

Upgrading And Implementing MI Methods In Neurology

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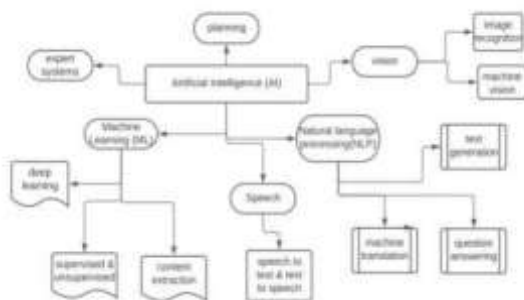
Abstract—Implementing and upgrading the existing AI techniques in neuro surgery by obtaining an exact database for the neurological problems. These symptoms can be recognized by the techniques such as image processing and it can help to reduce the multiple scans. If there is a correct diagnosis made and the part of defect in the brain is found there is no need of multiple scans in the brain for diagnosis. The defects can be confirmed by the image processing technique itself. By using EEG detector the brain waves are compared with the normal brain waves and the facial expressions are compared with the person's normal facial expressions and conclusion can be made if the person's brain has been damaged.

Index Terms—Intense Image processing, Open Craniotomy, Deep learning, EEG magnetic and ct radiations can kill the brain tissues. If the person who is affected from stroke has been already admitted

I. INTRODUCTION

Adjusting to new inputs, performing human-like tasks makes it possible for machine using Artificial Intelligence (AI). Most of the examples that you hear about AI in today's world starting from chess played by computers to self-driving cars that depends mostly on deep learning and natural language processing. Today many technologies have been implemented in medical field too.

A. NEUROLOGICAL STUDY:



If any person is diagnosed with a tumor , a stroke, or any kind of seizures , the person is first analyzed and implemented to undergo many CT scans and MRI scans. It is said that those

in order to recover from the brain tissue hemorrhagic damage if multiple scans are imposed on the person there are higher risk for further damage of brain tissues . This can be prevented by implementing one of the techniques of the AI algorithm. Image processing technique will help to reduce the multiple scans that are imposed on brain. The brain generates some specific waves that can be captured in EEG(Electro Encephalato Graph) ,this helps in detection of brain waves under normal and abnormal situation that the human brain experiences. Emotions and behaviors are the communication between neurons within our brains. Synchronized electrical pulses from masses of neurons communicating with each other are produced by brainwaves.

A sensor placed on the scalp is used to detect the brainwave. They are classified to describe their functions (below) into bandwidths, but are best plan as of a continuous spectrum of consciousness, from slow, loud and functional to fast, subtle, and complex. Thinking of brainwaves as musical notes is a handy analogy. Subtle high pitched flute are more like a low frequency waves deeply penetrating drum beat, while in higher frequency brainwave, the higher and lower frequencies link and cohere with each other through harmonics. Our actions are manipulated by the brainwaves. We can feel tired, slow, sluggish, or dreamy when slower brainwaves are dominant. When we feel wired, or hyper-alert, the higher brainwave is dominant .



At the root of all our thoughts, emotions and behavior's is the communication between neurons within our brains. Brainwaves are produced by synchronized electrical pulses from masses of neurons communicating with each other. Brainwaves are detected using sensors placed on the scalp. They are divided into bandwidths to describe their functions (below), but are best thought of as a continuous spectrum of consciousness; from slow, loud and functional - to fast, subtle, and complex .It is a handy analogy to think of brainwaves as musical notes - the low frequency waves are like a deeply penetrating drum beat, while the higher frequency brainwaves are more like a subtle high pitched flute. Like a symphony, the higher and lower frequencies link and cohere with each other through harmonics. Our brainwaves change according to what we're doing and feeling. When slower brainwaves are dominant we can feel tired, slow, sluggish, or dreamy. The higher frequencies are dominant when we feel wired, or hyper-alert. The descriptions that follow are only broad descriptions - in practice things are far more complex, and brainwaves reflect different aspects when they occur in different locations in the brain. Brainwave speed is measured in Hertz (cycles per second) and they are divided into bands delineating slow, moderate, and fast waves.

II. INFRA-LOW (<.5HZ)

Infra-Low brainwaves (also known as Slow Cortical Potentials), are thought to be the basic cortical rythms that underlie our higher brain functions. Very little is known about infra-low brainwaves.

Their slow nature make them difficult to detect and accurately measure, so few studies have been done. They appear to take a major role in brain timing and network function.

