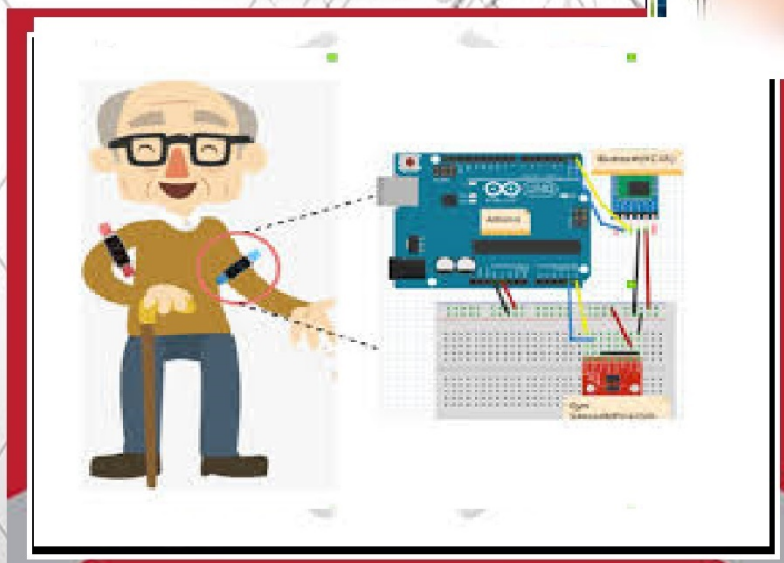
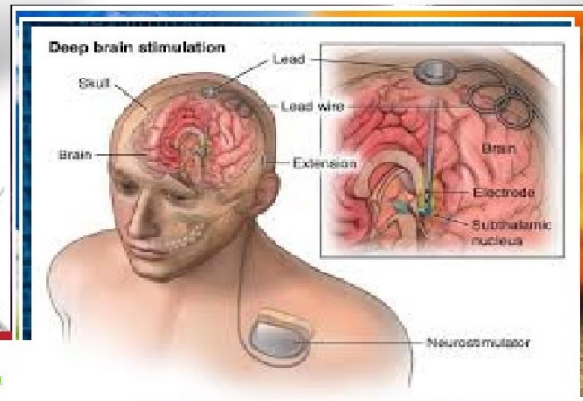


ELECTRONICS & COMMUNICATION ENGINEERING

TECH
CONNECT
June, 2020



**LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING
MYLAVARAM**

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1. Devices for detecting Alzheimer's disease

Alzheimer's is a continuous state of confusion that causes brain cells to deteriorate and die. It is the most common cause of Dementia-A chronic or persistent disorder of mental processes caused by brain disease. The early stage of the disease includes forgetting recent events or conversations. As the disease advances the patient suffers with memory disability and difficulty to perform everyday tasks. There is no cure for the Alzheimer's disease or improvement for the process of this disease. In advanced stage, severe loss of brain function leads to death of the person.

ALZHEIMER'S DISEASE:

Dr. Alois Alzheimer is the first person who discovered Alzheimer's disease. He categorized the features of a patient familiar as "AUGUSTE D." in 1906. He said that the person having Alzheimer's disease experiences loss of memory, personality disorder, and intellectual changes. Alzheimer's disease (AD) is a neurological or neurodegenerative disorder, in which neuro means neurons and degenerative means loss i.e. loss or death of neurons results in AD. AD is the third most expensive disease after cancer and cardiovascular diseases and it has become very common in the present industrialized world. It is estimated that 5.8 million Americans are affected by AD and this number might get doubled by 2050. AD is a common form of dementia. Dementia and AD might look similar in sense but medically dementia means memory loss while AD has other set of symptoms like decrease in co-ordination of muscle movement, language problem, poor judgment and some even cannot control their emotions. AD increases slowly and results in decrease in memory, thinking ability and person progressively fails to solve the simplest tasks. The main cause of the AD is the plaques and tangles that are formed due to some unusual breakdown of some proteins in our brain. Symptoms become worsen as these plaques and tangles build up and get worsen as the days prolong.

These plaques and tangles in the cerebrum are as yet thought to be a portion of the primary highlights of Alzheimer's illness. Loss of associations between nerve cells (neurons) in the cerebrum is the component which results in Alzheimer's. Neurons transmit messages between various pieces of the mind, and from the cerebrum to muscles and organs in the body.

