

Analyzing Mind Tendencies using Brainwaves

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Abstract— We are making use of measured data through EEG device to find one's attributes and tendencies, to maintain him/her in a certain state of mind for a specific type of functioning and to find his/her mind's response to various situations/acts. The paper presents how to control brainwaves and examining cerebrum information for doing some usable things in regular day to day existence. Mind information is gathered by a headset with terminals and some EEG hardware.

Keywords—EEG, brainwaves, cerebrum information.

I. INTRODUCTION

Everyone is unique in their abilities and skills. It will be unfair to put someone in any type of work without understanding the nature of his/her mind. Finding one's potential & capabilities and putting them in relevant field will make them find fullest expression of their skills and knowledge. Mind is basically a set of subjective faculties which includes consciousness, imagination, perception, judgment, language and memory which resides in the brain as well sometimes in central nervous system. In this age, machines are more trusted than human beings in many areas. Machines are much more fast, accurate and capable than human abilities. Observing one's behavior and analyzing mind is very complicated, time taking process; there are so many chances of errors. Instead, aptitude tests are developed. Along with entrance tests, aptitude tests are also considered as eligibility criteria for almost all major universities, jobs and businesses. There may occur a difference between one's certified documents and real-life abilities, that is why finding mind's qualities are important. The technique which we are introducing will be used for same purpose as aptitude tests, but it will overcome the limitations. The approach will be different and the same technique can be also used for other purpose.

II. OBJECTIVE

A. Method of data collection:

Current aptitude test involves various types of question sets like numeric, verbal, diagrammatic, situational judgement, cognitive ability and so on.

Where this system includes various real-life situations like playing musical instrument, reading book, mathematical question solving, public speaking etc.

B. Practical approach:

Aptitude test uses set of questions to find one's qualities. Based upon the qualities it can predict how the mind will respond in particular situation. This system will work in reverse manner; it will measure the responses of mind in various real-life situations, and based on that responses it will find the qualities.

C. Less error factors:

There are less error factors than aptitude test. Once the person gets completely adapted with the device and functions naturally during the test, there are comparatively less chances of error.

Before the test, it must be ensured that the person is totally adapted with the brainwaves sensing device, if he/she feel nervousness and do not function naturally during the test, it may distort the readings and cause false reports.

III. PROCEDURE

- EEG device is a major component here. There is continuous communication between neurons lies at the root of all our thoughts, emotions and experiences. Brainwaves are generated by electric impulses from neurons when they are communicating. We will be placing the EEG device to at participants' head.

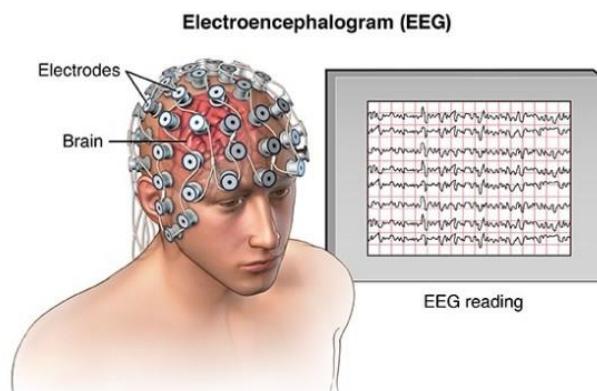


Fig. 1 EEG Device

- Participants will be sent to various situations like public speaking, reading, writing, problem solving, listening etc. to find how their mind responds and behaves in situations.
- Measured waves will be classified in 5 categories. That is Delta (0.5 to 4 Hz), Theta (4 to 8 Hz), Alpha (8 to 13 Hz), Beta (13 to 32 Hz) and Gamma waves (greater than 32 Hz) for further analysis.
- For every situation, mind will respond in one of the given categories above. All the collected data will be analysed to find the participants' aptitude.

IV. FREQUENCIES

First we need to understand that brainwaves are not cause but consequences of cerebral activity of human brain. These are generated when neurons pass electric impulses to each other.

A. Delta:

These are the slowest waves among all. It is generated when our experiencing intensity is least. Increase in delta waves decreases consciousness. It is important for healing and rejuvenation.

