K.L.N. College of Engineering

i'Storm

Department of Information Technology

SPECIAL INTEREST GROUP

LIVE WITH TECHNOLOGY

PRINCIPAL MESSAGE

It is a matter of great pride and satisfaction for K.L.N. COLLEGE OF ENGINEERING to bring out the News Letter '**I'STORM**' Released from the Department of Information Technology. The College has made tremendous progress in all areas-academic, non-academics, capacity building relevant to staff and students. The College has achieved another milestone in getting NBA (National Board of Accreditation).I am confident that this issue of Department News Letter will send a positive signal to the staff, students and the person who are interested in the Technical education and Technology based activities. A News Letter is like a mirror which reflects the clear picture of all sorts of activities undertaken by a Department and develops writing skills among students in particular and teaching faculty in general. I congratulate the Editorial Board of this News Letter who have played wonderful role in accomplishing the task in Record time. I express my deep sense of gratitude to Dr.N.Balaji, HOD/IT under whose guidance this Technical work has been undertaken and completed within the stipulated time. Also my heartfelt Congratulations to staff members and Students for their fruitful effort. With Best Wishes.

PRINCIPAL

Dr.A.V. RAMPRASAD

THE EDITOR'S DESK

It gives me immense pleasure to note that response to this newsletter of our department **i'STORM** has been overwhelming. The wide-spectrum of articles in different sections gives me a sense of pride that our students and professors 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. Commendable job has also been done by the Editorial Board in planning for and producing the Newsletter. My congratulations to the team who took the responsibility for the arduous task most effectively. I am hopeful that this small piece of technical work shall not only develop the taste for reading among students but also develop a sense belonging to the institution as well.

H.O.D (I.T)

Dr.N.Balaji

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OUR COLLEGE :

Vision

To become a Premier Institute of National Repute by Providing Quality Education, Successful Graduation, Potential Employability and Advanced Research & Development through Academic Excellence.

Mission

To Develop and Make Students Competent Professional in the Dynamic Environment in the field of Engineering, Technology and Management by emphasizing Research, Social Concern and Ethical Values through Quality Education System.

OUR DEPARTMENT:

Vision

To emerge as a centre of excellence through innovative technical education and research in Information Technology.

Mission

To produce competent information technology professionals to face the industrial and societal challenges by imparting quality education with ethical values.

Program Educational Objectives

The Educational Objectives of Information Technology Program represents major accomplishments that we expect from our graduates to have achieved three to five years after graduation. More specifically our graduates are expected.

1. *To excel in industrial or graduate work in information technology and allied fields.*

2. *To practice their professions conforming to ethical values and environmental friendly policies.*

3. *To be able to have an exposure in emerging cutting edge technologies and adapt to ever changing technologies.*

4. *To work in international and multi – disciplinary environments.*

Program Specific Outcomes

1. *Ability to apply the fundamentals of mathematics, science, engineering, information and computing technologies to identify, analyze, design develop, test, debug and obtain solutions for complex engineering problems.*

2. *Ability to select and apply appropriate modern tools and cutting edge technologies in the field of Information and communication to meet the industrial and societal requirements with public health and safety considerations.*

3. *Ability to analyze the multidisciplinary problems and function effectively in various teams for developing innovative solutions with environmental concerns and apply ethical principles in their career.*

4. *Ability to acquire leadership and communication skills to manage projects and engage in lifelong technical learning to keep in pace with the changes in technologies.*

Program Outcome

1. ***Engineering knowledge:*** *Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.*
2. ***Problem analysis:*** *Identify, formulate, 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.*
8. ***Ethics:*** *Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.*
9. ***Individual and team work:*** *Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.*
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 chang*

Icon of the month

N.R.Narayana Murthy

Nagavara Ramarao Narayana Murthy (born 20 August 1946), commonly referred to as Narayana Murthy, is an Indian IT industrialist and the co-founder of **Infosys**, a multinational corporation providing business consulting, technology, engineering, and outsourcing services. Murthy studied electrical engineering at the National Institute of Engineering, University of Mysore, and M. Tech at the Indian Institute of Technology Kanpur.

In 1981, Narayana Murthy founded Infosys, a global software consulting company headquartered in Bangalore. He served as the CEO of Infosys during 1981 – 2002, as the Chairman and Chief Mentor during 1981 – 2011, and as the Chairman Emeritus during August 2011 – May 2013. Under his leadership, Infosys was listed on NASDAQ in 1999.

Mr. Murthy articulated, designed, and implemented the Global Delivery Model, which has become the foundation for the huge success of the IT services outsourcing industry in India. He has led key corporate governance initiatives in India. He is an IT advisor to several Asian countries.

He serves on the boards of Ford Foundation, United Nations Foundation, Rhodes Trust and the Institute for Advanced Study in Princeton, New Jersey. He has served as a member of the HSBC board and the Unilever board. He has served on the boards of Cornell University, Wharton School, and the Graduate School of Business at Stanford University. He has also served as the Chairman of the Indian Institute of Management, Ahmedabad.

Mr. Murthy was ranked among the top 10 of Financial Times' list of 'Business Pioneers in Technology', published in March 2015. In 2014, he was ranked 13th among CNBC's 25 global business leaders who have made the maximum impact on society during the last 25 years. He was named among the '12 Greatest Entrepreneurs of Our Time' by the Fortune magazine in 2012. The Economist ranked him among the 10 most admired global business leaders in 2005. He has been awarded the Legion d'honneur by the Government of France, the CBE by the British government.

