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ADROITNESS
IN INNOVATION

ELECTRONICS & INSTRUMENTATION ENGINEERING

DR. MAHALINGAM COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARMENT ELECTRONICS AND INSTRUMENTATION ENGINEERING

Dr. Mahalingam College of Engineering and Technology (MCET) is a self – financing educational institution situated in Pollachi, Coimbatore District. MCET is the vision of Arutchelvar Dr. N. Mahalingam, whose determination and dynamism made possible the realization of this institution of excellence. MCET was established in 1998 to commemorate the 75th Birthday of this great visionary Arutchelvar Dr. N. computer facilities and techniques.

VISION:

We develop a globally competitive workforce and entrepreneurs.

MISSION:

Dr. Mahalingam College of Engineering and Technology, Pollachi endeavors to impart high quality, competency based technical education in Engineering and Technology to the younger generation with the required skills and abilities to face the challenging needs of the industry around the globe. This institution is also striving hard to attain a unique status in the international level by means of infrastructure, state-of-the-art computer facilities and techniques
mission icon core value.

CORE VALUES:

- Equity.
- Transparency
- Creativity
- Team Work
- Environment Sustainability
- Staff Development
- Women in Development.

NIA INSTITUTIONS:

The society's solicitation made him the Chairman of NIA to expand education right from schooling to engineering. Within a short span of 50 years the bud- NIA- has blossomed in lot many avenues and has spread its fragrance in industrialization, education, finance, transportation, synthetic gems, textiles, agriculture and automobiles.

Nachimuthu Industrial Association not only shelters the society by offering jobs in which it flourishes but also been a preamble for rural students to gain knowledge and explore the fast-paced world. Having made the institution a banyan tree in which entire society can shelter. The Chairman after rendering his tireless work, he has become the Emeritus course-icon.

The Himalayan achievement in education and developing society, the industrial genius has been recognized by Government of India and had conferred Padma Bhusan on him in 2007.

DEPARTMENT OF ELECTRONICS & INSTRUMENTATION ENGINEERING

Department of Electronics & Instrumentation was started in the year 2011, aiming to produce quality engineers with the knowledge of the latest trends and developments in the field of industrial automation. Department provides a platform for the learners to equip themselves with the knowledge transferred from the faculty expertise, state-of-the-art laboratory facilities, software and motivation for the other value added co-curricular activities. In the recent scenario, developments taking place in areas like Process Control, Communication, Space, Medicine, Defense etc., open up large number of opportunities for engineers specializing in Instrumentation and Control Engineering. Department of EIE is focusing on better academics and better career planning.

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DEPARTMENT VISION

To develop globally competent instrumentation engineers and entrepreneurs with societal, environmental and human values

DEPARTMENT MISSION

Supportive Learning Environment: Provide suitable learning environment to the graduates with innovative learning resources and adequate infrastructure.

Engineering Skills: Enhance electronic, instrumentation and automation skills of the engineering graduates to fulfill the industrial requirements.

Sustainable and Eco-Friendly: Create awareness among the graduates for sustainable, eco friendly products and safety standards.

Ethical and Professional Responsibility: Enrich continuous learning, communicative, collaborative and administrative skills of the engineering graduates to become ethical, social responsible engineers and entrepreneurs

Program Educational Objectives (PEOs):

PEO1:Technical Excellence: Actively apply technical and professional skills in engineering practices towards the progress of the organization in competitive and dynamic environment.

PEO2: Higher Studies& Research: Own their professional and personal development by continuous learning and apply the learning at work to create new knowledge.

PEO3:Professional & Ethical Knowledge : Conduct themselves in a responsible, professional and ethical manner supporting sustainable economic development which enhances the quality of life.

Programme Outcomes (POs):

PO1.Engineering knowledge: Apply the knowledge of Mathematics, Science and engineering to solve problems in the field of Electronics & Instrumentation Engineering.

PO2 .Problem Analysis: Identify, formulate/model, analyse and solve complex problems in the field of Electronics & Instrumentation Engineering.

PO3.Design and Development: Design an electronic system/component, or process to meet specific purpose with due consideration for economic, environmental, social, political, ethical, health and safety issues.

PO4.ConductInvestigations: Design and conduct experiment, analyse and interpret data to provide valid conclusions in the field of Electronics and Instrumentation Engineering.

PO5 .Modern Tool Usage: Apply appropriate techniques and modern software tools for design and analysis of Electronic systems with specified constraints.

PO6.Engineer and Society: Apply contextual knowledge to provide engineering solutions with societal, professional & environmental responsibilities

PO7.Environment and Sustainability: Provide sustainable solutions within societal and environmental contexts for problems related to Electronics & Instrumentation Engineering.

PO8.Ethics: Comply with code of conduct and professional ethics in engineering practices

PO9.Individual and Teamwork: Perform effectively as a member/leader in multidisciplinary teams.

PO10.Communication: Communicate effectively to engineering community and society with proper aids and Documents.

PO11.Project management and Finance: Demonstrate knowledge and understanding of the engineering and management principles to manage projects in multidisciplinary environment.

PO12.Lifelong Learning: Recognise the need for, and have the ability to engage in independent and lifelong learning.

Programme Specific Outcomes (PSOs):

PSO1: Instrument Analysis: Analyze and monitor the characteristics of electronic measuring instruments and controllers to ensure performance, safety and quality of the process

PSO2: Controller Selection: Select the suitable instruments, control scheme and controllers as per the requirements.