Alzheimer's is a continuous state of confusion that causes brain cells to deteriorate and die. It is the most common cause of dementia- a chronic disorder of mental process

caused by brain disease. The early stage of the disease includes forgetting recent events or conversations. As the disease advances the patient suffers with memory disability and difficulty to perform everyday tasks.

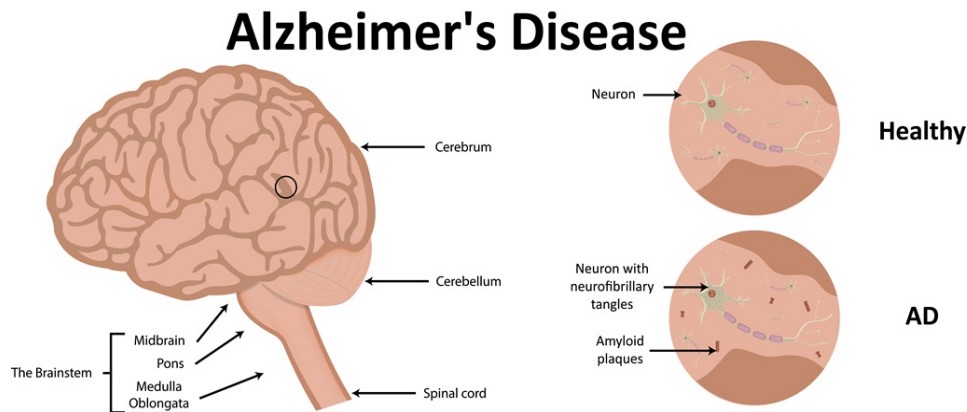


Fig 1. Distribution of neurons

There is no cure for the Alzheimer's disease or improvement for the process of this disease. In advanced stage, severe loss of brain function leads to death of the person.

AD has three stages: Mild AD, Moderate AD, Severe AD and also symptoms might vary depending on their stages. To study any part of the body we have invasive and non-invasive techniques. Invasive techniques are not at all suggestible to study the brain related diseases of healthier patients because these techniques involves invading the body, by cutting or by puncturing the skin and inserting instruments into the body. Non – invasive study of human brain can be done either by structural analysis or by functional analysis. Structural analysis is done by using neuro imaging techniques.

MILD AD:

In the beginning period of Alzheimer's, an individual may work freely. The person may in any case drive, work and be a piece of social exercises. In spite of this, the individual may feel as though the person in question is having memory slips, for example, overlooking commonplace words or the area of regular articles. The person may feel difficulty to identify their friends, family members and relatives. Regular indications are:

- Fail to remember the article just read.
- Forgetting the valuable things.
- Enhance the difficulty with arrangement or designing.
- Frame of mind changes that implies gloomy or upset.
- Having less vitality and drive to get things done.

- Issues thinking of the correct word or name.
- Inconvenience recollecting names when acquainted with new individuals.

MODERATE AD:

Moderate Alzheimer's is regularly the longest stage and can keep going for a long time. As the sickness advances, the individual with Alzheimer's will require a more prominent degree of care. During the moderate phase of Alzheimer's, the dementia indications are progressively articulated. An individual may have more noteworthy trouble performing assignments, for example, taking care of tabs, yet they may in any case recall huge insights regarding their life.

The indications included are:

- Neglect or forgetting one's own individual history.
- An expanded danger of meandering and getting lost.
- Difficulty with sleeping.
- Inconvenience controlling bladder and entrails in certain people.
- Hesitation about where they are or what day it is.
- Trouble coming up with recollecting their individual address or mobile number or school where they are graduated.

SEVERE AD:

The late stage of the disease, chronic actions are drastic. The person cease to have capability to react to their surroundings and gradually to direct gesture. They feel difficulty while communicating with others. As memory and intellectual aptitudes keep on declining, critical character changes may occur and people need broad assistance with day by day exercises. The actions included are:

- Trouble with consuming.
- Feels difficulty while expressing.
- Utmost mood swings.
- Extended struggling in communicating.
- Become exposed infections, particularly pneumonia.
- Need personal care for daily activities.
- Hallucination i.e. seeing, hearing, things aren't really happens.