He is a foreign member of the US National Academy of Engineering and a Fellow of the Indian National Academy of Engineering. He is the recipient of the 2012Hoover Medal. The Tech Museum, San Jose, conferred on him the James C. Morgan Global Humanitarian Award in 2012. He received the 2007 Ernst Weber Medal from the Institute of Electrical and Electronics Engineers, USA (IEEE).

He is the first Indian winner of Ernst and Young's World Entrepreneur of the Year award. He has also received the Max Schmidheiny Liberty prize. He has appeared in the rankings of businessmen and innovators published by BusinessWeek, Time, CNN, Fortune, Forbes, Financial Times and India Today.

He is also a Trustee of the Infosys Science Foundation, which governs the Infosys Prize, an annual award to honor outstanding achievements of researchers and scientists across six categories.

He has been described as Father of Indian IT sector by Time magazine due to his contribution to outsourcing in India. Murthy has also been honored with the Padma Vibhushan and Padma Shri awards.

From being a leader with a clear vision who has taken a small enterprise to make it a establish a strong hold on the international market, today Infosys has 3 billion dollars in revenue, 70,000 employees and over 500 customers. He served as chairman from 2002 to 2011. After taking Infosys to such heights, he retired in 2011. But Infosys couldn't be without its spearhead for long.

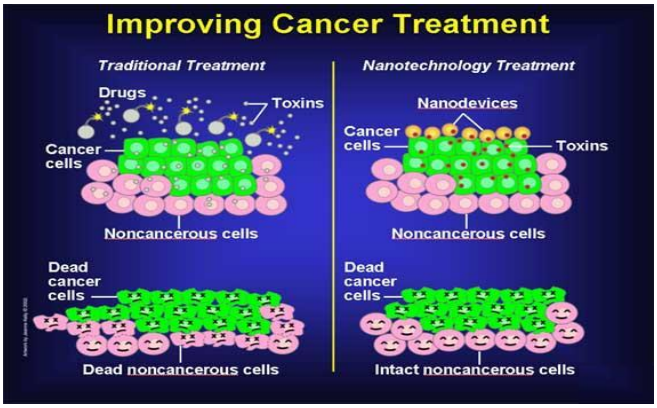
"Performance leads to recognition. Recognition brings respect. Respect enhances power. Humility and grace in one's moments of power enhances dignity of an organization, "This is what Narayana Murthy stood for. His achievements and values are an inspiration for every Indian. We can say that he truly lived the Indian dream. And hope the youngsters in this country will be encouraged to walk in his footsteps.

-B.Sathyajothi (2nd year)

Application of nanotechnology in cancer treatment

At a cellular level, cancers are usually quite different from normal tissue. Many cancer cells actually change the chemicals on their surface, so are easy to identify. Most of the rest grow faster or change shape. And every cancer involves a genetic change that causes a difference in the chemicals inside the cell. The immune system already takes advantage of surface markers to destroy cancer cells; however, this is not enough to keep us cancer-free. **Nanobots** will have several advantages. First, they can physically enter cells and scan the chemicals inside. Second, they can have onboard computers that allow them to do calculations not available to immune cells.

Third, **nanobots** can be programmed and deployed after a cancer is diagnosed, whereas the immune system is always guessing about whether a cancer exists. Nanobots can scan each of the body's cells for cancerous tendencies, and subject any suspicious cells to careful analysis; if a cancer is detected, they can wipe it out quickly, using more focused and vigorous tactics than the immune system is designed for.



Sensor test chips containing thousands of nanowires, able to detect proteins and other biomarkers left behind by cancer cells, could enable the detection and diagnosis of cancer in the early stages from a few of a patient's blood.

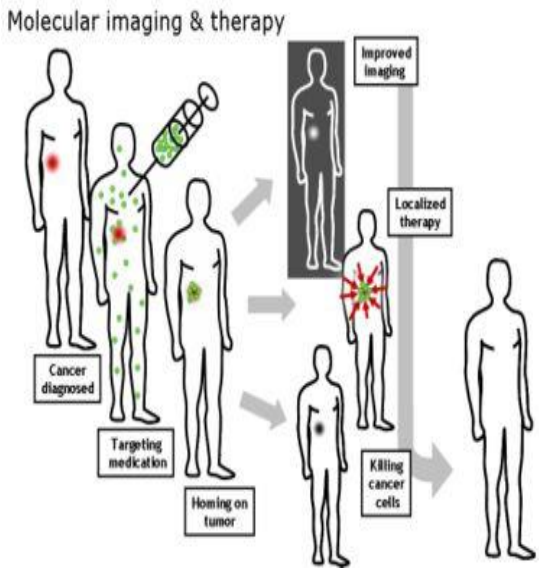
Researchers at Rice University under Prof. Jennifer West, have demonstrated the use of 120 nm diameter Nano shells coated with gold to kill cancer tumors in mice.

The Nano shells can be targeted to bond to cancerous cells by conjugating antibodies or peptides to the Nano shell surface. By irradiating the area of the tumor with an infrared laser, which

passes through flesh without heating it, the gold is heated sufficiently to cause death to the cancer cells.

Additionally, John Kanzius has invented a radio machine which uses a combination of radio waves and carbon or gold nanoparticles to destroy cancer cells. Nanoparticles of cadmium selenite (quantum dots) glow when exposed to ultraviolet light.