Augmented reality (AR)

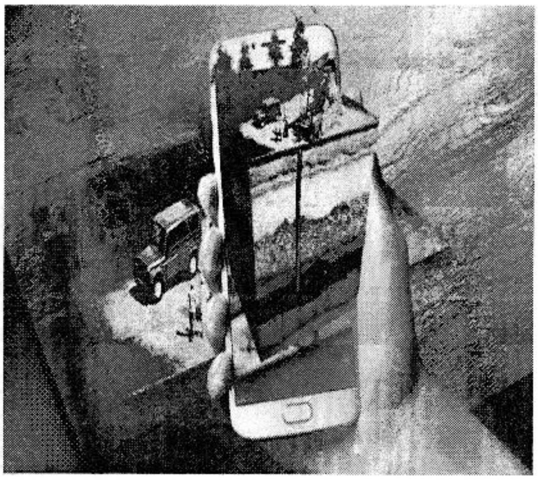
By
K.DHAARANI
15BEI034

INTRODUCTION

It is a direct or indirect live view of a physical, real-world environment whose elements are "augmented" by computer-generated perceptual information, ideally across multiple sensory modalities, including visual, auditory, hapti c, somatosensory, and olfactory. The overlaid sensory information can be constructive (i.e. additive to the natural environment) or destructive (i.e. masking of the natural environment) and is spatial registered with the physical world such that it is perceived as animmersive aspect of the real environment. In this way, augmented reality alters one's current perception of a real world environment, whereas virtual reality replaces the real world environment with a simulated one. Augmented Reality is related to two largely synonymous terms: mixed reality and computer-mediated reality.

VALUES

The primary value of augmented reality is that it brings components of the digital world into a person's perception of the real world, and does so not as a simple display of data, but through the integration of immersive sensations that are perceived as natural parts of an environment. The first functional AR systems that provided immersive mixed reality experiences for users were invented in the early 1990s, starting with the Virtual Fixtures system developed at the U.S. Air Force's Armstrong Labs in 1992. The first commercial augmented reality experiences were used largely in the entertainment and gaming businesses, but now other industries are also getting interested about AR's possibilities for example in knowledge sharing, educating, managing the information flood and organizing distant meetings. Augmented reality is also transforming the world of education, where content may be accessed by scanning or viewing an image with a mobile device. Another example is an AR helmet for construction workers which display information about the construction sites.



Augmented reality is used to enhance the natural environments or situations and offer perceptually enriched experiences. With the help of advanced AR technologies (e.g. adding computervision and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulable. Information about the environment and its objects is overlaid on the real world. This information can be virtualor real, e.g. seeing other real sensed or measured information such as electromagnetic radio waves overlaid in exact alignment with where they actually are in space. Augmented reality also has a lot of potential in gathering and sharing tacit knowledge. Augmentation techniques are typically performed in real time and in semantic context with environmental elements. Immersive perceptual information is sometimes combined with supplemental information like scores over a live video feed of a sporting event. This combines the benefits of augmented reality technology and heads up display technology (HUD).

Hardware

Hardware components for augmented reality are:

processor, display, sensors and input devices. Modern mobile computingdevices like smartphones and tablet computers contain these elements which often include a camera and MEMS sensors such as accelerometer, GPS, and solid state compass, making them suitable AR platforms.

DISPLAY

Various technologies are used in augmented reality rendering, including optical projection systems, monitors, handheld devices, and display systems worn on the human body.

A head-mounted display (HMD) is a display device worn on the forehead, such as a harness or helmet. HMDs place images of both the physical world and virtual objects over the user's field of view. Modern HMDs often employ sensors for six degrees of freedom monitoring that allow the system to align virtual information to the physical world and adjust accordingly with the user's head movements. HMDs can provide VR users with mobile and collaborative experiences. Specific providers, such as uSens and Gestigon, include gesture controls for full virtual immersion.

BLOCKCHAIN

By

S.ARUNKUMAR

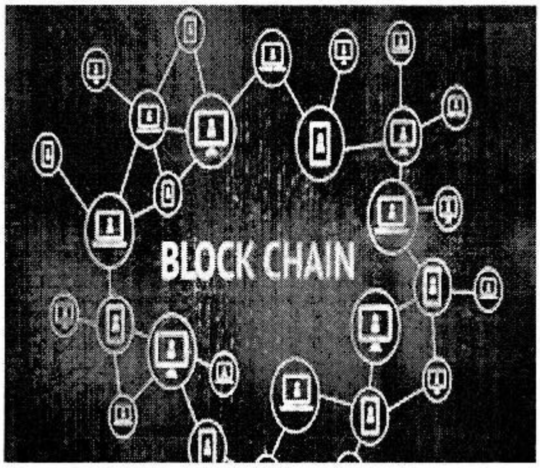
15BEI024

INTRODUCTION

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

STRUCTURE

A block chain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the collusion of the network. This allows the participants to verify and audit transactions inexpensively. A block chain database is managed autonomously using a peer network and a distributed time stamping server. They are authenticated by mass collaboration powered by collective self-interests. The result is a robust workflow where participants' uncertainty regard ing data security is marginal. The use of a block chain removes the characteristic of infinite reproducibility from a digital asset. It confirms that each unit of value was transferred only once, solving the long-standing problem of double spending. Block chains have been described as a value-exchange protocol. This block chain-based exchange of value can be completed more quickly, more safely and more cheaply than with traditional systems. A block chain can assign title rights because it provides a record that compels offer and acceptance.



