Brain Fingerprinting

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Abstract:- **Brain Fingerprinting is 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 computer screen.**
Brain fingerprinting technology is based on finding that the brain generates a unique brain wave pattern when a person encounters a familiar stimulus. Us upward functional magnetic resonance imaging in lie detection derives from studies suggesting that persons asked to lie show different patterns of brain activity than they do when being truthful. Issues related to the use of such evidence in courts are discussed. It concludes that neither approach is currently supported by enough data regarding its accuracy in detecting deception to warrant use in court. In the field of criminology, anew lie detector has been developed in the United States of America. This is called "brain fingerprinting". This invention is supposed to be the best lie detector available as on date and is said to detect even smooth criminals who pass the polygraph test (the conventional lie detector test) with satisfaction. The new method employs brainwaves, which are useful in detecting whether the person subjected to the test, remembers finer details of the crime. Even if the person willingly suppresses the necessary information, the brain wave issuer to trap him. 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 felony crimes:

Keywords: What is brain fingerprinting? , Technique, Four phases of Farwell Brain Fingerprinting, Applications, Comparison with other technologies.

I.INTRODUCTION

Brain fingerprinting is a controversial technique that is advocated as a way to identify a terrorist or other dangerous person by measuring the "brain print" of that person when shown a particular body of writing or an image that was previously familiar (such as of a training camp or manual). The brain print is based on the P300 complex, a series of well-known brainwave components that can be measured. The technique is said to be more effective than a lie detector test. The inventor of the technique, Dr. Lawrence Farwell, has used the technique in at least one court case to determine the innocence of a man convicted of murder and the guilt of his accuser. Farwell showed each person pictures of the crime scene and measured their brainwave responses to determine which person had seen the crime scene before. Claiming that the test is 99.99% infallible, Farwell's test convinced the court to free the convicted person. The real perpetrator pleaded guilty. In the test, the subject is fitted with a patented headband equipped with sensors and shown a series of relevant words or pictures on a computer screen. When the brain recognizes something familiar, the brain elicits a wavelike response known as a MERMER (memory and encoding-related multifaceted electroencephalographic response). The MERMER in turn contains the brain response known as a P300. The test can be done in as little as 10 minutes. As a counter-terrorist measure at airports or other places, the technique, if mandated, could be challenged as a possible invasion of privacy. Critics also question whether brain fingerprinting could be administered efficiently and without a considerable number of false readings. They also ask how it could be used to screen for terrorists who had not been exposed to the words or pictures being shown.

II 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 detail of the event of 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.

III.TECHNIQUE

the technique uses the well-known fact that an electrical signal known as P300 is emitted from an individual's brain beginning approximately 300 milliseconds after it is confronted with a stimulus of special significance, e.g. a rare vs. a common stimulus or a stimulus the subject is asked to count. The application of this in brain fingerprinting is to detect the P300 as a response to stimuli related to the crime or other investigated situation, e.g., a murder weapon, victim's face, or knowledge of the internal workings of a terrorist cell. Because it is based on EEG signals, the system does not require the subject to issue verbal responses to questions or stimuli.

The person to be tested wears a special headband with electronic sensors that measure the EEG from several locations on the scalp. The subject views stimuli consisting of words, phrases, or pictures presented on a computer screen. Stimuli are of three types:

Irrelevant

: Stimuli that is irrelevant to the investigated situation and to the test subject.

Target

: Stimuli that are relevant to the investigated situation and are known to the subject.

Probe

: Stimuli that are relevant to the investigated situation and that the subject denies knowing. Probes contain information that is known only to the perpetrator and investigators and not to the general public or to an innocent suspect who was not at the scene of the crime. Before the test, the scientist identifies the targets to the subject, and makes sure that he/she knows these relevant stimuli. The scientist also makes sure that the subject does not know the probes for any reason unrelated to the crime, and that the subject denies knowing the probes. The subject is told why the probes are significant (e.g., "You will see several items, one of which is the murder weapon"), but is not told which items are the probes and which are irrelevant.

