

Brain fingerprinting for brain disordered patient and lie detection

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Abstract - : *The brain interfacing is very advance technique used which is determines if a person is lying or not on the basis of brain wave. similarly, the brain waves also determines what is going on in persons brain, this information is useful while dealing with brain disordered person. Main objective behind this is to gather information from patients brain. By using electroencephalography to ascertain the presence or absence of information into human brain.*

Key Words: *Brain finger printing ,Digital EEG , Brain Machine Interface(BMI), Brain Computer Interface(BCI), power spectral density.*

1.INTRODUCTION (Size 11 , cambria font)

Brain fingerprint is a computer based technology designed for determining the hidden information in individual person's brain by measuring brain waves. brain wave suggests the response of individual over a situation , words, phrases or images which are shown on computer screen. The objective of the brain computer interface is to map the brain signal of human being through using digital EEG [2]. Basically the incidents happened in our or patients or persons life has recorded / stored into mind. In this technique the mapped signals are determined which gives information about what is going on in persons brain . This could be possible by applying standard technique which is known as brain fingerprinting through digital electroencephalograph.[1]

Through this technique we can not only estimate response to visual or audio stimulus but also truth or lie. Basically this technology is based on the principle that the brain is central to all human acts. In case of a criminal act, human brain is engaged with executing and planning and recording crime time. The main difference between a truth or lie is that, if a person is telling lie the brain will be more actively act on hiding the lie and this are checked in terms of brain waves.

On the same track we can also estimate what is going on in brain disordered person if we ask such patient to work on the keyboard or gave a smart-phone over which he or she can scroll up or down on screen.

Researchers has found that when a person is typing or scrolling down on a smart-phones screen the data can be gathered from persons day to day activity.



fig.1 brain emitting waves

2.RELATED WORK

“Matching the happened incident at the crime scene with incidence in the brain” . When a person lies then a record is stored in the brain of the particular. Brain Fingerprinting provides an aim to scientifically connect facts from the situation where the person has lied with the incident that stored in brain. Brain Fingerprinting system measures electrical brain signal variations on computer / laptop screen regarding crime-investigation or even in case of brain disordered person. this works only when the things stored in the brain of patient or suspect matches the happened things from the situation[4]. Thus, the guilty can be identified and the innocent can be cleared in an accurate, scientific, objective, non-invasive, non-stressful. A memory and encoding related multifaceted electroencephalographic response is elicited when an individual recognizes and processes an incoming stimulus that is significant or noteworthy[4]. The procedure used is similar to the Guilty Knowledge Test; a sequences/ combination of words, sounds, or

pictures are presented via computer to the subject for a fraction of a second each. When an irrelevant stimulus is seen, it is insignificant and not noteworthy, and the electrode response is absent. The electrodes response occurs within a second after the stimulus presentation, and can be readily detected using EEG electrodes, amplifiers and a computerized signal-detection algorithm.

3.Experiment :

To detect the person who is having information and involving into any criminal cases activities, can be find out by seeing the Brain-Signal only. Digital Electroencephalography technique[8] is used for obtaining the brain signals..

Test is shown in given fig(3).

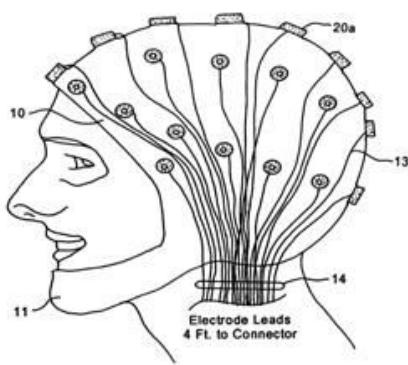


fig 3. electrodes connected on the scalp.

Brain Signal Types : There are mainly four types of waves as[9]:

1)Alpha wave: alpha waves are green colored wave. Its frequency range lies between 9 – 13 Hz. this occurs when a person is completely awake and are strongest over the occipital(back of the head) and the frontal cortex.

2)Beta wave: beta waves are blue colored wave. Its frequency range lies between 15-30 Hz. this is the fastest among all waves.

3)Theta wave: Theta wave are reddish colored wave. Its frequency range lies between 4 to 7.5 Hz and is considered as classed as slowest among all the waves. It plays an important role in infancy and childhood.

4)Delta wave: delta wave are gray colored wave. Its frequency range lies between 1 to 3 Hz (usually 0.1-3.5

Hz), this radiate when a person is deep sleep and reflect the unconscious mind. Delta waves are the lowest frequency EEG rhythms.

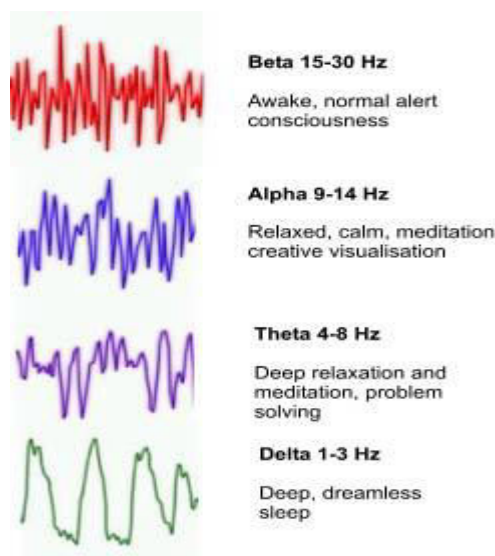


fig 4 : different types of brain waves.

But in brain fingerprinting a suspected subject is tested and by seeing only three type of brain signal we can detect the falsely accused persons[10].



fig.5 estimating from keyboard activity.

For the brain disordered person to work on something becomes difficult so by observing the rhythm in pressing key from keyboard. researcher has found that there is rhythm in persons typing and scrolling on a smartphone screen and this signal is after processing gives data that can be gathered from people's everyday activity. "This activity is measured in milliseconds response times, are predictive of a person's cognitive and emotional state," Dagum says.

similarly," how long people hold down each key, and how

long it takes them to move their fingers from one key to another. Data that can be harvested by looking at keystroke combinations provides a unique signature for an individual, "says CEO Jan Samzelius.

this is observed by doctors. if the person is healthy then the pace of typing determines the mental health of person. if the person is healthy then the typing time for the person is less as this is habitual process, but things get wrong when something happen to brain this pace of typing changes and the person has to think about each and every word or sometimes he unable to understand the keyboard in front of it. this information is gathered by both brain fingerprinting as well as monitoring typing.

4.APPLICATIONS:

1)security: To Identify terrorists , criminals and the terrorists which are accomplices prior to attack .this could be determined by whether specific information is present into the brain memory of the suspect.

2) Medical field :

a) Alzheimer's Disease : detects p300 brainwave, symptoms reversible through dietary and medicinal changes.

b)in the field of pharmacy : doctors can observe a patient to see to see effects of new treatment and medication on the patient.

Cons of Brain fingerprinting Tech : a) it is very Costly and available at high research specific Laboratories only.

c) used to solve important criminal cases only.

3. CONCLUSIONS

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