BLOCKS

Blocks hold batches of valid transactions that are hashed and encoded into a Merkle tree. Each block includes the hash of the prior block in the block chain, linking the two. The linked blocks form a chain. This iterative process confirms the integrity of the previous block, all the way back to the original genesis block.

Sometimes separate blocks can be produced concurrently, creating a temporary fork. In addition to a secure hash-based history, any block chain has a specified algorithm for scoring different versions of the history so that one with a higher value can be selected over others. Blocks not selected for inclusion in the chain are called orphan blocks. Peers supporting the database have different versions of the history from time to time. They only keep the highest-scoring version of the database known to them. Whenever a peer receives a higher-scoring version (usually the old version with a single new block added) they extend or overwrite their own database and retransmit the improvement to their peers. There is never an absolute guarantee that any particular entry will remain in the best version of the history forever. Because block chains are typically built to add the score of new blocks onto old blocks and because there are incentives to work only on extending with new blocks rather than overwriting old blocks, the probability of an entry becoming superseded goes down exponentially as more blocks are built on top of it, eventually becoming very low. There are a number of methods that can be used to demonstrate a sufficient level of computation. Within a block chain the computation is carried out redundantly rather than in the traditional segregated and parallel manner.

PERMISSIONLESS

Bit coin and other crypto currencies currently secure their block chain by requiring new entries to include a proof of work. To prolong the block chain, bit coin uses Hash cash puzzles developed by Adam Back in the 1990s.

Financial companies have not prioritised decentralized block chains. In 2016, venture capital investment for block chain-related projects was weakening in the USA but increasing in China. Bit coin and many other crypto currencies use open (public) block chains.

PERMISSIONED (PRIVATE) BLOCKCHAIN

Permissioned block chains use an access control layer to govern who has access to the network. In contrast to public block chain networks, validators on private block chain networks are vetted by the network owner. Permissioned block chains can also go by the name of 'consortium' or 'hybrid' block chains.

USES

Block chain technology can be integrated into multiple areas. The primary use of block chains today is as a distributed ledger for crypto currencies, most notably bit coin. While a few central banks, in countries such as India, China, United States, Sweden, Singapore, Sou th Africa and United Kingdom are studying issuance of a Central Bank Issued Crypto currency (CICC), none have done so thus far.

ELECTRONIC SENSING

By

R.MANIKANDAN

16BEI023

This article aims to describe the capability and ability of electronic sensing technology towards modern life and its contribution in the robotics and medical field.

The expression "electronic sensing" refers to the capability of reproducing human senses using sensor arrays and pattern recognition systems. "Electronic sensing" or "E-sensing" technologies have undergone important developments from a technical and commercial point of view since 1982, research has been conducted to develop technologies, commonly referred to as electronic noses that could detect and recognize odours and flavours. The stages of the recognition process are similar to human olfaction and are performed for identification, comparison, quantification and other applications, including data storage and retrieval. However, hedonic evaluation is a specificity of the human nose given that it is related to subjective opinions. These devices have undergone much development and are now used to fulfil industrial needs.

Some of the emerging technology devices that are introduced are:

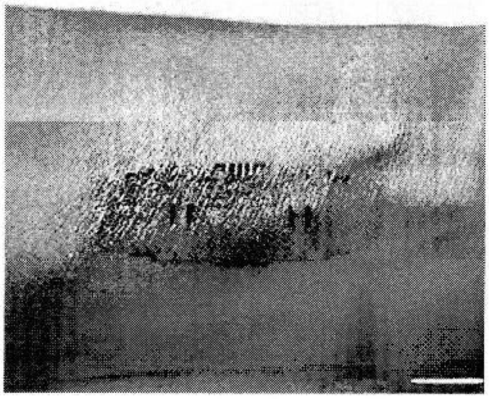
1. Electronic skin
2. Electronic tongue
3. Electronic nose

ELECTRONIC SKIN

Electronic skin or e-skin is a thin electronic material that mimics human skin in one or more ways. Specifically, human skin can sense pressure and temperature, stretch, and can heal itself. Electronic skin aims to apply these functions to robotic and health applications. A stretchable solar cell that could be used to power their electronic skin.

In 2018, researched reported they developed an electronic skin that can be healed when damaged and that can also be fully recycled at room temperature.Self-healing electronic skin will help robots have a sense of touch like human.

University of Tokyo researchers have developed an e-skin that can measure vital signs like yourheartbeat and display them in real time on a skin display.The sensor can pair with a smartphone and transmit its info to thecloud, too.



Skin signals: the device applied directly to the skin can record useful medical information

In future even virtual screens may also be placed on to the device to know our body function

ELECTRONIC NOSE

The electronic nose was developed in order to mimic human olfaction that functions as a non-seperative mechanism i.e., odour/flavour is perceived as a global fingerprint.Electronic nose include three major parts: a sample delivery system, a detection system. A computing system. In instrumentation field it will be helpful in detection of quality control in food industries.

Nasal implants could warn of the presence of natural gas, for those who had anosmia or a weak sense of smell.