III. DELTA WAVES (.5 TO 3 HZ)

Delta brainwaves are slow, loud brainwaves (low frequency and deeply penetrating, like a drum beat). They are generated in deepest meditation and dreamless sleep. Delta waves suspend external awareness and are the source of empathy. Healing and regeneration are stimulated in this state, and that is why deep restorative sleep is so essential to the healing process.

IV. THETA WAVES (3 TO 8 HZ)

Theta brainwaves occur most often in sleep but are also dominant in deep meditation. Theta is our gateway to learning, memory, and intuition. In theta, our senses are withdrawn from the external world and focused on signals originating from within. It is that twilight state which we normally only experience fleetingly as we wake or drift off to sleep. In theta we are in a dream; vivid imagery, intuition and information beyond our normal conscious awareness. It's where we hold our 'stuff', our fears, troubled history, and nightmares.

V. ALPHA WAVES (8 TO 12 HZ)

Alpha brainwaves are dominant during quietly flowing thoughts, and in some meditative states. Alpha is 'the power of now', being here, in the present. Alpha is the resting state for the brain. Alpha waves aid overall mental coordination, calmness, alertness, mind/body integration and learning.

VI. BETA WAVES (12 TO 38 HZ)

Beta brainwaves dominate our normal waking state of consciousness when attention is directed towards cognitive tasks and the outside world. Beta is a 'fast' which is present when we are alert, attentive, engaged in problem solving, judgment, decision making and focused on mental activity.

Beta brainwaves are classified into three bands. 'Fast idle', or musing can be thought as Lo-Beta . Beta (22Hz) is high engagement actively figuring something . Integrating new experiences, high anxiety, or excitement is highly complex in Hi-Beta . Continual high frequency processing is not a very efficient way as it takes a tremendous amount of energy to run the brain.

VII. GAMMA WAVES (38 TO 42 HZ)

The fastest of brain waves (high frequency, like a flute)are Gama wave, and relate to simultaneous processing of information to different brain areas. The mind has to be quiet to access gamma which is the most subtle way .

Gamma was termed as 'spare brain noise' until researchers discovered it was highly active when in the state of universal love, altruism, and the 'higher virtues'. It is also above the frequency of neuronal firing, that its generation remains a mystery. It is seen that gamma rhythms modulate perception and consciousness of a human and that a greater presence of it relates to expanded consciousness and spiritual emergence.

These are some kinds of brain waves that are generally generated from human brain . Image processing technique can be used to detect the facial expressions and retinal level of the eyes during

these kind of defects found inside our brain.

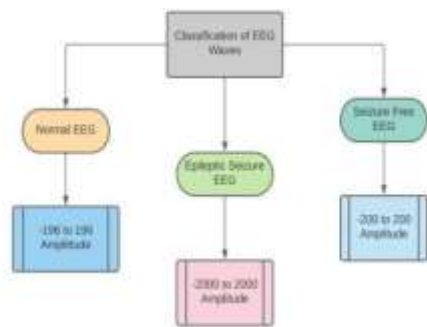


IMAGE PROCESSING TECHNIQUE

- Generally image processing in AI consists of several stages where the AI used to import, analysis, manipulation and output.
- The AI import an algorithms which plays a crucial role in capturing various images in the human body
- As a Developer we can import many algorithm such as image spectrum ,rapid screening process for faster detection and capturing of the images in our body.
- In AI Image Editing, graphic software tools are used for the quality of images which is captured by the machines
- In Image Restoration technique the AI produces a clean original image and tells the information about the image captured
- In Independent Component Analysis ,the captured images will be transmitted as signals to the machines.
- Anisotropic Diffusion in AI is used to remove important parts of the image which is necessary for printing the image.
- Linear Filtering in AI is used to transmit and receive the input and the output signals of the image captured to the machines.
- Pixilation in image processing is used to print the captured image patterns into a digitalized one where we can view the image in even in smartphones with clear quality
- These are all the methods used in image processing. Luckily brain can show its symptoms if there is any fault inside the neurons there will be at least a minor defects seen in the body and the facial expressions.

