

# Spine to Brain Communication and Reverse Engineering for Sensing the Neuron's Command Generation using E-Frequency Modulation Graph Signals

Raginee Tripathi

Dept of CS/IT, Sharda Mahavidhyalaya, Sarlanagar, Maihar, MP, India

Corresponding author: Raginee Tripathi, Email: raginee\_tripathi@rediffmail.com

Brain-computer interface (BCI) is a very interesting and active research domain of computer science & and electronics for real-world innovations regarding human behavior patterns. To present an innovative hypothesis regarding human brain reverse engineering using electromagnetic electronics and a digital device development scheme for reforming the thought process of human behavior and intra-communication mechanisms. This paper will be a novel staircase to Brain Computer Reverse Engineering; Brain is a highly fertile area for the production of ideas that create a thinking direction. Various ideas generated in the human brain, which shows the creativity or destructivity, or behavior about the thinking direction treated as medical physics for the innovation. Ideas generated in the human brain and thought process directions are the main sources of human behavior either for intra-communication or for intercommunication. Firstly, it proposes a theoretical framework for an intra-communication mechanism, which would be suppose for future implementation and will prove scientific hypothesis.

**Keywords:** Brain-Computer Interface (BCI), Magnetic Resonance Imaging (MRI), Electronic Brain Wash (EBW), Electro Cardiac Graphics (ECG), Brain-Computer Reverse Engineering (BCRE), Electroencephalogram (EEG).

## **1 Introduction**

According to Emeritus Scientist NIH, Dr. Story Landis a brain is the most complicated organ of the human body and the most complicated calculating machine that we all are familiar with the working scenario. Ideas produced by the human brain play the role of a seed for human behavior. If the re-engineering of these ideas and thought process direction is possible shortly, it will be very helpful to control crime in our society with the help of EME (Electro- Magnetic Electronics) digital devices. Every living object that has a brain, can work properly and systematically. Without a brain any living object cannot think properly, i.e. the working of the living object must be improper and uncontrollable without a brain. Thus, we can say the brain is the control station of the living body. Human, animal, mammal, bird, or other brain-holding living bodies working is under control. The working of such a body controlled externally and self can handle many properties that are more natural. In this research paper, we are presenting a hypothesis and its little bit of introductory phase of innovation regarding an EME device that can affect a living brain and can change the level and direction of human thinking means can communicate with human brain..

Every person who is aware of computers also knows that a computer's working is similar to the human brain. It is just a copy of the human brain lacking in emotions and feelings. Scientists and researchers are trying to develop such a type of digital machine that have thinking process, emotions, and feeling. The human brain can control this type of device but such type of electronic device cannot control the human brain.

Electrical vibrations can repair the human brain. Mechanical devices can take over the human brain. Electronic machines can record human thinking and identify the accuracy of speaking. But the copy of the human brain can control the brain in the same way as our thinking process is diverted using different types of mirrors. This presented hypothesis "how a brain can be re-engineered and molded using the power of computation. It means, shortly a machine will train to human brain according to social needs and will control to thought process of the human brain that will be governed by an EME device.

An awareness about the brain; is that a mature human head works like a container of the brain that is incorporated by five sense organs for introducing exterior data as input to the brain. For Brain computability, these five inputs need to work properly and coordinate with each other. Disorder among sensory organs of a living object creates improper working of that object. To notice the movement of highly alcoholic humans, the activity of burning patients, wounded hoarse movement, fish in troubled water, or many more living body's activities and found that due to disorder or improper input to the brain affects the working of living objects. Very recently, we study about that the result of the latest colorful MRI (Magnetic Resonance Imaging) of the human brain shows the creativity of human and produce the output according to the brain's thinking direction.

In the human brain thought, process is never a never-ending process that runs up to infinity. Only the direction of the thought process of any human body develops the nature and behavior of humans that decide the decisive power and activity done by the human. The human brain is a governing and ruling organ that has full rights to control the behavior of humans. Jellinger et.al. [15] Behavioral deficits in neurodegenerative diseases are credited by the selective dysfunction of defenseless neurons via cell-autonomous mechanisms that presenting a chain of thought production and relationship for human behavior. Britton JW et.al [6] explained Electroencephalography for various aged brain functioning from child to old age.

