help of ultrasonic sensor.Now we will again find the amount of fuel in fuel tank and find the difference which will give the number of liters of fuel entered into fuel tank Now we will calculate the distance that can be travalled by the vehical with the amount of fuel present in the fuel tank

Conclusion:

Along with this there can be many advancements that are possible like Creating a database which consists of data of different vehical fuel tank, We can also add a new hardware component called buzzer which will indicate when fueltank is completely filled and we may also use it to avoid stealing of petrol etc..,

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D.S.V.Venkatesh
(16A31A1243)

Ch.k.Raghu Ram
(16A31A1242)

PILL CAMERA
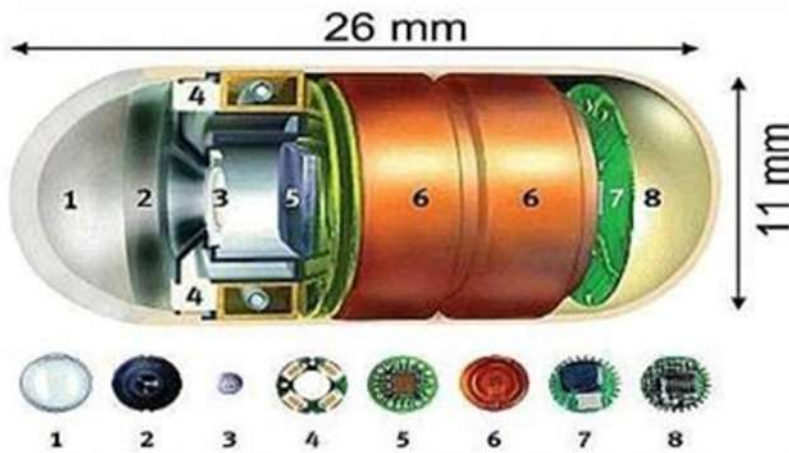
Endoscopy means looking inside and typically refers to looking inside the body for the medical reasons using an endoscope. Endoscopy can also refer to using a borescope An endoscope & a flexible camera that travels into the body's cavities to directly investigate the digestive tract, colon or throat. The tiny camera is like swallowing a pill attached to a string. The camera's 1.4-mm-thick tether allows the doctor to move the camera around and pull it back up once the five- or 10-minute test is finished.

Features of pill camera:

The features of pill camera includes

• A rigid or flexible tube.

• A light delivery system to illuminate the organ or object under inspection. The light source is normally outside the body and the light is typically directed via an optical fiber system.

• A lens system transmitting the image to the viewer from the fiber scope an additional channel to allow entry of medical instruments or manipulators.

Working and control mechanism:

The capsule is constructed with an isolate outer envelope that is biocompatible and impervious to gastric fluids. The camera chip is constructed in complementary-metal —oxide-semiconductor technology to require significantly less power than charge-coupled devices.

Conclusion:

Wireless capsule endoscopy is indeed a breakthrough in small bowel investigation. This innovation in the next couple of years will increase it scope in wide range of patients with variety of illnesses. It could be said that the innovation suited for patients with gastrointestinal bleeding of unclear etiology The VECTOR and NEMO research being sponsored by the EU will be another interesting area in the near future.

D.Nikhila

(17A31A1204)

LI-FI TECHNOLOGY

Li-Fi (also known as light fidelity) is a technology for wireless communication between devices using light to transmit data in a high speed. It offers several advantages like working across higher bandwidth, working in areas susceptible to electromagnetic interference and offering higher transmission speeds.

Design of li-fi:

Main objective is to build a prototype using off the shelf electronic devices, establish a successful link for the transmission of digital data and provide a working li-fi

Implementation of li-fi:

Li-Fi is typically implemented using white LED light bulbs at the downlink transmitter. By fast and subtle variations of the current, the optical output can be made to vary at extremely high speeds.