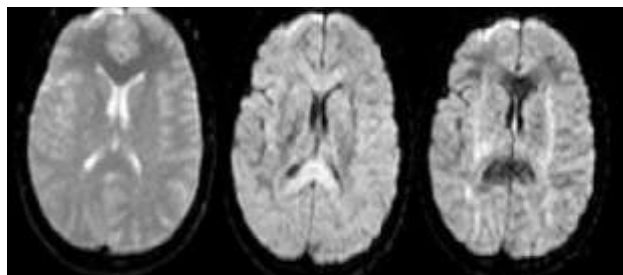
Algorithm for Detection of Brain Stroke:

AI algorithms for earlier detection of stroke is used to determine the type of stroke will speed treatment and improve outcome Brain images that have been pre-reviewed by artificial

intelligence software to identify a stroke. The software automatically sends an alert to the smartphone users with links to the imaging for diagnosis and treatment at a faster time .

Detection of stroke algorithms can be done using AI(Artificial Intelligence). The current maturity level of artificial intelligence technology can unlock numerous opportunities for stroke care, from uncovering the underlying risks to develop stroke in certain patient groups to alerting health specialists about suspicious abnormalities on medical scans According to Centers for Disease Control and Prevention (CDC), stroke puts a significant burden on the healthcare system. When it comes to stroke discharging of an individual is just the beginning of a journey for recovery.

Image of Stroke detection using image processing



What does a Healthcare can work for Stroke Patients?

The best possible way to prevent getting stroke, or, at least, accelerate time to diagnosis and thereby minimizing the brain damage. The patient may fully regain their mobility, self-care and social skills, progress sooner, or experience only a slight decline if they recovered soon from stroke.

Stroke can be preventable up to 80% of cases if the patients recognize and mitigate the risks in sooner time. However health risks related to a patient's habits and choices in nutrition, physical activity, and lifestyle can play a role .

Therefore, a patient tends to disregard their physician's prescription.

AI will attempt to throw abstractions away by analyzing retinal images, extracting their personal health risks, and making predictions based on both knowledge and algorithm. The researchers reported that the algorithms succeeded in predicting the chances of particular patients developing stroke or heart attack in a five-year period with a 70% accuracy.

How AI Can Detect and Predict Stroke

Detection of stroke and to determine the type of stroke will speed treatment and improve outcome Brain images that have

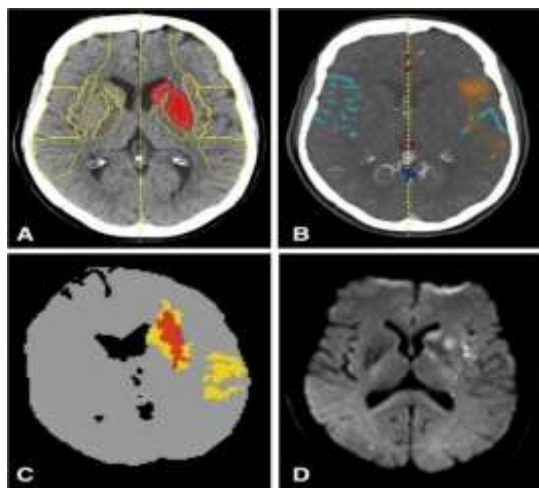
been pre-reviewed by artificial intelligence software to identify a stroke. This software automatically sends alert to the physician's smartphone with links to the imaging for a final human assessment in quick time for active recovery. With its increasing role in medical imaging, artificial intelligence (AI) can detect stroke detection algorithms The current maturity level of artificial intelligence technology can unlock numerous opportunities for stroke care, from hiding the underlying risks to develop stroke in certain groups of patients to alerting health specialists about suspicious abnormalities on medical scans. According to Centers for Disease Control and Prevention (CDC), stroke puts a significant burden on the healthcare system, being one of the leading causes of long-term disability and accounting for \$34 billion in costs per annual for care delivery, medications, and including

missed work days. A major part of expenditures related to stroke arises from a rehabilitation period. In acute conditions, discharge from the hospital means the patient has completely recovered. But in stroke, discharge is just the beginning of a journey towards recovery. The best possible way to prevent patients from having a stroke, or, at least, accelerate time-to-diagnosis and thus minimize the brain damage. If a stroke is cured immediately, the patient may fully regain their mobility, self-care and social skills, progress sooner, or experience only a slight decline. But an nil accuracy diagnosis may lead to dire consequences. Ischemic stroke is the common type of this condition, and it is usually treated using tissue plasminogen activator (tPA) to dissolve the blood clots and restore the blood flow to the brain. However, this medication can only be deadly to a patient with a hemorrhagic stroke as it will increase the internal bleeding. In turn, a hemorrhagic stroke may require surgical intervention to stop the bleeding. Deciding on the type of stroke can be challenging, but health specialists still need to figure it out quickly to save the patient's life and functionality.