IV 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:

A. Brain Fingerprinting Crime Scene Evidence Collection
B. Brain Fingerprinting Brain Evidence Collection
C. Brain Fingerprinting Computer Evidence Analysis
D. 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 matches evidence stored in the brain of the suspect. 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.

V APPLICATIONS OF BRAIN FINGER PRINTING

A.COUNTER TERRORISM

Brain fingerprinting can help address the following critical elements in the fight against terrorism
A. Aid in determining who has participated in terrorist acts, directly or indirectly.
B. Aid in identifying trained terrorists with the potential to commit future terrorist acts, even if they are in a “sleeper” cell and have not been active for years.
C. Help to identify people who have knowledge or training in banking, finance or communications and who are associated with terrorist teams and acts.
D. Help to determine if an individual is in a leadership role within a terrorist organization.
Brain fingerprinting technology is based on the principle that the brain is central to all human acts. In a terrorist act, there may or may not be peripheral evidence such as fingerprints or DNA, but the brain of the perpetrator is always there, planning, executing, and recording the crime. The terrorist has knowledge of organizations, training and plans that an innocent person does not have. Until the invention of Brain Fingerprinting testing, there was no scientific way to detect this fundamental difference. Brain Fingerprinting testing provides an accurate, economical and timely solution to the central problem in

the fight against terrorism. It is now possible to determine scientifically whether or not a person has terrorist training and knowledge of

B.*Terroristactivities.*

With the Brain Fingerprinting system, a significant scientific breakthrough has now become a practical applied technology. A new era in security and intelligence gathering has begun. Now, terrorists and those supporting terrorism can be identified quickly and accurately. No longer should any terrorist be able to evade justice for lack of evidence. And there is no reason why an innocent individual should be falsely imprisoned or convicted of terrorist activity. A Brain Fingerprinting test can determine with an extremely high degree of accuracy those who are involved with terrorist activity and those who are not.

C.Criminaljustice

a critical task of the criminal justice system is to determine who has committed a crime. The key difference between a guilty party and an innocent suspect is that the perpetrator of the crime has a record of the crime stored in their brain, and the innocent suspect does not. Until the invention of Brain Fingerprinting testing, there was no scientifically valid way to detect this fundamental difference. Brain Fingerprinting testing does not prove guilt or innocence. That is the role of a judge and jury. This exciting technology gives the judge and jury new, scientifically valid evidence to help them arrive at their decision. DNA evidence and fingerprints are available in only about 1% of major crimes. It is estimated that Brain Fingerprinting testing will apply in approximately 60 to 70% of these major crimes. The impacts on the criminal justice system will be profound. The potential now exists to significantly improve the speed and accuracy of the entire system, from investigations to parole hearings. Brain Fingerprinting testing will be able to dramatically reduce the costs associated with investigating and prosecuting innocent people and allow law enforcement professionals to concentrate on suspects who have verifiable, detailed knowledge of the crimes.

D.Medical

'Brain Fingerprinting' is the patented technology that can measure objectively, for the first time, how memory and cognitive functioning of Alzheimer sufferers are affected by medications. First generation tests have proven to be more accurate than other routinely used tests, and could be commercially available in 18-24 months. The 30 minute test involves wearing a headband with built-in electrodes; technicians then present words, phrases and images that are both known and unknown to the patient to determine whether information that should be in the brain is still there. When presented with familiar information, the brain responds by producing MERMERs, specific increases in neuron activity. The technician can use this response to measure how quickly information is disappearing from the brain and whether the drugs they are taking are slowing down the process.