1. If LED is on, digital data '1'is transmitted and if LED is off, digital data '0' is transmitted.

2. LED's varies in intensity so fast that a human eye cannot detect it. A controller connected at the back de of these LED's is used to code data.

How it works:

The data from the internet is sent to the server via internet connection. The sever is connected to the lamp driver which has software code on it and it converts the data of the internet into binary. A LED lamp is connected to the lamp driver. The photo receptors on our phones, laptops, systems receives the data transmitted and processes and amplifies the data.

Features:

Bandwidth: The visible light spectrum is 10,000 times larger than the entire radio frequency spectrum.
Data Density: Li-Fi can achieve about 1000 times the data density of Wi-Fi because visible light can be well contained in the tight illumination area.
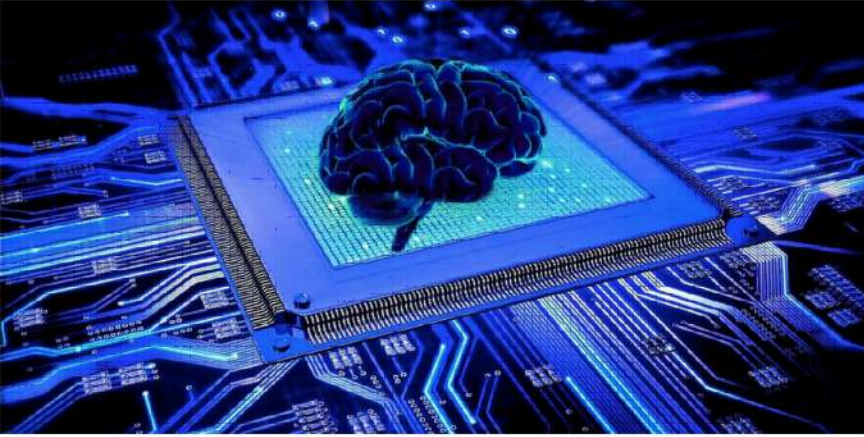
Conclusions:

Thus, if Li-Fi technology can be put into practical use, every bulb can be used as an alternative toWi-Fi hotspots. Li-Fi will make us to proceed towards the cleaner, greener, safer and brighter future.

Ch.Ushaswini
(17A31A1202)

BLUE BRAIN

Blue brain is the name given to the world first virtual brain. That means a machine that can function as human brain. There is an attempt to create an artificial brain that can think, response, take decision, and keep anything in memory. to make an artificial brain which acts like a human brain and the main objective is to upload a human brain into the device with which the human beings can take decisions without any effort. Normally after the death of the body, we lose the knowledge but this is not going to happen with the blue brain and it is going to keep everything right from the knowledge to the memories for advancing the human society.

Feature of blue brain:

Blue brain " -The name of the world's first virtual brain. That means a machine that can function as human brain. Today scientists are in research to create an artificial brain that can think, response, take decision, and keep anything in memory. The main aim is to upload human brain into machine

Working and control mechanism

The brain essentially serves as the body's information processing center. It receives signals from sensory neurons in the central and peripheral nervous systems, and in response it generates and sends new signal that in structure the corresponding parts of the body to move or react in some way. It also integrates signals received from the body with signals from adjacent areas of the brain, giving rise and consciousness. The brain weighs about 1,500grams (3 pounds) and constitutes about 2 percent of total body weight. It consists of three major divisions the massive paired hemispheres of the cerebrum.

The brainstem, consisting of the thalamus, hypothalamus, mid brain, pons, and medulla oblongata the cerebellum.

Conclusion

The blue brain project is the advancement in biological and digital technologies. Through this technology at some point a human can be transferred into computer. The limitations and arguments in this technology are easy to overcome.

K. Dugra Vinusha
(17A31A1210)

ACTIVITIES

Technical Debate

All the participants are divided into two teams and they debate on the topics given accordingly, either supporting or contradicting the topic

Word Hunt

A puzzle game where the participants have to find the technical words from the shuffled letters given.