An electronic nose system typically consists of a multisensory array, an information processing unit such as artificial neural network

(ANN), software with digital pattern recognition algorithms.The cross reactive sensor array is composed of incrementally different sensors chosen to respond to a wide range of chemical classes and discriminate diverse mixture of possible analysis."In 2022, the Electronic skin and nose will be the key player in increasing the market of robots"

ELECTRONIC TONGUE

The electronic tongue is an instrument that measures and compares tastes.Chemical compounds responsible for taste are detected by human taste receptors, and the seven sensors of electronic instruments detect the same dissolved organic and inorganic compounds.

In the biological mechanism, taste signals are transducted by nerves in the brain into electric signals. E-tongue sensors process is similar: they generate electric signals as potentiometric variations.Taste quality perception and recognition is based on building or recognition of activated sensory nerve patterns by the brain and on the taste fingerprint of the product. This step is achieved by the e-tongue's statistical software which interprets the sensor data into taste patterns.

FINRENAISSANCE - INNOVATIVE FUTURE SOLUTIONS FOR YOUR RISK, REGULATORY AND COMPLIANCE NEEDS TODAY

By

S.AMOSE VASANTH

15BEI010

MANAGING MODEL RISK

All too often, senior managers take it for granted that a mathematical model is accurate. This may be a mistake, however, without a sophisticated model vetting process. Managing model risk has been a priority in sophisticated risk-literate organizations with a strong risk culture. Nevertheless, model risk turned out to have been not well understood in many organizations prior to and during the financial crises of 2007–2009. This is far from the only embarrassing failure of risk management in recent decades.Our dependence on mathematical models to calculate regulatory capital has provided an incentive to make model risks more transparent. Models measuring financial risk (e.g. market risk in the trading book, credit risk in the wholesale and consumer lending books, etc.) and operational risk (e.g. credit card fraud, cyber risk, etc.) can be misleading. They can be misapplied, fed the wrong input, and can provide results which are too often misinterpreted.

(1) Model documentation. A vetting book should be constructed to include full documentation of the model, including both the assumptions underlying the model and its mathematical expression. This should be independent from any particular implementation (e.g. the type of computer code) and should include a term sheet (or a complete description of the transaction).

A mathematical statement of the model should include an explicit statement of all the components of the model (e.g. variables and their processes, parameters, equations, etc.). It should also include the calibration procedure for the model parameters. Implementation features such as inputs and outputs should be provided, along with a working version of the implementation.

(2) Soundness of model. The internal model vetting process needs to verify that the mathematical model produces results that are a useful representation of reality. At this stage, the risk manager should concentrate on the financial aspects and not become overly focused on the mathematics. Risk management model builders need to appreciate the real-world financial aspects of their models as well as defining their value within the organizations they serve. Risk management model builders also need to communicate limitations or particular uses of models to senior management who may not know all the technical details. Models can be used more safely in an organization when there is a full understanding of their limitations.

(3) Independent access to data. The internal model vettershould check that the middle office has independent access to an independent database to facilitate independent parameter estimation.

(4) Benchmark modelling. The internal model vetter should develop a benchmark model based on the assumptions that are being made and on the specifications of the deal.The results of the benchmark test can be compared with those of the proposed model.

(5) Formal treatment of model risk. A formal model vetting treatment should be built into the overall risk management procedures and it should call for periodically re-evaluating models. It is essential to monitor and control model performance over time.

(6) Stress-test the model. The internal model vetter should stress-test the model. For example, a stress-test can look at some limit scenario in order to identify the range of parameter values for which the model provides accurate pricing. This is especially important for implementations that rely on numerical techniques. In light of the 2007–2009 financial crisis, stress-tests conducted by banks did not produce realistically large loss numbers.

The evolution towards sophisticated financial mathematics is an inevitable feature of modern financial risk management, and model risk is inherent in the use of models. Firms must avoid placing undue blind faith in the results offered by models, and must hunt down all the possible sources of inaccuracy in a model. In particular, they must learn to think through situations in which the failure of a mathematical model might have a significant impact. The board and senior managers need to be educated about the dangers associated with failing to properly vet mathematical models. They also need to insist that model risk is made transparent, and that all models are independently vetted and governed under a clearly articulated peer review process.

GOOGLE GLASS

By

M.JAYASURYA

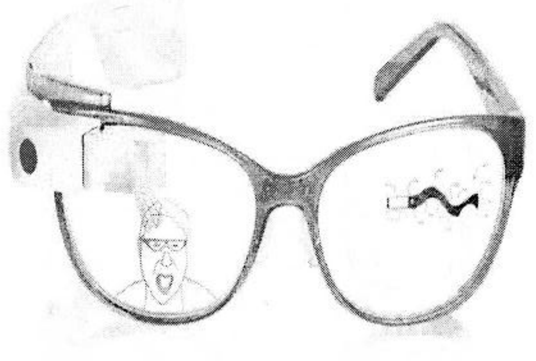
16BEI025

I. INTRODUCTION

The Google Glass is a technology that has been long-rumoured about. As the name portrays, the Google Glass is a pimped out pair of glasses. And by pimped out, I mean it comes with a optical head mounted display (OHMD) which allows the wearer to see through and look at projected images coming from a small component on the glasses themselves. The Google Glass also has several other capabilities: users can ask the headset question, prompt it to Google words, take photo and video by the prompt of your voice, get directions and view a GPS, and even participate in group web conversations via a Wi-Fi connection. The Google Glass takes "hands-free" to a whole new level.