Preventing Stroke, Rewinding Risks

Stroke can be prevented in up to 80% of cases if the patients recognize and mitigate the risks in due time. But most health risks are related to a patient's habits and choices in nutrition, physical activity, and lifestyle. Thereby, a patient might tend to disregard their physician's suggestions.

Computer Aided Image of AI of brain stroke



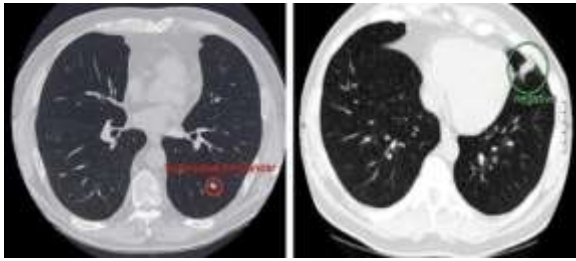
AI attempts to throw abstractions away and show the patients by analyzing retinal images, extracting their personal health risks, and making predictions based on the knowledge and the algorithm received. The researchers reported that algorithms succeeded in predicting the chances of particular patients developing stroke or heart attack in a five-year period with a 70% accuracy.

How AI can detect Lung Cancer:

AI can detect lung cancer with the algorithm of the subtle patterns of lungs by capturing the image patterns of the lung system. The need for early detection has fulfilled the development of AI systems that can detect several types of diseases which are caused by lungs, not only lung cancers even lung tumors can also be detected by image processing. With the help of image patterns of lungs the initial

screening process is important for identifying the disease . With the help of AI the captured image will be processed and transmitted as signals to the machines which will print the captured images of the lungs.

Image of a Lung which detects Cancer



Generally lung cancers are detected only where it is harder to treat and the survival rate is so low. We can detect lung cancers with image processing technique with the algorithm of the Initial symptoms by regular screening of capturing the images and identify with the help of symptoms and facial expressions of the person.

Imaging Processing Technique for Neuroscience Medical imaging in AI is the process of producing visible images of inner structures of the body by detecting the patterns of various images as well as a visible view of the interior tissues. This process pursues the disorder identification and management. When the AI captures the image pattern using fast processors it converts the energies arithmetically and logically to signals. Those signals later are converted to digital images. Those signals from the AI images represent the different types of tissues inside the body.

The AI patterned images play a necessary role on a daily basis. The processing refers to handling images by using image processing techniques.

An image processing technique is the usage of computer to manipulate the AI images. With the growth of different AI image capturing techniques, the images can be kept efficiently where this technique became quicker, inexpensive, and simpler

This allows living beings to organize and understand the many complex elements in their external environment.

How AI can Detect Eye imaging.:

AI system also captures the eye that transmutes light into neural signals and the related parts of the brain that process those signals and excerpt essential data. This system permits the light to cross the eye, allows narrows when exposed to a heavier light source, reduces the light to the retina and enhances the visual process.

A simple, noninvasive method for monitoring a subject's eye movements is done by a Video camera. The smallest eye movement that can be reliably detected is an resolution of the system. The hardware systems that are available estimates the direction of gaze in real time from a image of the pupil, such systems must have less image processing to attain real-time performance and are limited to a resolution of about 10 minutes. Two ways to improve resolution are given below

The first method is to improve the image processing algorithms that are used to derive an estimate. Analysis of

the data can improve resolution by at least one order of magnitude for images of the pupil in offline.

A second method by which to improve resolution is to increase the optical gain of the imaging setup . In Ophthalmoscopic imaging,retinal blood vessels provides additional optical gain and improved immunity to small head movements but requires a highly sensitive camera. The large no of images involved in a typical experiment imposes great demands on the storage handling and processing of data. A major problem has been the real-time digitization and storage of large amounts of video imagery, but recent developments in video compression hardware have made this problem solvable at reasonable cost. Images of both Retina and the pupil can be analyzed successfully using a basic toolbox of image-processing routines which are, for the most part, well suited to implementation on vectorizing supercomputers.

Conclusion

By uploading and implementing an exact database for the neurological problems these symptoms can be recognized by the techniques such as image processing and it can help to reduce the multiple scans. If there is a correct diagnosis made and the part of defect in the brain is found there is no need of multiple scans in the brain for diagnosis. The defects can be confirmed by the image processing technique itself. By using EEG detector the brain waves are compared with the normal brain waves and the facial expressions are compared with the person's normal facial expressions and conclusion can be made if the person's brain has been damaged.

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