Humans have two types of intravascular communication systems one is the nervous system and other is the endocrine system. The coordination of both the system regulates body processes using chemical and electrical signals pass between cells. Scientists categorize the nervous system into two main sub-systems: the central nervous system (CNS) and the peripheral nervous system (PNS). One sub-system is the central nervous system is made of the Brain and Spine and the other one is the peripheral nervous system made with a Complex Network of Nerves. The nervous system is made up with the usages of

tiny cells called neurons (NEW-ronz) for sending and receiving messages back and forth from the brain, through the spinal cord, through the nerves of whole human body. Billions of neuron work together to create a communication network throughout the human body. Different kinds of neurons have different kinds of jobs to perform for efficient and effective intravascular communication. Sensory neurons send information from sensory organs (eyes, ears, nose, tongue, and skin) to the human brain while Motor neurons play the responsibility to carry command from the brain to the human body to instruct muscles to move. These neural connections build up the systematic mechanism by which a thought process executes for thinking, learning, moving, and feeling. The major brain sections responsible to communicate with body parts shown in figure [1]

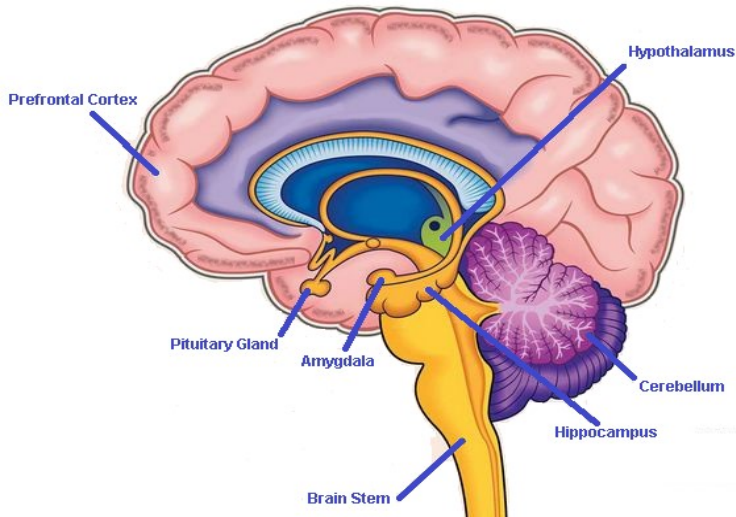


Figure 1. Physiological Composition of Human Brain

As per [16], the Physical composition and measures of the human brain are as shown in Table 1.

Table 1. Measures of Human Brain for Physical Composition

S.No.	Attributes	Value
1.	Weight	3 pounds
2.	Width	140 mm
3.	Length	167 mm
4.	Height	93 mm
5.	FAT	60%
6.	Water	73% of head weight
7.	Proteins	20%
8.	Glucose	145 grams

## 2 Hypothesis

According to NIH published article “HOW DOES HUMAN BRAIN COMMUNICATE WITH BODY PARTS?” electricity is the flow of charged ions moving across the surface layer of a cell membrane [3]. The movement of ions carries electrical wavy patterns along the length of a neuron. The longer

projection of the neuron called the axon is the main part that sends signals from one cell to another. These antennas like structures are respondents and carriers of electrochemical signaling. Every neuron has tree-like branches that receive signals are called dendrites. The cell membrane contains gated protein channels that open and close allowing ions to enter or leave the cell, known as permeability. When a channel opens, ions flood into the cell to carry electrical charge. Similarly, the next channel opens, and then the next, such that the electrical wave moves along the cell. On the other hand, a different channel opens more slowly allowing the ions to leave the cell as an electrochemical signal shown in Figure [2].