B. Theta:

These waves are produced when we have dropped the sense of outer world. It comes from imagination, intuition, memory and also feelings like fears, irritating thoughts. It is a sign of learning state.

C. Alpha:

It is a sign of alertness, ease and calm. Enough amount of these waves' signs good mental health. We can easily shift task when we are in this state. When we are consciously and effortlessly doing some or we are in state of relaxation then we are producing alpha waves.

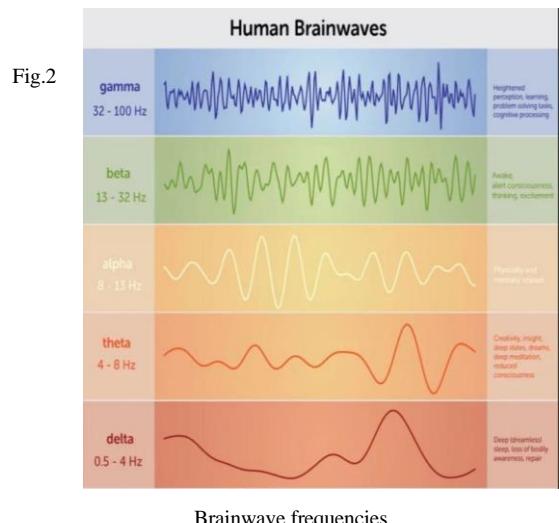
D. Beta:

It is a sign of signifies fast activity of brain. Like if we are doing some analytical task, critical thinking, creative problem solving. Beta waves are further divided as low beta, medium beta, high beta. When

we are focused but not stressed, involved but not entangled, we produce low beta. When our sense of alertness is very high, like walking in dark room, we produce medium beta waves. When we are in a complex thoughts, great excitement or anxiety then we produce high beta waves.

E. Gamma:

Fastest waves are gamma waves. These are found in all parts of brain. Gamma waves are produced when brain is doing multi-processing.



Brainwave frequencies

V. TEST

Currently we are finding few abilities. Participants have to go through various situations which we are listed out. Output of the test like what participant write, speak, decides, solves does not matter. But how his/her mind functions is important.

A. Communication:

This includes writing essay on various topics, speaking dynamically on given topics.

B. Logical Thinking:

This includes Puzzles solving, treasure hunt in which one has to think in a logical way. Even in tricky situations we need logical thinking.

C. Geometric Perception:

Rubik's cube, drawing 3D objects (freehand) we use geometric perception. In crafting also, we use geometric perception.

D. Numeric:

We need numeric ability during Multiplication, profit loss situation and while solving Sudoku.

E. Grasping ability:

Introducing into completely new concept grasping ability is important. Understanding a concept in distorted chronology, we need grasping power.

F. Decision Making:

While playing Trump Cards, UNO decision making is important. In Specific driving situation or in critical situation we have make decision within fraction of time. Sports also includes dynamic decision ability.

G. Multitasking:

While driving one has to give attention on many things like on steering, gears, clutch, road judgment, maps at same instance.

V. CASE STUDY

Consider the case study of measuring communication ability. Participant is has given a topic to write essay in a specific given time. What and how participant is writing the essay is not considered. Types of brainwaves produced will differ by participant to participant. Depending upon what frequency is produced, we will find participant's communication ability. The meaning of every bandwidth for this case is given below.

A. Theta:

If participant is producing theta waves while writing, he/she is involved in doing task. Performance is good enough but he/she is finding difficulty also. Participant have fair communication skills.

B. Alpha:

If participant is producing alpha waves, it means he/she is doing this task effortlessly. Focused but also relaxed. Participant is having good communication skills.

C. Beta:

Participant producing beta waves while writing means he/she is finding difficulty to do it. He/She is getting distracted or feeling anxiety. It means participant is having bad communication skills.

CONCLUSION

Reading actual behavior in real life situations will provide more accurate results than traditional computerized static question-answer based aptitude tests. Sets of questions are replaced by sets of real-life situations. We still have to work a lot on finding appropriate situations for various faculties of mind. This test is much more time taking as it includes real life situations. It should be also ensured that the participant is completely adapted with the device and not feeling any nervousness initially. Otherwise results may get distorted.

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