EXISTING NEURO IMAGING TECHNIQUES:

Many neuro-imaging techniques are existing for example MRI, CT, PET, SPECT etc. are most commonly used techniques. The disadvantage of these neuro imaging techniques are they are high in cost and many hospitals cannot afford their equipment. And the major disadvantages of these are the disease can be identified only after the severe damage occurred to the brain cells.

MRI:

Magnetic resonance imaging utilizes both magnetic fields and radio waves for the production of elevated condition of two- or three-dimensional structural images of brain without using ionization radiation (x-rays). MRI is used in pharmaceutical approach of nuclear magnetic resonance (NMR). As it is danger because of radiation but it is better choice compared to CT scan. It gives more and different information compared to CT scan. MRI is majorly used in medical field for the analysis and activities of changes in disease. MRI is time taking process and the person subjected to a tapering enclosed tube. The main advantage of MRI is it allows doctors and scientist to study the interior structure of human brain. It is not dangerous compared to CT. As CT produces more radiation it increases the disease rather than curing.

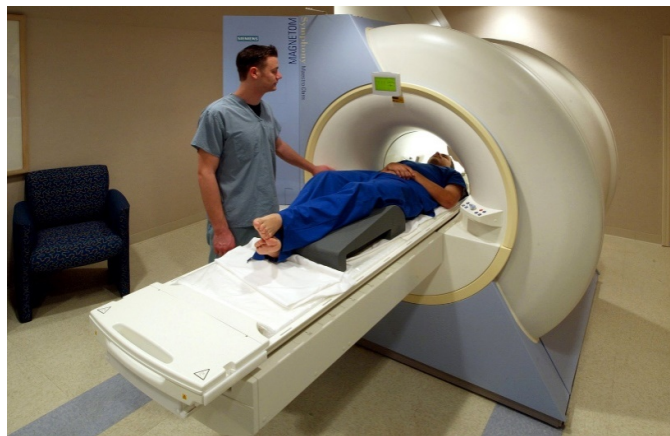


Fig. 2 MR Imaging

CT:

A computerized tomography scan utilizes both computers and rotating x-ray machines for the creation of sampling pictures of the body. The CT scan images provide more information compared to x-ray images. The images are sent to computer, it produces the slices of image, or sampling images. It produces 3D image of constrained area of a body. It helps the doctors for the study of interior features of body. The advantage is that it

eliminates the overlapping structure and provides the clear view of interior structures. It allows us to study the shape, size and texture. it also provides the detailed information of particular body part. It uses high radiation compared to usual x-rays for the analysis of disease. The CT scan affects the adjacent part. as it uses high radiation it increases cancer rather than curing it.

PET:

The PET is a functional imaging technique for nuclear medicine that helps to observe metabolic processes within the body as a way of diagnosing diseases. This method is used to diagnose disease. The system detects gamma ray pairs produced by a positron emitting radioisotope, most commonly fluorine-18, which is introduced into the organism on a molecule called a radioactive tracer, which is biologically active. It gives the better and improved data by reducing the repeated scanning sessions of a patient. it increases the patient's comfort during the process of scanning. it gives the clear information within a short period of time. Since the radioactive material is joined with glucose and afterward infused into the patient, this can be a worry for some diabetic patients. Before having a PET/CT check, a diabetic patient's glucose level will be assessed, and a glucose serum blood test may be controlled. As the test uses the high radiation it might be unsuitable for patient with kidney problems.

So for early diagnosing of AD functional analysis is preferred. In functional analysis Electroencephalogram (EEG) is used for diagnosing the AD. EEG is the recordings of electrical activity of brain impulses. Studies say that AD leads to the following changes in the EEG signal: 1) slowing of EEG signal 2) reduced complexity 3) perturbations in EEG synchrony. EEG has five frequency bands. These are as follows Delta (1-4 Hz), Theta (4-7 Hz), Alpha (7-12 Hz), Beta (12-30 Hz), Gamma (>30 Hz). Each frequency band is having its own functionality. By partitioning these five frequency bands from EEG signal we can study various features and observe the abnormality of the diseased patients. Many medical approaches are there for a disease diagnosing, but till now there is no feasible approach for identifying the AD. Our aim is to diagnose the AD in the early stages so that it helps the patients to improve their standard of living.