II. BACKGROUND

The current edition of the Google Glass now weighs less than the average pair of sunglasses. In 2011, the first Google Glass prototype weighed nearly eight pounds. In 2012, after the eight-pound prototype but before the Explorers trial run, Google Glass made appearances on the Gavin Newsom Show, at a Google Input/output seminar where those in attendance were able to watch a live feed from a skydiver, and even at a hospital in Madrid, where the Spanish doctor Pedro Guillen, Chief of Trauma Service of Clínica CEMTRO of Madrid, became the first physician in the world to broadcast a surgery through the use of Google Glass.



III. POTENTIAL BENEFITS

Long gone are the days where maps were used to navigate the world. Everyone now relies on the GPS. Whether that GPS is located on top of a dashboard, comes standard on the latest automobile, or is an app on a phone, none of them compare to the GPS that comes with the Google Glass. Imagine driving down the road and experiencing the following situation. It is a beautiful day outside and the windows are down. You have your printed directions and the map in your hand when, all of a sudden, they are sucked outside. Looking in the rear-view mirror, you see that the directions are now in pieces after being run over by a tractor-trailer. No worries, you have your phone! Of course now, you have to pull over before you can Google directions or ask Siri for help. The directions are all pulled up and ready to go but as soon as you start driving, your phone dies. And of course, the car charger is at home. What happens next? I have no idea. But if this unlucky person had been wearing the Google Glass, there would have been no need for the printed map or printed directions, no need to pull over and use the phone, and no need for the car charger. The Google Glass was designed so as not to interfere with the wearer's vision. It was designed to be so sleek that it just disappears. With no vision impairment and its ability to connect to the Internet via cellular towers and a data plan or Wi-Fi, it easily becomes a GPS. Ask the Glass for directions to a local grocery store or even to a restaurant in another state, it is able to literally lay a map over the road in front of you and change it based on your point of view.

IV. LEGAL AND ETHICAL ISSUES/SECURITY CONCERNS

Just as it comes with benefits, Google Glass comes with its fair share of legal and ethical issues and security concerns. "Many say that the Google Glass does not raise any new privacy issues, but merely rehashes existing ones in a more prominent way." Existing issues with almost all of the new technology, whether it be smartphones, tablets, cameras, or computers, include unwanted surveillance and the ability to take discreet pictures and/or video, cheat on quizzes and exams, and a multitude more.

V. SOCIAL PROBLEMS

We could have the ability to pick our friends out of a crowd, see how old someone is and if they are single by connecting Facebook to the facial scanner. It might even be possible to one day learn everything about a complete stranger by scanning their face and then Googling them. There would be no need to use the television, or even a computer, to check the weather, news, or watch a movie. No need for any social interaction at all. Today's society revolves around technology; the Google Glass is only going to amplify what we are already experiencing.

VI. FURTHER REQUIRED RESEARCH

Google has been considering opening up retail stores where customers would be able to try them on. Google also hopes to start partnerships with major sunglass companies, such as Ray-Ban, in order to further promote their product. (Miller, 2013) As discussed earlier, and perhaps the most important area of research that needs to be focused on, is their facial recognition software. Without the proper privacy requirements and privacy features, Google may lose many potential customers who are afraid of the security risk.Other areas of research, which could serve to benefit the Google Glass, are the incorporation of texting and calling, more colours, and a cheaper price.

VII. CONCLUSION

Steve Jobs left his footprint in the history of technology when he created his Apple products. Google and its executives may be doing the same. Google is already a famous name because of its search engine, email accounts, maps, Google earth, and, most recently, Google Wallet. With the addition of the Google Glass, it may just be enough to push Apple and those like it out of the way and put Google on top.

HYPERLOOP

By

S.ARUN MUTHURAM

15BEI014

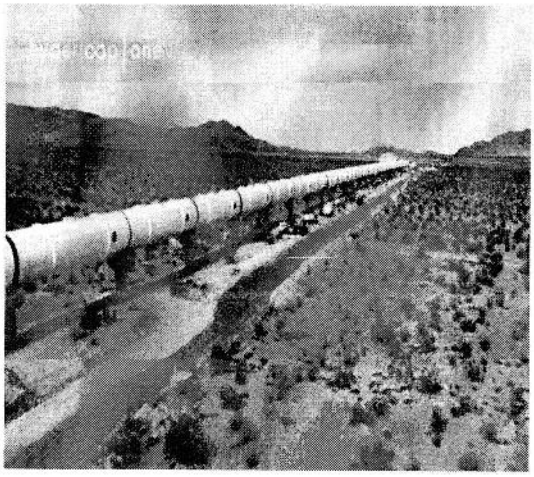
INTRODUCTION

Predicting the future is much more dark art than science, and it is an undertaking that must be treated with caution. That is my disclaimer before the attempt to speculate how we will travel by rail as the 21st century advances.