VI. ADDITIONAL APPLICATIONS

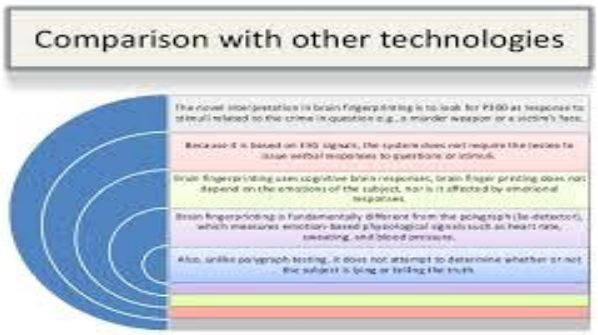
In advertising, Brain Fingerprinting Laboratories will offer significant advances in measuring campaign and media effectiveness. Most advertising programs today are evaluated subjectively using focus groups. We will be able to offer significantly more advanced, scientific methods to help determine the effectiveness of campaigns and be very cost competitive with current methodologies. This technology will be able to help determine what information is actually retained in memory by individuals. For example, in a branding campaign do people remember the brand, the product, etc. and how do the results vary with demographics? We will also be able to measure the comparative effectiveness of multiple media types. In the insurance industry, Brain Fingerprinting Laboratories will be able to help reduce the incidence of insurance fraud by determining if an individual has knowledge of fraudulent or criminal acts. The same type of testing can help to determine if an individual has specific knowledge related to computer crimes where there is typically no witness or physical evidence. Casestudies

the biggest breakthrough, according to Farwell, was its role in freeing convicted murderer Terry Harrington, who had been serving a life sentence in Iowa State Penitentiary for killing a night watchman in 1977. In 2001, Harrington requested a new trial on several grounds, including conflicting testimony in the original trial. Farwell was faced with an immediate and obvious problem: 24 years had passed since the trial. Evidence had been presented and transcripts published long ago; the details of the crime had long since come to light. What memories of the crime were left to probe? But Farwell combed the transcripts and came up with obscure details about which to test Harrington. Harrington was granted a new trial when it was discovered that some of the original police reports in the case had been missing at his initial trial. By 2001, however, most of the witnesses against Harrington had either died or had been discredited. Finally, when a key witness heard that Harrington had "passed" his brain fingerprinting test, he recanted his testimony and the prosecution threw up its hands. Harrington was set free. In Macon County, Mo., Sheriff Robert Dawson learned about the method from his secretary, who had also seen it featured on television. In 1999, Dawson ordered a test on J.

B. Grinder, accused of raping and murdering a 25-year-old woman. Grinder had admitted and denied the allegations so many times that, according to Dawson, "We didn't know what to believe anymore." Confronted with the test results, which seemed to confirm one of Grinder's many confessions, Grinder pled guilty to the charges and also admitted to killing three other girls in Arkansas. When another murder investigation ran into problems earlier this year, Dawson turned again to brain fingerprinting. He refrained from discussing the details of the case with the suspect and with the media so that the P300 probes would be valid. While the suspect denied knowing anything about the case, Farwell's test suggested otherwise.

VII COMPARISON WITH OTHER TECHNOLOGIES

Conventional fingerprinting and DNA match physical evidence from a crime scene with evidence on the person of the perpetrator. Similarly, Brain Fingerprinting matches informational evidence from the crime scene with evidence stored in the brain. Fingerprints and DNA are available in only 1% of crimes. The brain is always there, planning, executing, and recording the suspect's actions. Brain Fingerprinting has nothing to do with lie detection. Rather, it is a scientific way to determine if someone has committed a specific crime or other act. No questions are asked and no answers are given during Farwell Brain Fingerprinting. As with DNA and fingerprints, the results are the same whether the person has lied or told the truth at any time



VII CONCLUSION

Brain Fingerprinting is a revolutionary new scientific technology for solving crimes, identifying perpetrators, and exonerating innocent suspects, with a record of 100%accuracy in research with US government agencies, actual criminal cases, and other applications. The technology fulfills an urgent need for governments, law enforcement agencies, corporations, investigators, crime victims, and falsely accused innocent suspects.

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