Mind explore has developed after some time, with philosophical, trial, and hypothetical stages. As age increases different actions of brain can be damaged by the result of Neurodegenerative diseases. Due to these diseases some usual samples contain chronic as Alzheimer's disease, alcoholic dementia or vascular dementia; Parkinson's disease and infections. This disease also affects the remembrance and intelligence power of a human. Patients in the beginning times of AD may rest more than expected or wake

up perplexed. As the sickness advances, patients may start to rest during the day and stir much of the time for the duration of the night. Patients with further developed AD once in a while rest for extensive stretches. Or maybe, they rest unpredictably for the duration of the day and night.

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2.Fall detection Systems

Now-a-days we lead a life that is in a rush and that, apparently, has an absence of empathy. Because of this negligence, the old and weak are sadly overlooked. The establishment of help care centers mushroomed thus of this disturbing pattern. Alongside a fast development in maturing populace there is likewise a decline in the number of inhabitants in caretakers.

In India for instance, there is an enormous increment in the older populace, with a present gauge of 90 million beyond 60 years old. This is an after effect of a lopsided development among age gatherings, with the 60+ populace progressively definitely more quickly than the 15-60 age gathering. The age reliance proportion of the nation is presently at a dangerous 0.58. Studies show very nearly a fourth of such older folks have unexpected weakness conditions, as one could anticipate. This implies an estimated 22 million people are in danger from infrequent wellbeing entanglements.

According to WHO survey, "The populace of individuals more than 60 arrives at 12.5% by 2025 in India." This represents a disturbing burden to the old from a cultural perspective. India has a long and treasured culture of regard and commitment towards seniors. Be that as it may, with the beginning of the family unit time, a few networks think that it hard to completely focus on the senior residents. This has proclaimed the development of NGO's and senior consideration habitats, for example, Help Age India. Yet at the same time, this makes one wonder is it conceivable to take care of our seniors, paying little heed to the time? No, that is an unquestionably all the more problem that is begging to be addressed. It is in reality time India took to thinking about senior resident day in and day out by grasping innovation.

Older people who live autonomously are presented to higher possibility of falls. Other than that, falling down habitually may moreover reason mental and physiological mischief that lead to serious damage or even death toll if logical consideration isn't constantly outfitted at the present time. So as to diminish the peril of old people getting harm from fall, clinical intrigue wants to be given straight away. In this manner, a reliable fall discovery contraption can assist with finding fall in matured people and make a call to the dear and near ones.

Falls are one of the most conspicuous reasons for accidental injury. They are not as Straight forward as what you may see them to be. They are coded as E880-E888 in Global

Classification of Disease-9 and as W00-W19 in ICD- 10, which incorporate a wide scope of falls including those on a similar level, upper level, and other unspecified falls. For it, we can define it as per WHO, "Unintentionally stopping on the ground, floor or other lower level, barring purposeful change in position to rest in furniture, divider or different items".

Falls are the reason for 40% of all injury related deaths and need prompt clinical consideration. The purpose behind a fall might be heart issues, loss of awareness, weakness, fatigue, illnesses and loss of parity. In spite of the fact that falls happen through all age gatherings, the significant lumps of occurrences are those of senior residents. Roughly 28-35% of individuals matured 65 or more fall each year. This figure doubles for the age gathering of 70+ with 32-42%. Falling down and come to be intuitive can be difficult on the grounds that nobody knows about this falling occasion which may also lead the person to have more prominent serious mishaps. It is fundamental to have a fast response and salvage time if falling occasion occurs. There are various innovations open to help identifying fall in old individuals. One of the harvest time identification frameworks applied the webcam to show the games of older individuals and recognizing fall. Nonetheless, the expense of set up and activity is steeply-valued and it's far best pertinent for indoor environment.

TYPES OF FALLS:

Falls are frequently brought about by various variables. The faller may live with many hazard factors for falling and possibly have issues when another factor shows up. All things considered, the executives is regularly customized to treating the factor that caused the fall, as opposed to the entirety of the hazard factors a patient has for falling. Hazard elements might be assembled into natural elements, for example, presence of a particular infirmity or ailment. Outside or outward factors remember the earth and the route for which it might empower or dissuade inadvertent falls. Such factors as lighting and brightening, individual guide hardware and floor footing are exceptionally significant in fall prevention.