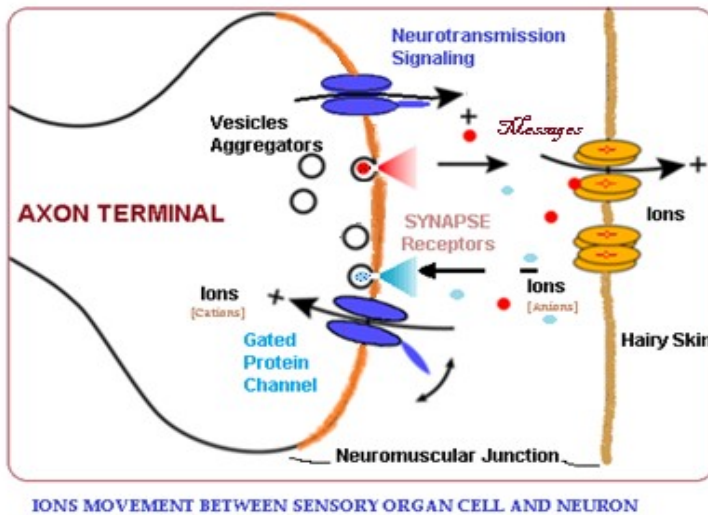


Figure 2. Electro-Chemical Signaling Permeability through Neurotransmission

- Image causes channels to open in light-detecting neurons, along with eyes.
- Touch causes channels to open in sense-detecting neurons, along with skin.
- Auditory causes channels to open in vibration-detecting neurons, along with ears.
- Taste causes channels to open in taste-detecting neurons, along with the tongue.
- Sniff causes channels to open in Smell-detecting neurons, along with the nose.

Now, the possibility of aggregation of channels to open as per demand by cells at the Neuro-Muscular Junction using a device propelled like digital signaling. If considering electro signaling generating devices that can create an impact on neurons like electric (current-voltage) shock patterns, sound (pitch-tone) loudness patterns, optic (photon-frequency) heat patterns, etc. that will produce various kinds of electro-chemical signaling patterns, can be considered as e-FMG signals. These FMG signals are a kind of histogram based on frequency modulation over chemical chain reactions for neuron protein. The brain activity measured during a sleep study recorded on an EEG (electroencephalogram) [4]: Brain activity recorded as a line on a continuously scrolling piece of paper or computer screen. The line moves up and down as it registers electrical impulses and the result is a wave pattern whose shape, frequency, and amplitude, or height, measured by electronically. A complete sleeping patterns are explained as REM and non-REM sleep as [10] Perslev et. al. [17] shown three types of wavy patterns or hypnograms recorded out of five during sleep shown in Table [2].

**Table 2.** Hypnograms during Brain Rest (Sleep) and Actions

Sr.	Wave	Freq.	Amplitude [Height]	Sleep Type/ Activeness
1	Delta Waves [Slow wave]	0-4 Hz	75 $\mu$ V	Non-REM sleep
2	Theta waves [Spiky wave]	4-8 Hz	50 $\mu$ V	REM sleep (Slow active)
3	Alpha Waves [Active wave]	8-12 Hz	15 to 50 $\mu$ V	Active Brain (Closed eyes) sleep
4	Beta Waves [Sharp wave]	13-30 Hz	10 to 20 $\mu$ V	Fast Activity
5	Gamma Waves [Fastest wave]	30-100 Hz	5 to 10 $\mu$ V	Well Regulated and Efficient Brain

The Cerebral Cortex Creates Consciousness and Thinking [5], it is wrinkled and folded creates a greater surface area and size, and allows a huge capacity for learning, remembering, and thinking. CORTICALIZATION can be measured near about 20 billion nerve cells and 300 trillion synaptic connections, all are supported by billions GLIAL cells. The axon of many neurons is a type of GLIAL cells, which are indispensable partners of neurons. The neurons could not function accurately without these cells. Similarly, the limbic system of brain area, positioned between the brain stem and two cerebral hemispheres. The limbic system governs emotion and memory management processing. It includes the AMYGDALA, the HYPOTHALAMUS, and the HIPPOCAMPUS. The amygdala has connections to other systems of human body, including the sympathetic nervous system. Pituitary gland (master gland) governs the functions of all other glands of the human body and receives chemical signals from the hypothalamus. Similarly, pineal gland responds to light and dark and secretes melatonin for regulating circadian rhythms and the sleep-wake cycle.

In short, some key Neurotransmitters and their functions are -

- Acetylcholine governs muscle contractions and causes glands to secrete hormones.
- Glutamate shapes learning and memory.
- Gamma-aminobutyric acid controls muscle activity of the visual system.
- Serotonin constricts blood vessels and brings on sleep.
- Dopamine is involved in mood and the control of complex movements.

The vertebrate central nervous system (CNS) is a highlyenergy-consuming organ due to the metabolic costs associated with synapse junction activation: 34% in rodents, and 74% in humans. Since synapses play an important role in moving, sensing, learning, and remembering, the problem with synapses can cause losses of sensory perception of the human brain. Synapse allows delivery of impulses from neurons to muscular cells or glad. Impulses converted into chemical signals for further transmission. If this transmission process is modulated like to frequency based graph and maintains chemical composition for efficient neurotransmission, controlling over human behavior can be measured by a graphical system.