When injected, they seep into cancer tumors. The surgeon can see the glowing tumor, and use it as a guide for more accurate tumor removal.



In photodynamic therapy, a particle is placed within the body and is illuminated with light from the outside. The light gets absorbed by the particle and if the particle is metal, energy from the light will heat the particle and surrounding tissue. Light may also be used to produce high energy oxygen molecules which will chemically react with and destroy most organic molecules that are next to them (like tumors). This therapy is appealing for many reasons.

-V.Yuvasri (2nd year)

Android Marshmallow

Android 6.0 "Marshmallow" is a version of the Android mobile operating system. First unveiled in May 2015 at Google I/O under the codename "Android 'M'", it was officially released in October 2015

Marshmallow primarily focuses on improving the overall user experience of Lollipop, introducing a new permissions architecture, new APIs for contextual assistants (a feature notably leveraged by "Google Now On Tap"—a new capability of the Google Search app), a new power management system that reduces background activity when a device is not being physically handled, native support for fingerprint recognition and USB Type-C connectors, the ability to migrate data and applications to a microSD card and use it as primary storage, as well as other internal changes.

User Experience:

A new "Assist" API allows information from a currently-opened app, including text and a screenshot of the current screen, to be sent to a designated "assistant" application for analysis and processing. This system is used by the Google Search app feature "Google Now on Tap", which allows users to perform searches within the context of information currently being displayed by holding the "Home" button or using a voice command. The search generates on-screen cards overlaid onto the app, which display information, suggestions, and actions related to the content. "Direct Share" allows Share menus to display combinations of contacts and an associated app to be displayed, as opposed to selecting an app and then choosing a target within the app itself.

A newly inserted SD card or other secondary storage media can be designated as either "portable" or "internal" storage. "Portable" maintains the default behavior of previous Android versions, treating the media as a secondary storage device for storage of user files, and the storage media can be removed or replaced without repercussions. When designated as "Internal" storage, the storage media is reformatted with an encrypted ext4 file system, and is "adopted" by the operating system as the primary storage partition. Existing data (including applications and "private" data folders) are migrated to the external storage, and normal operation of the device becomes dependent on the presence of the media. Apps and operating system functions will not function properly if the adopted storage device is removed. If the user loses access to the storage media, the adopted storage can be "forgotten", which makes the data permanently inaccessible.

Platform:

Android Marshmallow introduces a redesigned application permission model: there are now only eight permission categories, and applications are no longer automatically granted all of their specified permissions at installation time. An opt-in system is now used, in which users are prompted to grant or deny individual permissions (such as the ability to access the camera or microphone) to an application when they are needed for the first time. Applications remember the grants, which can be revoked by the user at any time. The new permission model will be used only by applications compiled for Marshmallow using its software development kit (SDK), and all other applications will continue to use the previous permission model, however, permissions can still be revoked for those apps, with a warning that doing so might prevent the app from working properly.

Marshmallow introduces new power management schemes known as "Doze" and "App Standby"; when running on battery power, a device will enter a low-power state if it is inactive and not being physically handled. In this state, network connectivity and background processing is restricted, and only "high-priority" notifications are processed. Additionally, network access by apps is deferred if the user has not recently interacted with the app. Apps may request a permission to exempt themselves from these policies, but will be rejected from Google Play Store as a violation of its "Dangerous Products" policy if their core functionality is not "adversely affected" by them.

Android Marshmallow provides native support for fingerprint recognition on supported devices via a standard API, allowing third-party applications to implement fingerprint-based authentication. Fingerprints can be used for unlocking devices and authenticating Play Store and Android Pay purchases. Android Marshmallow supports USB Type-C, including the ability to instruct devices to charge another device over USB. Marshmallow also introduces "verified links" that can be configured to open directly in their specified application without further user prompts. User data for apps targeting Marshmallow can be automatically backed up to Google Drive over Wi-Fi. Each application receives up to 25 MB of storage, which is separate from a user's Google Drive storage allotment.

As of Marshmallow, the Android Compatibility Definition Document contains new security mandates for devices, dictating that those that are capable of accessing encrypted data without affecting performance must enable Secure boot and device encryption by default. These conditions comprise part of a specification that must be met in order to be certified for the operating system, and be able to license Google Mobile Services software. The requirement for mandatory device encryption was originally intended to take effect on Lollipop, but was delayed due to performance issues.

-P.B.Sheela Rani (2nd year)

Artificial Neural Networking

Introduction:

The first step toward artificial neural networks came in 1943 when Warren McCulloch, a neurophysiologist, and a young mathematician, Walter Pitts, wrote a paper on how neurons might work. They modelled a simple neural network with electrical circuits. Neural networks, with their remarkable ability to derive meaning from complicated or imprecise data, can be used to extract patterns and detect trends that are too complex to be noticed by either humans or other computer techniques.