Intrinsic Factors:

1. Balance and Gait:

It causes Parkinsonism, dementia, neuropathy, neuromuscular disease or vestibular disorder arising from stroke disease;

2. Visual and Motor Reaction Time Problems:

This will cause an all-inclusive response time will delay reactions and remuneration to unequal characters standing or strolling, thereby increasing the likelihood of falls.

3. Medications: It causes

- a) Poly pharmacy is popular in the elderly.
- b) Sedatives dramatically increase the risk of decrease.
- c) Cardiovascular medicines may lead to decrease

4. Visual impairment: It causes

- a) Glaucoma, macular degeneration and retinopathy increase the risk of falling.
- b) Bifocals and trifocals can increase the risk of falling as the lower portion of the corrective lenses are designed for distances of approximately 18inches, thereby preventing clear vision of one's feet / floor, approximately 4.5 to 5.5 feet below one's eyes. Cognitive problems
- c) Dementia increases the chances of falls

5. Cardiovascular causes:

- a) Orthostatic hypotension,
- b) Postprandial hypotension,
- c) Carotid sinus syndrome,
- d) Neuro cardiogenic syncope– the commonest cause of syncope in A&E patients,
- e) Cardiac arrhythmias,
- f) Structural heart disease, such as valvular heart disease.

Extrinsic Factors:

1. Poor lighting because of low luminance of existing light, can prevents the identification of hazard things and obstacles. Vision falls apart with age, and additional lighting will be required where seniors move as often as possible. The intensity of the bulbs utilized ought to be higher than ordinarily acknowledged.

2. Stairs with deficient handrails, or excessively steep, empowering excursions and falls. Milder surfaces can assist limit with affecting wounds by padding loads.

3. Entryways with sufficient headroom so the client's head doesn't hit the lintel. Entryways of low headroom (not exactly around 2 meters) are basic in old houses and bungalows for instance.

4. Mats/floor surfaces with low grating, causing poor footing and individual unsteadiness. All surfaces ought to have a high grinding coefficient with shoe soles.

5. Clothing/footwear inadequately fitting, shoes of low contact against floor. Elastic soles with ribs ordinarily have a high contact coefficient, so are favoured for most purposes. Dress should fit the client well, without trailing parts (fixes falling underneath the heel and free shoestrings) which could catch with hindrances.

6. Lack of aids such as walking sticks or walking frames, such as Zimmer frames to improve user comfort.

METHODS OF FALL DETECTION :

Falling occasion among the old individuals may happen when the parental figures are not around to direct which lead to the issue of dependability. Along these lines, a wise fall identification framework that is dependable and practical must be considered as an alternative to help older individuals. As of now accessible methods that are utilized to configuration fall recognition frameworks are ordered into three classifications which are camera based technique, acoustic based strategy also, kinematic based technique. These methodologies assist with decreasing the exertion of medical attendant and guardians to screen day by day exercises of the old individuals. Moreover, they give appropriate clinical consideration critically to the old if there should be an occurrence of fall. In spite of these focal points, there are still numerous issues and the cutting edge in fall identification is very untimely. There are as yet requirement for enormous research so as to think of a framework that can settle all the downsides of current conventional methodologies. Technique that can anticipate a fall before it really happens should be grown so preventive measures can be taken rapidly before any extreme wounds occur.

Camera Based Method:

This strategy used a couple of set of cameras and a microcontroller or a PC (PC) as the committed server. General thought is that the camera is utilized to catch video or picture while moving it to a PC for picture dissecting and handling, portioning individuals

from foundation and consequently a fall recognition framework. This strategy as it were required single arrangement and can screen various people.

A fall recognition framework utilizing camera-based technique by performing pose acknowledgement. So as to portion closer view district of a individual's stance, foundation subtraction calculation was actualized included with a few present handling on improve the outcomes. Shockingly, the result from the investigation accomplished a high pace of fall location (97.08%) with least bogus caution discovery of 0.8%. Lamentably, the downside from this technique is it experiencing issues to recognize fall when there are numerous moving items and impediments happen. utilized a robotized observing framework with face acknowledgment include to identify a fall in a specific territory. The framework used webcams to gather information, for example, the speed of individual's development, position of the individual, and separation between the individual what's more, the camera. Such information was utilized to perform picture handling so as to decide regardless of whether the individual is encountering a fall.

