"TO STUDY OF BRAIN FINGERPRINTING TECHNOLOGY AND ITS APPLICATION"

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ABSTRACT: *Brain fingerprinting is based on finding that the brain generates a unique brain wave pattern when a person encounters a familiar stimulus Use of 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. The author 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, a new 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 ease. The new method employs brain waves, 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 is sure to trap him, according to the experts, who are very excited about the new kid on the block.*

Keywords: criminology, autonomic arousal, electroencephalography, brain wave, palm sweating

1. INTRODUCTION

Brain Fingerprinting is an investigative technique that measures recognition of familiar stimuli by measuring electrical brain wave responses to words, phrases, or pictures that are presented on a computer screen. Brain fingerprinting was invented by Lawrence Farwell. The theory is that the suspect's reaction to the details of an event or activity will reflect if the suspected prior knowledge developed, proven, and patented the technique of Farwell Brain Fingerprinting, 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 a computer screen. Farwell 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 actual crimes

A. 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 relies 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.

2. TECHNIQUE

The person to be tested wears a special headband with electronic sensors that measure the electroencephalography from several locations on the scalp. In order to calibrate the brain fingerprinting system, the tested is presented with a series of irrelevant stimuli, words, and pictures, and a series of relevant stimuli, words, and pictures. The test subject's brain response to these two different types of stimuli allow the tester to determine if the measured brain responses to test stimuli, called probes, are more similar to the relevant or irrelevant responses. The technique uses the well known fact that an electrical signal known as P300 is emitted from an individual's brain 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 pro band is asked to count. The novel interpretation in brain fingerprinting is to look for P300 as response to stimuli related to the crime in question e.g., a murder weapon or a victim's face. Because it is based on EEG signals, the system does not require the test to issue verbal responses to questions or stimuli. Brain fingerprinting uses cognitive brain responses; brain finger printing does not depend on the emotions of the subject, nor is it affected by emotional responses. Brain fingerprinting is fundamentally different from the polygraph (lie-detector), which measures

emotion-based physiological signals such as heart rate, sweating, and blood pressure. Also, unlike polygraph testing, it does not attempt to determine whether or not the subject is lying or telling the truth.

3. HOW DOES IT WORK?

When a crime is committed, a record is stored in the brain of the perpetrator. Relevant words, pictures or sounds are presented to a subject by a computer in a series with stimulation. The brainwave responses are measured using a patented headband equipped with EEG sensors. P300- specific, measurable brain response emitted by the brain of a subject who has the relevant information stored in his brain is collected!

4. SCIENTIFIC PROCEDURE

Brain Fingerprinting incorporates the following procedure: A sequence of words or pictures is presented on a video monitor under computer control. Each stimulus appears for a fraction of a second. Three types of stimuli are presented: "targets," "irrelevant," and "probes." The targets are made relevant and note worthy to all subjects: the subject is given a list of the target stimuli and instructed to press a particular button in response to targets, and to press another button in response to all other stimuli. Since the targets are noteworthy for the subject, they elicit a MERMER. Most of the non-target stimuli are irrelevant, having no relation to the crime. These irrelevant do not elicit a MERMER. Some of the non target stimuli are relevant to the crime or situation under investigation. These relevant stimuli are referred to as probes. For a subject who has committed the crime, the probes are noteworthy due to his knowledge of the details of the crime, and therefore probes elicit a brain MERMER. For an innocent subject lacking this detailed knowledge of the crime, the probes are indistinguishable from their relevant stimuli. For such a subject, the probes are not noteworthy, and thus probes do not elicit a MERMER.

5. COMPUTER CONTROLLED

The entire Brain Fingerprinting System is under computer control, including presentation of the stimuli and recording of electrical brain activity, as well as a mathematical data analysis algorithm that Compares the responses to the three types of stimuli and produces a determination of "information present" ("guilty") or "information absent" ("innocent"), and a statistical confidence level for this determination. At no time during the testing and data analysis do any biases and interpretations of a system expert affect the stimulus presentation or brain responses.
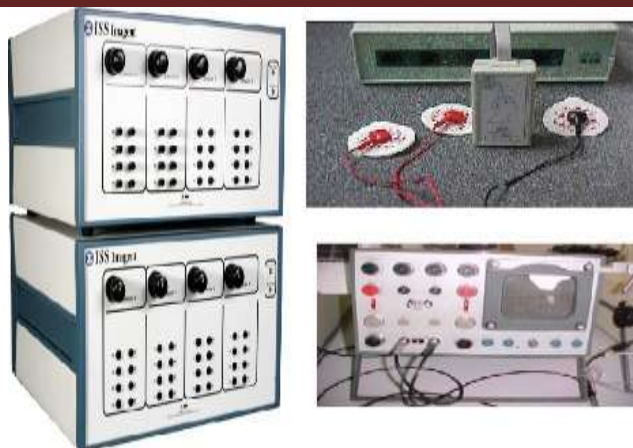
The Devices Used In Brain Fingerprinting

Figure 1: Device used in Brain Fingerprinting

Using Brain Waves to Detect Guilt how it works
A Suspect is tested by looking at three
Kinds of information represented by
Different colored lines:
-----Red: information the suspect is expected to know
-----Green: information not known to suspect
-----Blue: information of the crime that only perpetrator
Would know.

Figure 2: Colored lines

Not Guilty

Because the blue and green. Lines closely correlate, suspect does not have critical knowledge of the crime Guilty: because the blue and red Lines closely correlate, and suspect has critical knowledge of the crime

6. 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.

7. APPLICATIONS

A. Advertising Applications

How do we know what information people retain from a media campaign? There is a new technology that allows us to measure scientifically if specific information, like a product brand, is retained in a person's memory. Brain Fingerprinting testing adds a whole new dimension to the methods of measuring advertising effectiveness, going well beyond subjective surveys and focus groups. The implications for the advertising Industry are very exciting!

B. Counter Terrorism

Brain fingerprinting can help address the following critical elements in the fight against terrorism:

1. Aid in determining who has participated in terrorist acts, directly or indirectly.
2. 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.
3. Help to identify people who have knowledge or training in banking, finance or communications and who are associated with terrorist teams and acts.
4. 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 terrorist activities. 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. Medical Applications

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 Involve swearing a headband with built-in electrodes;

technicians then present words, phrases and images that are both

Figure 3: Medical Treatment

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.

8. 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.

9. ADVANTAGES

It is fundamentally different from polygraph test; it doesn't need any verbal response. This technology can be applied only in places where the investigators have sufficient amount of specific information about an event or activity Admissibility in court: The following established features of Brain fingerprinting will be relevant when the question of admissibility is tested in court. Brain fingerprinting has been thoroughly and scientifically tested. The rate of error is extremely low. The theory and practice of brain fingerprinting have gained general acceptance in the relevant scientific community. Accuracy 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 situation including actual crimes.

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