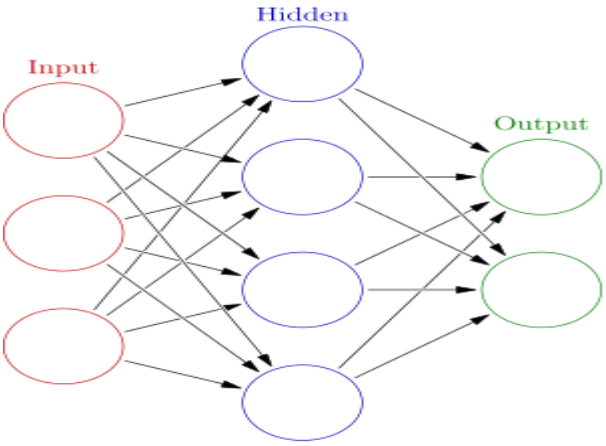
The field of ANN went through a dormant period during the 1970’s, because the early single-layer models were fundamentally flawed. Soon after, some multi-layer and trainable ANN models emerged in the early 1980’s. Despite having some inherent limitations, ANNs have been increasingly popular since then. They are feasible for those business applications which require the solution of very complex system of equations recognizing patterns from imperfect inputs, and adapting decisions to changing environment. Philip D. Wasserman of ANZA Research, Inc. envisions “artificial neural networks taking their place alongside of conventional computation as an adjunct of equal size and importance”. Indeed, digital computers will always be needed to compute payrolls, manage inventory, and schedule production. ANN software packages become increasingly user-friendly, they will attract more and more novice users.

What is artificial neural network?

Whenever we talk about a neural network, we should more popularly say ―Artificial Neural Network (ANN)‖, ANN are computers whose architecture is modeled after the brain. They typically consist of hundreds of simple processing units which are wired together in a complex communication network. Each unit or node is a simplified model of real neuron which sends off a new signal or fires if it receives a sufficiently strong Input signal from the other nodes to which it is connected.

Basically, all artificial neural networks have a similar structure or topology as shown. In that structure some of the neurons interfaces to the real world to receive its inputs. Other neurons provide the real world with the network's outputs. This output might be the particular character that the network thinks that it has scanned or the particular image it thinks is being viewed. All the rest of the neurons are hidden from view. But a neural network is more than a bunch of neurons. Some early researchers tried to simply connect neurons in a random manner, without much success. Now, it is known that even the brains of snails are structured devices. One of the easiest ways to design a structure is to create layers of

elements. It is the grouping of these neurons into layers, the connections between these layers, and the summation and transfer functions that comprises a functioning neural network. The general terms used to describe these characteristics are common to all networks.



Characteristics of ANN:

Conventionally, a computer operates through sequential linear processing technologies. They apply formulas, decision rules, and algorithms instructed by users to produce outputs from the inputs. Conventional computers are good at numerical computation. But ANNs improve their own rules; the more decisions they make, the better the decisions may become. There are six main characteristics of ANN technology:

1. The parallel processing ability
2. The distributed memory
3. The fault tolerance ability
4. The collective solution
5. The learning ability.
6. The network structures

Working of ANN:

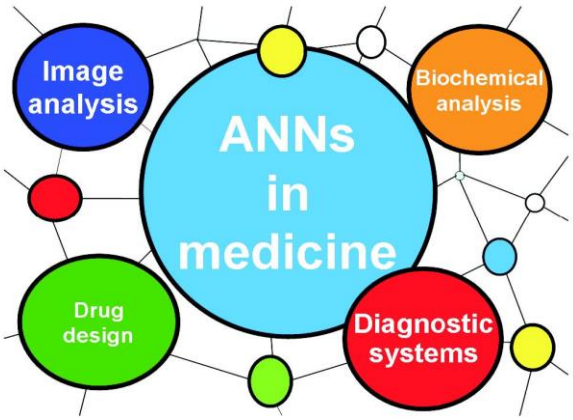
The other parts of the ―art‖ of using neural networks revolve around the myriad of ways these individual neurons can be clustered together. This clustering occurs in the human mind in such a way that information can be processed in a dynamic, interactive, and self-organizing way. Biologically, neural networks are constructed in a three-dimensional world from microscopic components. These neurons seem capable of nearly unrestricted interconnections. That is not true of any proposed, or existing, man-made network. Integrated circuits, using current technology, are two-dimensional devices with a limited number of layers for interconnection. This physical reality restrains the types, and scope, of artificial neural networks that can be implemented in silicon. Currently, neural networks are the simple clustering of the primitive artificial neurons. This clustering occurs by creating layers which are then connected to one another. How these layers connect is the other part of the "art" of engineering networks to resolve real world problems.

Advantages of ANN:

1. Adaptive learning: An ability to learn how to do tasks based on the data given for training or initial experience.
2. Self-Organization: An ANN can create its own organization or representation of the information it receives during learning time.
3. Real Time Operation: ANN computations may be carried out in parallel, and special hardware devices are being designed and manufactured which take advantage of this capability.
4. Fault Tolerance via Redundant Information Coding: Partial destruction of a network leads to the corresponding degradation of performance. However, some network capabilities may be retained even with major network damage
5. Pattern recognition is a powerful technique for harnessing the information in the data and generalizing about it. Neural nets learn to recognize the patterns which exist in the data set.
6. The system is developed through learning rather than programming.. Neural nets

teach themselves the patterns in the data freeing the analyst for more interesting work.

7. Neural networks are flexible in a changing environment. Although neural networks may take some time to learn a sudden drastic change they are excellent at adapting to constantly changing information.
8. Neural networks can build informative models whenever conventional approaches fail. Because neural networks can handle very complex interactions they can easily model data which is too difficult to model with traditional approaches such as inferential statistics or programming logic.
9. Performance of neural networks is at least as good as classical statistical modelling, and better on most problems. The neural networks build models that are more reflective of the structure of the data in significantly less time.