The advantage of utilizing omni-camera is that it can catch picture in 360° at the same time in one shot. This kills the vulnerable sides issue looked by the traditional camera. The trial results show an affectability of 78% without individual data and ascend to 90% with individual data. The downside of this framework is that the framework requires the client to give the individual data, for example, stature, BMI list which will expand the usage cost.

A fall discovery framework by utilizing a fixed camera and a committed PC:

Frontal area is first sectioned by subtracting the foundation from current outline. Next, highlight extraction which incorporates vertical and flat projection histogram from the portioned forefront and point between last standing stance with current frontal area bouncing box. In spite of the fact that the framework can perceive 90% of the falls, impediments issue despite everything exists with this methodology.

Vulnerable side is likewise another major concern particularly for approaches that utilizes just single camera. Foroughi et al, have built up another methodology for a fall recognition framework that based on human shape varieties. Mix of best-fit approximated oval around human body, projection histograms of the portioned outline and fleeting changes of head present are utilized to obtain pieces of information for location of various practices.

Acoustic Based Method:

Acoustic and climate sensors are utilized right now identify falls among old individuals. The expense for this strategy is moderately modest contrast with the camera based technique because of minimal effort equipment and usage. Instances of the sensors utilized are infrared sensors, vibration sensors and mouthpiece. These sensors gather information and afterward move it to a microcontroller or a PC for handling. Discovery of falls possibly initiated when the information gathered surpass a specific limit or conditions set by the PC. A creative framework makes use of cutting edge (SOC) to gauge surrounding/skin temperatures, increasing velocities and pulse for ongoing checking. The framework comprises of base station and direct checking gadget can beat as of now accessible classifiers with higher distinctive capacity.

Acoustic-FADE which including mouthpiece exhibit that are organized in uniform round. A few procedures incorporate restriction, beam forming what's more, stature data are utilized to decide the wellspring of the sound delivered and increment explicitness and nature of the got signal. Fall location was performed after the procedure of highlight extraction and grouping. Acoustic round mouthpiece exhibit setup has a little specks marked one to eight are the omni directional mouthpieces that consistently disseminated along a hover with a range of 0.25m.

A fall recognition framework that checking the floor vibration brought about by a fall. The framework used a piezoelectric sensor coupled to the floor by methods for spring plan and mass. The outcome from the trial shows 100percent genuine positive and no bogus cautions. In any case, the downside from this technique that it possibly can recognize falls when older individuals tumble down at that specific region. Besides, the vibrations can't be identified on a wide range of floor materials.

A fall location framework dependent on cluster of acoustic sensors. So as to separate a fall, the commotion and the tallness of the sound was utilized. The most significant advance is to evacuate the commotion by mounting two receivers on vertical z-axis with 4 meters separated from one another. The framework had the option to accomplish 70% with no bogus alert.

Kinematic Based Method:

This technique is generally utilized and pertinent for fall identification framework. It is best because of ease equipment usage, and wearable sensor for fall recognition either indoor or open air condition. Accelerometer and whirligig are put on piece of the

individual's body so as to separate tumble from exercises of everyday living (ADL). Information gathered by the accelerometer and whirligig are transmitted to microcontroller to be prepared. Since it is a wearable gadget, the scope of activity is certainly not a significant issue any longer. the framework is 91% affectability and 92% particularity. In any case, the downside of this framework is that it experiencing issues in recognize hopping onto bed and falling against a divider with situated position.

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3. Introduction to Antennas

An antenna is a device that is used to convert guided electromagnetic waves into electrical signals and vice versa. Antennas are frequency dependent devices. Each antenna is designed for certain frequency band and outside of this band, antenna rejects the signal. Therefore, we can say antenna is a band pass filter and transducer. Antennas are essential part in communication system therefore understanding their basics are important.

With the advances in telecommunication , the requirement for compact antenna has increased significant . In mobile communication, the requirement for smaller antennas is quite large, so significant developments are carried out to design compact, minimal weight, low profile antennas for both academic and industrial communities of telecommunication. The technologist focused into the design of microstrip patch antennas. Many varieties in designing are possible with microstrip antenna. Sir Jagadeesh Chandra Bose pioneered the investigation of radio and microwave optics. His remarkable microwave research is that he had reduced the waves to the millimeter level about 5mm wavelength and, he is the first person to detect radio waves using semiconductor junction. Antennas are characterized by a number of performance measures which a user would be concerned with in selecting or designing an antenna for a particular application . The parameters of antenna are gain, beam-width, radiation pattern, impedance and polarization.