Urban Mobility We live in an urbanized world. The engine of our economy and way of life is based in the city. Transportationis the key essential facilitator of this, and it will continue to be so for the foreseeable future. Mobility, therefore, plays a fundamental role in the process of developing urban areas. This is particularly relevant in the new crop of the polycentric mega polis, where the ability to move efficiently and rapidly across each city is vital. With the advent of electro mobility and driverless vehicles, it is fair to ask what role railways could play in this 21st-century mobility landscape. The answer is not easy, of course, but it lies at the railway's core advantage of mass transit and reduced land use. This should position urban railways as the backbone of the mobility chain. Urban railways have traditionally been and will continue to be electrified. The evolution of electrification solutions will play an important part in developing transit systems that are efficient and reliable. The introduction of energy-efficiency measures, such as reversible substations, and energy storage systems are two technological developments that will underpin the advancement of electrification. There are also some urban/ suburban electrification solutions that are ripe for upgrading; the third rail system is one that springs to mind. This system can still be found in large parts of London and the southern United Kingdom. As Prof.Rod smith from imperial college pointed out in one of his brilliant papers, a letter to The Times on 8 October 1904 ... the "live rail" is itself already an obsolete device, discarded in the latest types of electric railway. In ten years of time there will probably be no "live rail" left...it is an engineering blunder. In other words, the third rail system was declared obsolete over 100 years ago, and it is still being used! There is definitely an electrification challenge there. Cost is the culprit, you might be thinking. All of this will not mean anything if the railways cannot achieve high levels of patronage that will justify the higher upfront investment cost.

TRAVELING EFFICIENCY

Long Distance Long-distance rail travel in the 21st century will be dominated by speed. Stephenson's rocket won the 1829 rain hill competition, where it achieved the world speed record in the process—almost 58 km/h. fast forward 135 years, and the modern era of the high-speed rail was established by the Japanese with the 1964 inauguration of the tokaidoshinkansen commercial service, which could reach a maximum speed of 210 km/h. since then, the pursuit of faster and reliable high-speed services has rapidly increased across the globe. Service speeds of 300 km/h are common in modern networks, e.g., Spain'sAVe, the FrenchtgV, and Germany's ice. In the very near future, in-service speeds of 320–360 km/h will be routinely achieved. However, the technological and operational challenges that this poses are not trivial. Finding a balance between the levels of safety required while maximizing capacity and optimizing energy usage is one of the biggest dilemmas faced and the cornerstone of future rail travel. The rail industry needs to resourcefully utilize its endowed energy efficiency, and it is uniquely positioned to do this. Again, electrification already.



SPEED

The pursuit of faster and reliable high-speed services has rapidly increased across the globe.is at the heart of the systems that make this possible, and a 25-kV ac power supply is and will continue to be the chosen approach for this. It is no substitute for the railway.

CONCLUSION

In practice, the vast majority of us will continue to travel on trains that are, on the surface, at least not dissimilar to what we know today. For instance, in the United Kingdom, we are about to take the delivery of 122 train sets (class 800 for those interested in this sort of thing) in the coming 18 months. These trains will be the workhorses of intercity travel for the coming decades. If the trains they are replacing are anything to go by, we will still be using the new ones in 2050. Modern state-of-the-art railway investments around the globe are based on the steel-on-steel principle, and there is no reason to doubt this is, by and large, the rail travel of the future Physical and virtual connectivity will be at the heart of how we will be traveling in the future, not just by rail.

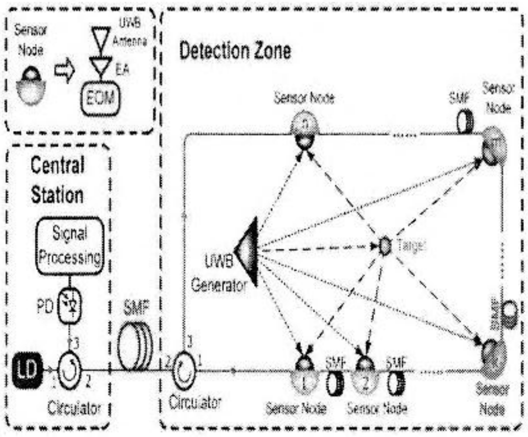
UWB SENSOR

By

S.DHIVYA

16BEI027

UWB Sensor expand Ultra wide band sensor. The Ultra wide band is a radio technology. It is also known as UWB or Ultra band or Ultra wide band. UWB was formerly known as Pulse radio. The UWB transmits that does not interfere with conventional narrowband and carries wave transmission in the same frequency band. It is a technology for transmitting information spread over a large bandwidth (>500MHZ) and it can able to share spectrum with other users.



It can also transmit information by generating radio energy at specific time intervals. The information can modulated on UWB signals or pulses by encoding the polarity of the pulse,its amplitude or by using orthogonal pulses. The UWB systems demonstrate at channel pulse rate in excess of 1.3 giga pulses per second using a continuous stream of UWB pulses. The aspect of UWB technology is the ability for a UWB radio system to determine the "time of flight". Of the transmission at various frequencies. This helps overcome multipath propagation as some of the frequency have line-of-sight trajectory. The UWB pulse is very short that is less than 60 cm for 500MHZ wide pulse and also less than 23 cm for 1.3GHZ bandwidth pulse. From this, the most signal reflection do not overlap the original pulse. The UWB has almost impulse like channel response a combination of multiple antenna techniques' is preferable as well. It can use a very low energy level for short-range, high bandwidth communications over a large portion of a radio spectrum. UWB has traditional application in non-cooperative radar imaging. Most recent applications largest sensor data collection, precision locating and tracking application. It is well suited for short-distance application. The UWB used in "see through the wall" precision radar imaging technology.