Applications of ANN:

The various real time applications of Artificial Neural Network are as follows:

1. Function approximation, or regression analysis, including time series prediction and modelling.
2. Call control- answer an incoming call (speaker-ON) with a wave of the hand while driving.
3. Classification, including pattern and sequence recognition, novelty detection and sequential decision making.
4. Skip tracks or control volume on your media player using simple hand motions- lean back, and with no need to shift to the device- control what you watch/ listen to.
5. Data processing, including filtering, clustering, blind signal separation and compression.
6. Scroll Web Pages, or within an eBook with simple left and right hand gestures, this is ideal when touching the device is a barrier such as wet hands are wet, with gloves, dirty etc.
7. Application areas of ANNs include system identification and control (vehicle control, process control), game-playing and decision making (backgammon, chess, racing), pattern recognition (radar systems, face identification, object recognition, etc.), sequence recognition (gesture, speech, handwritten text recognition), medical diagnosis, financial applications, data mining (or knowledge discovery in databases, "KDD").
8. Another interesting use case is when using the Smartphone as a media hub, a user can dock the device to the TV and watch content from the device- while controlling the content in a touch-free manner from afar.
9. If your hands are dirty or a person hates smudges, touch-free controls are a benefit.

Limitations of artificial neural networks:

Artificial neural network is undoubtedly a powerful tool for decision making. But there are several weaknesses in its use.

1. ANN is not a general-purpose problem solver. It is good at complex numerical computation for the purposes of solving system of linear or non-linear equations, organizing data into equivalent classes, and adapting the solution model to environmental changes. However, it is not good at such mundane tasks as calculating payroll, balancing checks, and generating invoices. Neither is it good at logical inference – a job suited for expert systems. Therefore, users must know when a problem could be solved with an ANN
2. There is no structured methodology available for choosing, developing, training, and verifying an ANN. The solution quality of an ANN is known to be affected by the number of layers, the number of neurons at each layer, the transfer function of each neuron, and the size of the training set. One would think that the more data in the training set, the better the accuracy of the output. But, this is not so. While too small a training set will prohibit the network from developing generalized patterns of the inputs, too large a one will break down the generalized patterns and make the network sensitive to input noise. In any case, the selection of these parameters is more of an art than a science. Users of ANNs must conduct experiments (or sensitivity analyses) to identify the best possible configuration of the network. This calls for easy-to-use and easy-to modify ANN development tools that are gradually appearing on the market.
3. There is no single standardized paradigm for ANN development. Because of its interdisciplinary nature, there have been duplicating efforts spent on ANN research. For example, the Back propagation learning algorithm was independently developed by three groups of researchers in different times: Werbos , Parker 1191, and Rumelhart, Hinton, and Williams. To resolve this problem, the ANN community should establish a repository of available paradigms to facilitate knowledge transfer between researchers. Moreover, to make an ANN work, it must be tailored specifically to the problem it is intended to solve. To do so, users of ANN must select a particular paradigm as the starting prototype. However, there are many possible paradigms. Without a proper training, users may easily get lost in this. Fortunately, most of the ANN development tools commercially available today provide scores of sample paradigms that work on various classes of problems. A user may follow the advice and tailor it to his or her own needs.
4. The output quality of an ANN may be unpredictable regardless of how well it was designed and implemented. This may not be the case for finding the solution to a problem with linear constraints in which the solution, if found, is guaranteed to be the global optimum. However, many problems have a non-linear region of feasible solutions. A solution to a non-linear problem reached by the ANN may not be the global optimum. Moreover, there is no way to verify that an ANN is correct unless every possible input is tried: such exhaustive testing is impractical, if not impossible. In a mission-critical application, one should develop ANN solutions in parallel with the conventional ones for direct comparison. Both types of systems should be run for a period of time, long enough to make sure that the ANN systems are error-free before they are used in real situations.
5. Most ANN systems are not able to explain how they solve problems. The current ANN implementations are based primarily on random collectivity between processing

elements (the individual “neurons”). As a result, the user may be able to verify a network’s output but not to trace a system’s flow of control . Recently, S.I.Gallan demonstrated that an explanation ability can be incorporated into an ANN. Further development of this is bound to attract more prospective users into the ANN bandwagon.

-K.R.Pradeep (2nd year)

Brain fingerprinting

Brain Fingerprinting is a controversial proposed investigative technique that measures recognition of familiar stimuli by measuring electrical brain wave responses to words, phrases, or pictures that are presented on a computer screen. Brain fingerprinting was invented by Lawrence Farwell. The theory is that the suspect's reaction to the details of an event or activity will reflect if the suspect had prior knowledge of the event or activity. This test uses what Farwell calls the MERMER ("Memory and Encoding Related Multifaceted Electroencephalographic Response") response to detect familiarity reaction. One of the applications is lie detection. Dr. Lawrence A. Farwell has invented, developed, proven Fingerprinting, a new computer-based technology to identify the perpetrator of a crime accurately and scientifically by measuring brain-wave responses to crime-relevant words or pictures presented on a computer screen. Farwell Brain Fingerprinting has proven 100% accurate in over 120 tests, including tests on FBI agents, tests for a US intelligence agency and for the US Navy, and tests on real-life situations including actual crimes.

What is Brain Fingerprinting?

Brain Fingerprinting is designed to determine whether an individual recognizes specific information related to an event or activity by measuring electrical brain wave responses to words, phrases, or pictures presented on a computer screen. The technique can be applied only in situations where investigators have a sufficient amount of specific information about an event or activity that would be known only to the perpetrator and investigator. In this respect, Brain Fingerprinting is considered a type of Guilty Knowledge Test, where the "guilty" party is expected to react strongly to the relevant activity.