Microstrip antennas:

In telecommunication, a microstrip antenna means an antenna fabricated using microstrip techniques on a printed circuit board and are mostly used at microwave frequencies. Microstrip antenna consists of a patch of various shapes on the surface of a PCB with a ground plane on the other side of the PCB. The RF current is given between the antenna and ground plane. In recent years, these antennas have their importance due to their thin planar structure used in various products, aircraft and missiles, their ease of fabrication using different techniques etc.

A patch antenna is a narrow-band, large beam antenna fabricated by removing the antenna element pattern in metal trace bonded to an insulating dielectric substrate, such as a printed circuit board, with a metal layer attached to the opposite site of the substrate which creates a ground plane.

Microstrip patch antenna is made of three materials .They are 1) ground 2) patch 3) substrate Microstrip antennas can be of different like square, rectangular, circular, elliptical and any continuous possible shape .

Substrates:

The usage of substrate is principally needed in microstrip antennas for the mechanical support of the antenna . In order to support stability substrate should consist of a dielectric material which effects the electrical performance of the antenna and transmission line. Dielectric Substrate: FR-4 (high loss, low gain antenna, cheap, easy availability); low loss and low permittivity (RT Duroid 6002, PTFE, high gain antennas); portable n mobile (RO4730, high performance, low weight, low permittivity, low loss, low distortion); ceramic (Rogers RO 3200, low cost, GPS patch antenna) etc. Dielectrics are used for improved mechanical and electrical stability. They are utilized to decrease the size of the antenna (higher permittivity, lower size) and can assist with creating displacement current which produces time changing Magnetic Field (by Ampere's Law). This can thus deliver time differing Electric Field (by Faraday's law) and a propagating EM field is created. Thus, a substrate can improve antenna's radiation capacity

Feeding techniques:

Microstrip antenna can feed by variety of methods. Those methods are of two categories-contacting and non-contacting schemes. The foremost popular feeding techniques are microstrip line, co-axial, proximity coupling and aperture coupling .

Microstrip Line:

In this feeding technique, a conducting strip is directly connected to the edge of the patch This type of feed also called Offset Microstrip line feed (contacting scheme). The advantage is that the feed can be etched on the same substrate to provide a planar structure. It provides ease of fabrication, impedance matching. The most common feeding technique used for microstrip antennas is Co-axial feed (or probe feed) [9]. An inner conductor of co-axial connector extends through the dielectric substrate and is soldered or attached to the radiating patch and the outer conductor is connected to the ground plane. The advantage of probe feed is that the feed can be placed at any desired position to provide impedance matching.

Aperture coupling

Aperture coupled feed is an indirect method of feeding the patch (non-contacting scheme) It couples the patch antenna with microstrip line through an aperture and creates an electric field in the aperture which induces surface currents on the patch. The disadvantage of this technique is that difficult to fabricate because of having multiple layers, also increases the thickness of the antenna.

Proximity coupling This feeding technique also called as electro-magnetic coupling scheme. In this feeding, two substrate materials are used so that the feed line is given in between those two substrates and the patch is on top of the upper substrate material.

Radiation mechanism:

The main purpose of an antenna is power radiation or reception. The Antenna can be attached to the circuitry at the station through a transmission line. The performance of an antenna depends upon the radiation mechanism of a transmission line. The radiation from an antenna occurs when the Electromagnetic field is generated by a source is transferred to an antenna equipment through the Transmission line and separated

from the Antenna into free space. Radiating mechanism is of two types 1.single wire 2.two wire

1. Single-wire: radiation in an antenna occurs if the wire is curved, discontinuous, bent and terminated and when the charge is oscillating in time-domain, it radiates even the wire is straight. Different wire configurations for single wired antenna radiation are

(i) Curved wire: helical antenna and loop antennas comes under this category these type of antennas are used for high frequency portable transceivers which are used in ultra-wide band communications.

(ii) Bent wire: the radiation takes place more efficiently when the wire is bent, either it may be single end or at both the ends of the wire because the flow of transmitted energy tries to escape from the transmission line.