"All this modern technology just makes people try to do everything at once"

WIRELESS POWER TRANSMISSION

By

J.DURKESH KUMAARAN
16BEI048

INTRODUCTION

Wireless Power Transmission was first invented by Nikola Tesla. Later it was developed into a technology called HAARP .It consists of about 180 antennas and it can transfer power about 3.6Megawatts.High Active Auroral Research Program,simply called HAARP is located in Alaska,US .It can able to change climate in any part of the world .About 60 Kms upwards there was troposphere, and here it was rich in Electromagnetic waves. By changing the density of the EM waves, it can able to change weather.This was the first seed to the development of WPT.

TYPES OF WPT:

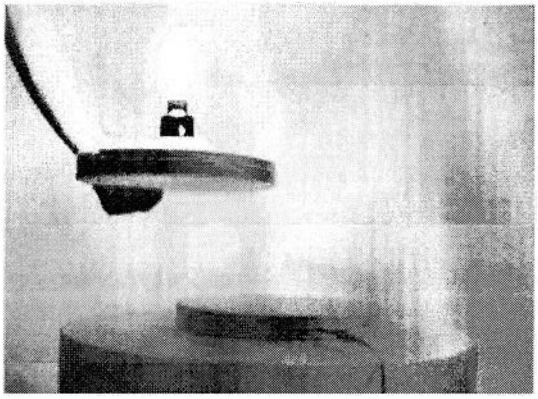
1. Near field
2. Far field

NEAR FIELD

There are three types of near field Transmission.Inductive coupling is the oldest and most widely used wireless power technology, and virtually the only one so far which is used in commercial products. It is used in inductive charging stands for cordless appliances used in wet environments such as electric toothbrushes and shavers, to reduce the risk of electric shock.

Resonant coupling is the second one.In 2007 a team led by Marin Soljačić at MIT used two coupled tuned circuits each made of a 25 cm self-resonant coil of wire at 10 MHz to achieve the transmission of 60 W of power over a distance of 2 meters (6.6 ft.) (8 times the coil diameter) at around 40% efficiency.Soljačić founded the company WiTricity (the same name the team used for the technology) which is attempting to commercialize the technology.

Next one is Capacitive coupling .The transmitter and receiver electrodes form a capacitor, with the intervening space as the dielectric. An alternating voltage generated by the transmitter is applied to the transmitting plate, and the oscillating electric field induces an alternating potential on the receiver plate by electrostatic induction,which causes an alternating current to flow in the load circuit. The amount of power transferred increases with the frequency the square of the voltage



PROS AND CONS OF NEAR FIELD:

Transcutaneous surgery such as artificial heart pacemaker.In case the lithium ion battery in the pacemaker gets discharged,it can be charged without any wire connections.Powermatic at coffee shops,Electric tooth brushes and charging of cars paved their way in their domains.But a con is that it has very short range.

FAR FIELD

MICROWAVES

Power transmission via radio waves can be made more directional, allowing longer-distance power beaming, with shorter wavelengths of electromagnetic radiation, typically in the microwave range.A rectenna may be used to convert the microwave energy back into electricity.For example, the 1978 NASA study of solar power satellites required a 1-kilometre-diameter (0.62 mi) transmitting antenna and a 10-kilometre-diameter (6.2 mi) receiving rectenna for a microwave beam at 2.45 GHz.In 2017, the Federal Communication Commission (FCC) certified the first mid-field radio frequency (RF) transmitter of wireless power.

RECTANNAS

Rectannas is a combination of Schottky diode and Dipole antenna.Schottky diode is used because it has low voltage drop and Dipole antenna is used since it receives signals from both sides.IMPATT diode is also used here, since it can able to generate out microwaves of high frequency.

LASER TRANSMISSION

In the case of electromagnetic radiation closer to the visible region of the spectrum (tens of micrometres to tens of nanometres), power can be transmitted by converting electricity into a laser beam that is then pointed at a photovoltaic cell.Laser transmission has no interference with any of the other waves such as radio waves.

NASA's Dryden Flight Research Centre demonstrated a lightweight unmanned model plane powered by a laser beam.This proof-of-concept demonstrates the feasibility of periodic recharging using the laser beam system.

CONCLUSION

Ambient source of energy is one of the developing technology in recent times.Here the Power can be obtained from rubbing of clothes,River currents,Ocean tidal currents,Radio TX,etc.

3D PRINTING OF LIVING CELLS

By

S.R.GAYATHRI

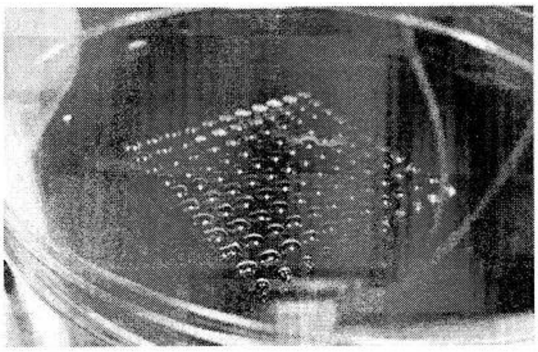
15BEI037

3D Printing is emerging technology and it finds application in various field like architecture and construction , maritime industry , mechanics , aeronautics, textile and fashion , optics , electronics, entertainment and broadcasting , chemical and food industry . It has moved one step further and finds application in bio printing and its major, overarching goal is to be able to fabricate functional 3D printed humanorgans. This could transform regenerative medicine, as the technology would allow for the 3D printing of new tissues that could repair or replace damaged body parts.