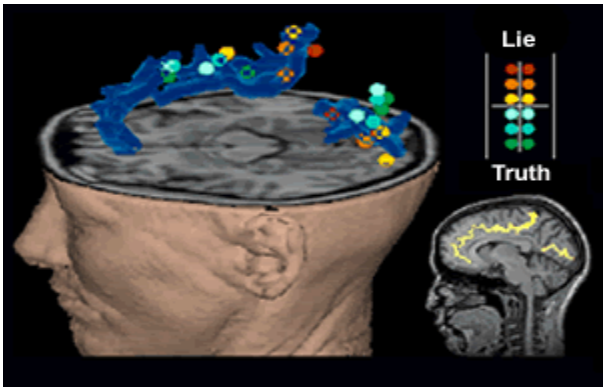
Existing (polygraph) procedures for assessing the validity of a suspect's "guilty" knowledge rely on measurement of autonomic arousal (e.g., palm sweating and heart rate), while Brain Fingerprinting measures electrical brain activity via a fitted headband containing special sensors. Brain Fingerprinting is said to be more accurate in detecting "guilty" knowledge distinct from the false positives of traditional polygraph methods, but this is hotly disputed by specialized researchers.

Technique:

The person to be tested wears a special headband with electronic sensors that measure the electroencephalography from several locations on the scalp. In order to calibrate the brain fingerprinting system, the testee is presented with a series of irrelevant stimuli, words, and pictures, and a series of relevant stimuli, words, and pictures. The test subject's brain response to these two different types of stimuli allow the testor to determine if the measured brain responses to test stimuli, called probes, are more similar to the relevant or irrelevant responses.

The technique uses the well-known fact that an electrical signal known as P300 is emitted from an individual's brain approximately 300 milliseconds after it is confronted with a stimulus of special significance, e.g. a rare vs. a common stimuls or a stimulas the proband is asked to count. The novel interpretation in brain fingerprinting is to look for P300 as response to stimuli related to the crime in question e.g., a murder weapon or a victim's face. Because it is based on EEG signals, the system does not require the testee to issue verbal responses to questions or stimuli.

Brain fingerprinting uses cognitive brain responses , brain fingerprinting does not depend on the emotions of the subject, nor is it affected by emotional responses. Brain fingerprinting is fundamentally different from the polygraph (lie-detector), which measures emotion-based physiological signals such as heart rate, sweating, and blood pressure. Also, unlike polygraph testing, it does not attempt to determine whether or not the subject is lying or telling the truth.



Four phases of Farwell Brain Fingerprinting:

In fingerprinting and DNA fingerprinting, evidence recognized and collected at the crime scene, and preserved properly until a suspect is apprehended, is scientifically compared with evidence on the person of the suspect to detect a match that would place the suspect at the crime scene. Farwell Brain Fingerprinting works similarly, except that the evidence collected both at the crime scene and on the person of the suspect (i.e., in the brain as revealed by electrical brain responses) is informational evidence rather than physical evidence. There are four stages to Farwell Brain Fingerprinting, which are similar to the steps in fingerprinting and DNA fingerprinting:

1. Brain Fingerprinting Crime Scene Evidence Collection
2. Brain Fingerprinting Brain Evidence Collection
3. Brain Fingerprinting Computer Evidence Analysis
4. Brain Fingerprinting Scientific Result.

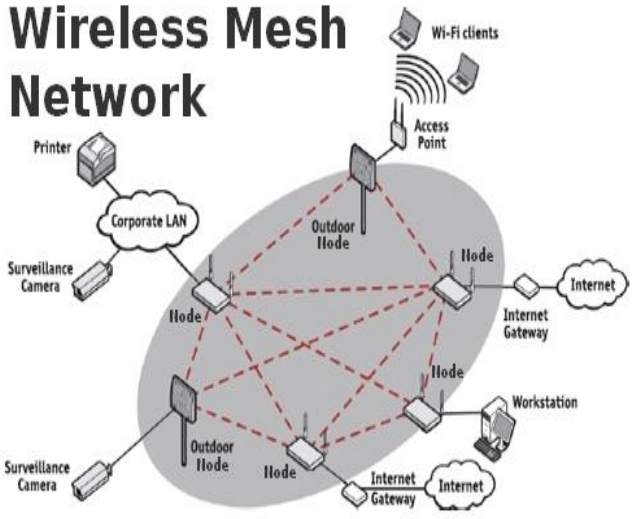
In the Crime Scene Evidence Collection, an expert in Farwell Brain Fingerprinting examines the crime scene and other evidence connected with the crime to identify details of the crime that would be known only to the perpetrator. The expert then conducts the Brain Evidence Collection in order to determine whether or not the evidence from the crime scene match.In the Computer Evidence Analysis, the Farwell Brain Fingerprinting system makes a mathematical determination as to whether or not this specific evidence is stored in the brain, and computes a statistical confidence for that determination. This determination and statistical confidence constitute the Scientific Result of Farwell Brain Fingerprinting: either "information present" – the details of the crime are stored in the brain of the suspect – or "information absent" – the details of the crime are not stored in the brain of the suspect.