### 3 Related Literature Review

McLean et. Al. defines Intrapersonal communication as talking with one’s self that includes self-talk, imagination, visualization, and recall of the memory. Joy Hirsch et. Al.[2] presented a neural mechanism for the mediation of dynamic social interactions that provides a general view of investigation underlying neural mechanisms for social interaction in. Leonard Shedletsky [11] examines eight basic components for intrapersonal communication i.e. source, receiver, message, channel, feedback, environment, context, and interference as transaction. Kevin M. Franks et.al. [12] Explained the pairing action potentials in synaptic coupled cortical pyramidal cells that induce LTP in a frequency-dependent manner where simulated the 3D geometry of the spine and the diffusion, binding with calcium. Scott Makeig et. al.[13] explain the exploratory use of ICA decomposition for ERP analysis based on three assumptions; first, summation at scalp electrode set of spatially stable brain areas, networks, or neural populations, and third-time courses of activation. However, the proposed hypothesis not supported for Broca’s area as per coherence determined by wavelet analyses of signals

originating from the STG and the sub-central area of the human brain. JOUR et.al. [8] explained sensory synaptic excitation impairs motor neuron function.

## 4 Methodology for Development

It requires three broad modules of Brain-Computer Interfacing for electronic brainwashing and communicating;

### 4.1 Signal Scanning Module for Brain Thinking Level Identification Mapping

Electrical pulsating module for actual relaxing and well behaving brain: for all five sensory organs, this phase will provide actual input to the human brain for producing constructive ideas. For controlling and ruling over inputting electric and magnetic signals for the production of innovative and creative ideas in place of destructive thought processes.

### 4.2 Classification Module for Thought Process Classifiers

A complete software system efficient for classifying thought processes so that human behavior identification made possible that called a thought process classifier. In [14] I already tried to explained the identification using sound signals that must be applicable for classification.

### 4.3 Germinating Module for Constructive Ideas and Washing Out for Weedy Ideas:

An electronic device injecting tiny heads mounted with sensors is applicable along the spine cord that can contract with cranial nerves. Twelve pairs of accumulation heads play dual functions (Injecting and sensing) for twelve pairs of cranial nerves. An article [9] tells the function of these nerves shown in table [3].

**Table 3.** Functions of Nerves in Human C.N.S.

Pair Number	Nerve Name	Function
I	Olfactory	Smelling Sense
II	Optic	Eyesight
III	Oculomotor	Eye Pupil Movement
IV	Trochlear	Eye Glove muscle movement
V	Trigeminal	Face sensation [chewing muscles]
VI	Abducens	Eyes Movement
VII	Facial	Face Movement [Taste, Glandular]
VIII	Vestibulocochlear	Balance & Hearing
IX	Glossopharyngeal	Taste, swallow, Throat movement
X	Vagus	Heart rate & digestion
XI	Accessory	Head Movement [Neck & Shoulder]
XII	Hypoglossal	Tongue Movement

According to the function of various sense organs, the device actuators will impose the FMG signals. These different types of signal-generating actuators must be very efficient components like aircraft cockpits.

## 5 Future Prospectus

Due to the rapid increment in population and lack of natural resources, crime is also growing regardless in human society. Various types of tools and techniques implemented to overcome these social problems like lie detector machines, video surveillance, and object identification as explained in [1]. Various mechanisms followed in forensics science and techniques need implementation for rectification of criminal problems. In the future, this hypothetical assumption made possible and the implementation of electronic devices made possible, which might change human behavior dramatically. This signal-based electro-mechanical device would control the fertile human brain with constructive ideas, remove destructive ideas, and re-structure the human thought process. Successful implementation is possible due to huge developments available in the fields of Magnetics Science, Electronics Communication and Electrical Engineering governs over mechanical.

## 6 Conclusion

We conclude that different wavy patterns can determine the health of brain. Different kind of electrical impulsions can affects these waves. Electrical impulsions can be produced electronically. An ECE device implanted in human body can produce electrical impulsions to affect the brain waves, and motor skills can be executed using e-FMG signals.

Thus we can say that the “Reverse Engineered for Neurons Sensing Device” can be implanted around the spine in the organ deficient human body. It means a coordinating device will be implanted between CNS and PNS for smooth functioning of remaining body organs.

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