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A Survey on Brain Fingerprinting

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ABSTRACT:“Dangerous minds commit dangerous crimes”; to identify these sort of minds there is a technique constructed which will allow us to monitor all the details regarding the crime stored in the criminal’s mind. Every crime done or not done should leave some evidences, while the physical evidences can be eradicated or tampered but the evidences stored in criminal’s mind will remain in it. Brain Fingerprinting, is the name of technique by which we can access those evidences and identify the criminal. This technique can be implemented on criminal with the help of P300 MERMER and Electroencephalography technology to track the brain wave originated after seeing some information corresponding to the crime.

KEYWORDS: EEG(Electroencephalography),MERMER(Memory and Encoding Related Multifaceted Electroencephalographic Response).

I. INTRODUCTION

“Crime” is spreading like an arson and the present methodologies including lie detector ,polygraph test, for identifying the veracity of wrongful doesn’t contribute to the adequate result to the crime investigation department. In present world ,due to uprise of technology a new strategy has been incorporated which will connect the brain waves originated by the suspect’s mind to the computer with the help of P300 or P300 MERMER technique and the recognition of this brain waves will help the crime investigation department to differentiate between the flawed and the impeccable. This process of connecting brain waves to the system is known as **Brain Fingerprinting** .This technique was introduced by **Lawrence A. Farwell** (a former researcher at Harvard University) in **1995** .And this technique is based on the principle that brain is locus of all human deeds, consequently we can identify the criminal with the help of information entrenched in his cerebrum.In this technique ,a series of words ,images, audios or any other validations collected by the investigator will be presented in front of the suspect and we know these evidences were bred-in-the-bone of his mind, thus if the person has committed a felony ,accordingly his brain will produce a different waveform as compared to the waves generated by the impeccable person’s mind and it would have been easy in identifying the criminal for the investigator. **Brain fingerprinting** has been proven 100% accurate in over 120 tests, including tests on FBI agents, US intelligence agency, US Navy, and tests on real-life situations including actual felony. This method can be applied only when the investigator have sufficient and specific information regarding the felony which would only be identified by the offender.

II.P300 MERMER

P300 MERMER(Memory and Encoding Related Multifaceted Electroencephalographic Response) .It is an advanced version of P300 which contains additional features which will contribute to more accurate results moreover, the difference between P300 and P300 MERMER is that **P300** takes 300ms for response and it doesn’t include the negative component of the brain and **P300 MERMER** takes 1400 ms as a response time and we are also considering the negative component of the brain waves . P300 MERMER is an event related potential that will respond to the stimuli generated by brain. It uses electroencephalography for determining the brain response. Electroencephalography is a technique which will measure the electrical activity from different parts of brain and will show its recording as a visual trace on a paper or on an oscilloscope screen.

III.ELECTROENCEPHALOGRAPHY

An EEG amplifier system is used in this technique which contains electrodes that pick up signals produced by electrical discharge of neurons in the related area of brain .EEG is combination of chips and algorithm in which chips are used to

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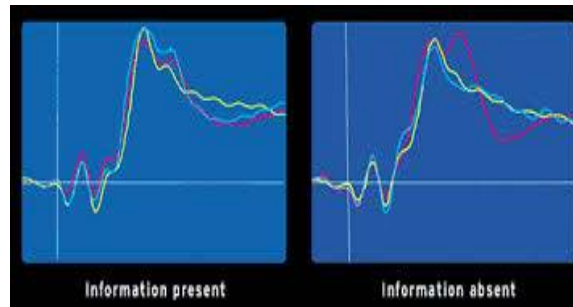


Fig: Waves desc. of “guilty “ and “non-guilty”(http://ieeexplore.ieee.org/document/1203074/)

These are the evidences that are shown to the accused ,the targeted are the ones which are relevant to the crime and expected to be known by the criminal, the irrelevant stimulus are the one which have no connection with the crime and the probe stimuli is the one which are relevant to the crime but the subject denies knowing it .After showing these stimulus the result will be generated in the form of a graph consisting of three colored waves red ,green and blue. If the generated probe wave is similar to that of the irrelevant one then the suspect is found “not guilty” and if the waveform of probe is similar to the relevant stimuli then the suspect is found “guilty”.

V. EXPERIMENTAL RESULTS

According to previous observations Brain Fingerprinting has assisted us, very much in order to identify accused. Dr. Farwell was once asked by Missouri Sheriff Robert Dawson at Macon County to conduct a Brain Fingerprinting test on murder suspect JB Grinder who is accused of murdering Julie Helton .It has been proven that the information stored in his brain matches with the information collected at the place where Julie Helton was murdered and later on JB Grinder confessed the murder of Julie Helton and three other women.

Advantages

1. Identification of criminal is more quick and scientific.
2. Record of 100% accuracy.
3. Reduce evasion of justice .
4. Access to criminal evidences in the brain.
5. Human rights oriented.
6. Reduce expenditure of money and other resources in law enforcement.
- 7.

Disadvantages

1. Process is somewhat Expensive.
2. The process has Limited scope over certain areas.
3. It works on what information stored in the subject’s brain but it doesn’t give any clue regarding how it goes there.

Applications

1: To forestall national threats : In any terrorist act the brain of the terrorist(accused) is always in there planning, executing and recording the crime, thus, there might be chances that specific evidences may or may not be find at the crime scene so with the help of brain fingerprinting using the information collected by the investigator and the information stored in accuser's mind it becomes easier to identify the terrorist and the planners of the terrorist attack.

2:Criminal justice: It has been proven that Brain Fingerprinting test is accurate in 99.9% test so it will be easier to find out the criminal and do justice with the victim.

3:Medical field: In case of Alzheimer’s patients , it is helpful to check their progress report while treatment with the help of Brain Fingerprinting.



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VI. CONCLUSION

Brain fingerprinting has perceived as one of the best techniques which will help us to identify the accused with almost 100% accuracy. It is better than other available techniques like polygraph test ,lie detector and fingerprinting test. As in these tests the chances of getting pure evidence is 1% which is not in the case with Brain Fingerprinting because brain doesn't need any command to take note of all details on crime scene as done by accused, it does that automatically. Apart from criminal investigation brain fingerprinting has applications in other fields too.

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