-R.B.Sulosh Meena (2nd year)

Wireless Mesh Technology

A wireless mesh network (WMN) is a communications network made up of radio nodes organized in a mesh topology. It is also a form of wireless ad hoc network. Wireless mesh networks often consist of mesh clients, mesh routers and gateways. The mesh clients are often

laptops, cell phones and other wireless devices while the mesh routers forward traffic to and from the gateways which may, but need not, be connected to the Internet. The coverage area of the radio nodes working as a single network is sometimes called a mesh cloud. Access to this mesh cloud is dependent on the radio nodes working in harmony with each other to create a radio network. A mesh network is reliable and offers redundancy. When one node can no longer operate, the rest of the nodes can still communicate with each other, directly or through one or more intermediate nodes. Wireless mesh networks can self-form and self-heal. Wireless mesh networks can be implemented with various wireless technologies including 802.11, 802.15, 802.16, cellular technologies and need not be restricted to any one technology or protocol.



Architecture:

Wireless mesh architecture is a first step towards providing cost effective and dynamic high-bandwidth networks over a specific coverage area. Wireless mesh infrastructure is, in effect, a network of routers minus the cabling between nodes. It's built of peer radio devices that don't have to be cabled to a wired port like traditional WLAN access points (AP) do. Mesh infrastructure carries data over large distances by splitting the distance into a series of short hops. Intermediate nodes not only boost the signal, but cooperatively pass data from point A to point B by making forwarding decisions based on their knowledge of the network, i.e. perform routing. Such architecture may, with careful design, provide high bandwidth, spectral efficiency, and economic advantage over the coverage area.

Wireless mesh networks have a relatively stable topology except for the occasional failure of nodes or addition of new nodes. The path of traffic, being aggregated from a large number of end users, changes infrequently. Practically all the traffic in an infrastructure mesh network is either forwarded to or from a gateway, while in ad hoc networks or client mesh networks the traffic flows between arbitrary pairs of nodes.

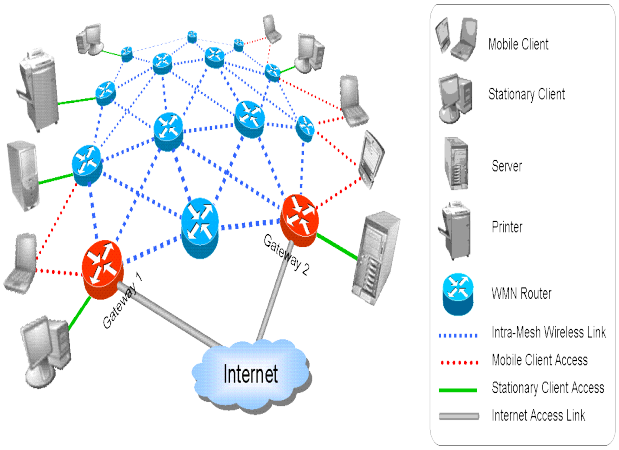
Management:

This type of infrastructure can be decentralized (with no central server) or centrally managed (with a central server), both are relatively inexpensive, and can be very reliable and resilient, as each node needs only transmit as far as the next node. Nodes act as routers to transmit data from nearby nodes to peers that are too far away to reach in a single hop, resulting in a network that can span larger distances. The topology of a mesh network is also reliable, as each node is connected to several other nodes. If one node drops out of the network, due to hardware failure or any other reason, its neighbors can quickly find another route using a routing protocol.

Applications:

Mesh networks may involve either fixed or mobile devices. The solutions are as diverse as communication needs, for example in difficult environments such as emergency situations, tunnels, oil rigs, battlefield surveillance, high-speed mobile-video applications on board public transport or real-time racing-car telemetry. An important possible application for wireless mesh

networks is VoIP. By using a Quality of Service scheme, the wireless mesh may support local telephone calls to be routed through the mesh.



Some current applications:

1. U.S. military forces are now using wireless mesh networking to connect their computers, mainly ruggedized laptops, in field operations.
2. Electric meters now being deployed on residences transfer their readings from one to another and eventually to the central office for billing without the need for human meter readers or the need to connect the meters with cables.
3. The laptops in the One Laptop per Child program use wireless mesh networking to enable students to exchange files and get on the Internet even though they lack wired or cell phone or other physical connections in their area.
4. The 66-satellite Iridium constellation operates as a mesh network, with wireless links between adjacent satellites. Calls between two satellite phones are routed through the mesh, from one satellite to another across the constellation, without having to go through an earth station. This makes for a smaller travel distance for the signal, reducing latency, and also allows for the constellation to operate with far fewer earth stations than would be required for 66 traditional communications satellites.

Operation:

The principle is similar to the way packets travel around the wired Internet – data will hop from one device to another until it eventually reaches its destination. Dynamic routing algorithms implemented in each device allow this to happen. To implement such dynamic routing protocols, each device needs to communicate routing information to other devices in the network. Each device then determines what to do with the data it receives – either pass it on to the next device or keep it, depending on the protocol. The routing algorithm used should attempt to always ensure that the data takes the most appropriate (fastest) route to its destination.

Multi-radio mesh:

Multi-radio mesh refers to a unique pair of dedicated radios on each end of the link. This means there is a unique frequency used for each wireless hop and thus a dedicated CSMA collision domain. This is a true mesh link where you can achieve maximum performance without bandwidth degradation in the mesh and without adding latency. Thus voice and video applications work just as they would on a wired Ethernet network. In true 802.11 networks, there is no concept of a mesh. There are only APs and Stations. A multi-radio wireless mesh node will dedicate one of the radios to act as a station, and connect to a neighbor node AP radio.