'In February 2013, researchers from Cornell University announced
a successfulproject creating realistic external ears – known

as pinna – using a 3D printing technique.'

This technology has successfully merged electronics and biology to create a functional ear that can "hear" radio frequencies. The tissue and antenna were merged via the use of an "off-the -shelf" 3D printer, and the results have the potential to not only restore but actually enhance human hearing in the future.



The process starts with the scan of an ear, a special camera that spins around the head of the person whose ear has to be developed. The camera takes 3D images of the head and then very precisely morphology of the year is developed. The next is developing ink for the printer. It is collagen harvested from rat tails with cartilage cells from cow's ears to create a hydrogel which was injected into a mold, with collagen acting as a scaffolding upon which the cartilage cells could settle and grow.

The ear itself consists of a coiled antenna within a cartilage structure, with two wires leading from the base and winding around the helical "cochlea" – the area of the ear that senses sound. The signal registered by the antenna could be connected to a patient's nerve endings in a similar way to a hearing aid, restoring and improving their ability to hear.

3D printing also involves in following as bionic eyes and mind-controlled prosthetic arms have allowed for the partial restoration of senses or a higher level of control, and removable, wireless tooth tattoo that detects harmful bacteria. Now the research is based on 3D printing of heart which can be implanted into humans.

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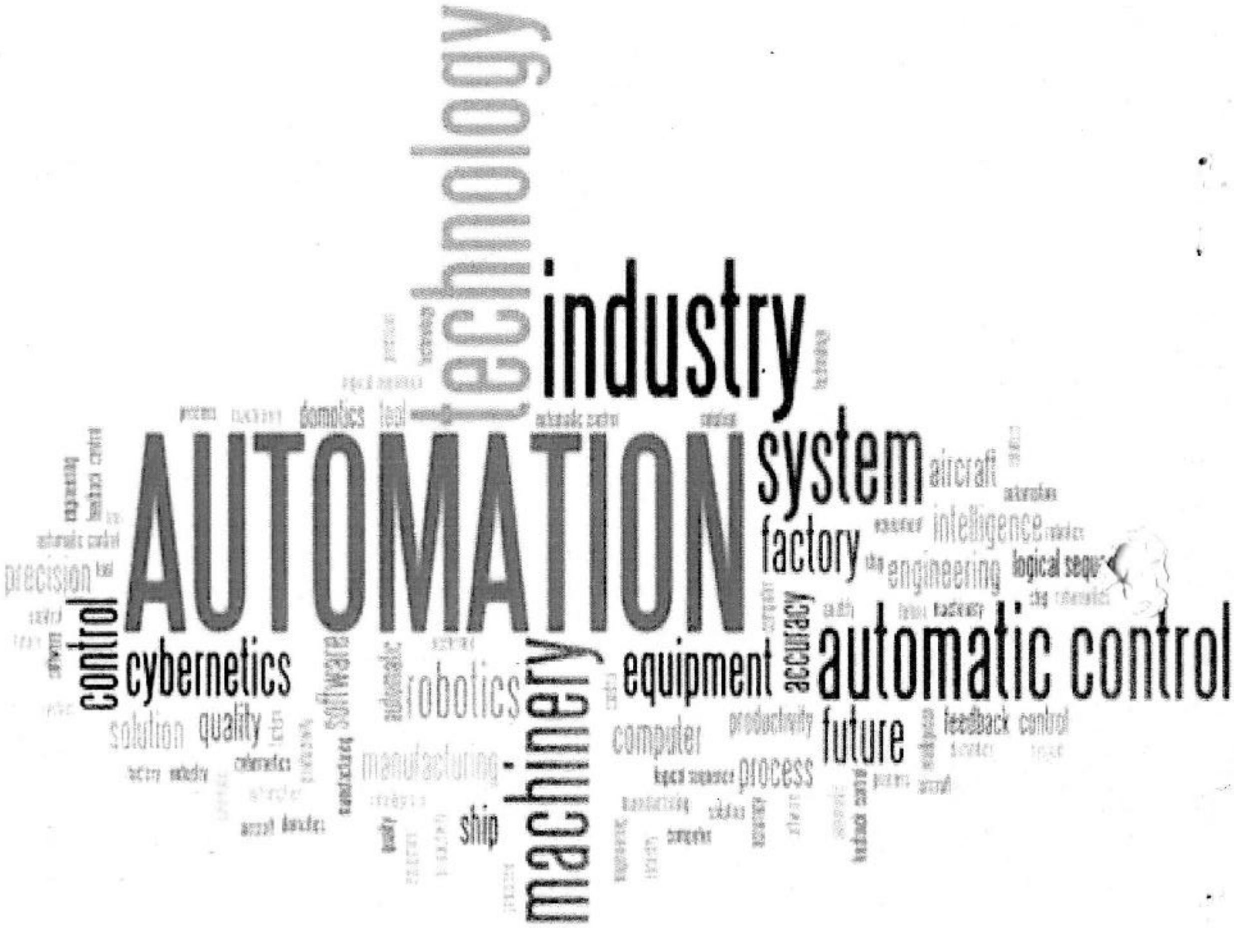

"HUMANS FOOT IS A MASTERPIECE OF ENGINEERING AND A WORK OF ART"