(iii) Discontinuous wire: The flow of transmission of energy is very high when the wave is transmitting from one boundary to another, this discontinuity in the medium is called as discontinuous wire.

(iv). Terminated wire: the perfect termination in an antenna occurs when the wire is properly terminated, this type of wired antennas can work even in noisy-environment without any tuners

2. Two-wire:

Let us assume that a voltage source is connected to a two conductor transmission line which is connected to an antenna. By introducing the voltage across the two-conductor line transmission produces a strong electric field between the conductors. Both linear and half dipole comes under this two-wire radiation mechanism

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4.Machine learning

Machine Learning is a fragment of artificial intelligence that deals with the problem of learning from data samples. The study of data science involves patterns and inferences for performing a particular role without using explicit instructions on algorithms and mathematical models used by computer systems. Many machine learning algorithms can construct a mathematical model based on sampled data to predict or to take decisions without being configured separately for each task to perform on the problem. The two phase learning consists of estimating the unknown dependencies in a data system and another phase of estimating the dependencies provides newly forecast outputs.

TYPES OF MACHINE LEARNING

There are three types of machine learning that vary according to the input data given that to solve the problem.

(i) Supervised learning

(ii) Unsupervised learning

(iii) Reinforced learning

Each technique further categorized as below.

MACHINE LEARNING

- Supervised Learning
 - Classification
 - Regression
- Unsupervised learning
 - Association
 - Clustering
- Reinforcement Learning
 - Gaming
 - Finance sector
 - Manufacturing

Supervised learning

This kind of learning will construct a mathematical model of a set of data containing both the inputs and the desired outputs. The data is referred to as training data, consisting of a series of examples of training, also called the supervisory signal. Supervised learning algorithms compose the classification and regression. Algorithms of

classification are used to provide continuous outputs that are restricted and algorithms of regression are used when outputs are capable of providing any number value within a range. Tumours are recognized as X and classified whether it is benign or malignant. The rounded examples are those tumours that have been misclassified.

Unsupervised learning :

It takes the set of data that only includes inputs and finds structure in the data by manipulating the inputs, such as grouping or clustering data points.

Reinforcement learning:

It is a machine learning approach which is inspired by behavioural psychology. This is similar to the way how the children learn to perform a new task. It contrasts with other approaches to machine learning, since the algorithm is not specifically told how to execute at task but operates by itself through the problem.

Algorithms :

There are different types of algorithms in machine learning like Artificial Neural Networks (ANN), Decision Trees (DTs), Sequential Machine Learning (SMO), Instance Base Learner (IBK), Best First tree (BF Tree), Rule Induction Random Forest, Support Vector Algorithm (SVM) etc. Out of all these algorithms we use SVM because it is useful for both regression or classification& mostly it is useful for classification. In this we plot the data as a point in N-dimensional space. It classifies the two classes by line.

N= No.of features you have.

It divides the tumors by line in which red circles indicate the one type tumors and blue stars indicate the other tumors. Based on the given data of the divided tumors SVM calculates the result whether it is benign or malignant. Benign indicates low risk and need to take precautions and go for check-up. Malignancy means it is high risk and they should go for immediate check-up.

Applications of machine learning :

Machine learning is utilized in different fields to mimic and get required examples. Some of them are

- Image recognition
- Speech recognition
- Automatic language translation
- Traffic prediction

- Media
- Online fraud detection
- Stock market trading
- Medical diagnosis
- Email spam filtering
- Virtual personal assistant

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Editorial

Life is always a challenge each need to take and struggle very hard to succeed among many odds. Last few months all are affected by the consequences of covid-19 Pandemic situation. None can perform their activities or tasks due to restricted movements. But people who are optimistic and having good will power, always see opportunities in the challenges and strive hard for new achievements. Either Wright brothers or Graham bell and so on , have not so easily invented new things. Thich Nhat Hanh quoted that “Hope is important because it can make the present moment less difficult to bear. If we believe that tomorrow will be better, we can bear a hardship today”. I wish all the students a safe stay at home with lots of knowledge earning. Majority complain always that ample time not available to do anything. Now they should introspect , time is there but what is done? Finally, this edition also takes the excerpts of the work carried out by the outgoing batch. I wish all of them all the best for their bright future. The cover page images are from the aans.org, devmesh.intel.com.

gln