Routing Protocol:

There are more than 70 competing schemes for routing packets across mesh networks. Some of these include:

1. AODV (Ad hoc On-Demand Distance Vector)

2. B.A.T.M.A.N. (Better Approach To Mobile Ad hoc Networking)
3. Babel (protocol) (a distance-vector routing protocol for IPv6 and IPv4 with fast convergence properties)
4. DSDV (Destination-Sequenced Distance-Vector Routing)
5. DSR (Dynamic Source Routing)
6. HSLS (Hazy-Sighted Link State)
7. HWMP (Hybrid Wireless Mesh Protocol)
8. IWMP (Infrastructure Wireless Mesh Protocol) for Infrastructure Mesh Networks by GRECO UFPB-Brazil
9. MRP (Wireless mesh networks routing protocol) by Jangeun Jun and Mihail L. Sichitiu
10. OLSR (Optimized Link State Routing protocol)
11. OORP (Order One Routing Protocol) (Order One Networks Routing Protocol)
12. OSPF (Open Shortest Path First Routing)
13. Routing Protocol for Low-Power and Lossy Networks (IETF ROLL RPL protocol, RFC 6550)
14. PWRP (Predictive Wireless Routing Protocol)
15. TORA (Temporally-Ordered Routing Algorithm)
16. ZRP (Zone Routing Protocol)

-C.V.Shanthi (2nd year)

Student's corner

Aptitude problems based on blood relation:

1.Pointing to a photograph of a boy Suresh said, "He is the son of the only son of my mother." How is Suresh related to that boy?

A. Brother
B. Uncle
C. Cousin
D. Father

Answer: Option D

Explanation: The boy in the photograph is the only son of the son of Suresh's mother i.e., the son of Suresh. Hence, Suresh is the father of boy.

2.Introducing a boy, a girl said, "He is the son of the daughter of the father of my uncle." How is the boy related to the girl?

A. Brother
B. Nephew
C. Uncle
D. Son-in-Law

Answer: Option A

Explanation: The father of the boy's uncle → the grandfather of the boy and daughter of the grandfather → sister of father.

3.Pointing to a photograph Lata says, "He is the son of the only son of my grandfather." How is the man in the photograph related to Lata?

A. Brother
B. Uncle
C. Cousin
D. Data is inadequate

Answer: Option A

Explanation: The man in the photograph is the son of the only son of Lata's grandfather i.e., the man is the son of Lata's father. Hence, the man is the brother of Lata.

4.Pointing to a photograph. Bajpai said, "He is the son of the only daughter of the father of my brother." How Bajpai is related to the man in the photograph?

A. Nephew
B. Brother
C. Father
D. Maternal uncle

Answer: Option D

Explanation: The man in the photo is the son of the sister of Bajpai. Hence, Bajpai is the maternal uncle of the man in the photograph.

5.Deepak said to Nitin, "That boy playing with the football is the younger of the two brothers of the daughter of my father's wife." How is the boy playing football related to Deepak?

A. Son
B. Brother
C. Cousin
D. Son-in-law

Answer: Option B

Explanation: Father's wife → mother. Hence, the daughter of the mother means sister and sister's younger brother means brother. Therefore, the boy is the brother of Deepak.

6.Veena who is the sister-in-law of Ashok, is the daughter-in-law of Kalyani. Dheeraj is the father of Sudeep who is the only brother of Ashok. How Kalyani is related to Ashok?

A. Mother-in-law
B. Aunt
C. Wife
D. None of these

Answer: Option D

Explanation: Ashok is the only brother of Sudeep and Veena is the sister-in-law of Ashok. Hence Veena is the wife of Sudeep. Kalyani is the mother-in-law of Veena. Kalyani is the mother of Ashok.

6.Amit said "this girl is the wife of the grandson of my mother". How is amit relates to the girl?

A. Brother
B. Grandfather
C. Husband
D. Father-in-law

Answer: Option D

Explanation: The girl is the wife of grandson of Amit's mother i.e., the girl is the wife of son of Amit. Hence, Amit is the father-in-law of the girl.

Bulletins

Faculty Development Program:

A faculty development program was conducted on 12.01.16 and 14.01.2016 for our department staffs on the topic Mobile Applications by Mr.A.John Paul Antony, Assistant professor/CSE from Kamaraj College of engineering.

Founder's day celebration:

Our department celebrated founder's day on 14.01.16 at Government Middle School, Pottapalayam by providing stationary items to the students.

As a part of founder's day celebration, a guest lecture was delivered on the topic "Scope of Engineering" for the students of Dolphin school by our HOD, Dr.N.Balaji on 22.01.16

Guest Lecture for Polytechnic students:

A guest lecture for the students of K.L.N Polytechnic College was delivered on 18.01.16 by our HOD, Dr.N.Balaji on the topic "Computer Networks- a practical approach".

Staff achievements: Attendance

Our department staffs Mr.L.R.J.Karthik and Mr.V.R.Bhuvaneshwaran were awarded for having full attendance.

Service:

Our department senior staffs Mrs.J.S.Kanchana, Associate Professor 1 and Mr.M.Satheesh Kumar, Assistant Professor 2 were awarded for 10 years of service in our college.

Student's achievement:

Placement Details - Polaris

	M.Sundar (125032)

Head Count of students placed in final year (2011-2015)

Company name	Count
TCS	7
IBM	9
CTS	5
Aricent	4
Infosys	1
Mind Tree	4
Infofaces	4
Polaris	1

Suggestions and Feedback Contact:
klnceitsig@gmail.com