A Virtual Cloud based Brain Connectivity Analysis Using IoT (Internet of Things)

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Abstract- The confidential and secure information of the user’s death storage cannot reach to the particular person or it takes minimum a day or hours to back up all the messages and information. There is lack of time efficiency to reveal all the messages. Here introducing a new concept called BCI (Brain Computer Interface) which is used to connect the human brain and computer. Since it is a BCI technique it consists of both hardware and software. In hardware the major role plays by EEG (Electroencephalogram) sensor, it is to check whether the brain is active or not. On the software side, the cloud is created for storing the information. An individual who want to share the information to his/her favorite or particular person can type the message and save the information in the cloud with his/her mail id and phone number which an individual want to convey. The wearable sensor have to wear like a band, as it may not affect the human brain or human body since it has the low frequency range of 7Hz or below. Once the individual is death the stored information in the cloud can sent to that registered mail id and phone number without any delay. The time efficiency is very fast.

1. Introduction
In the ongoing years, expanding the number of Internet of Thing (IoT) items and administrations are as a rule generally conveyed in all expert and mass-showcase utilization situations including keen structure. The hopeful figures released in a year ago about incomes and of sent de-indecencies exhibited the estimation of IoT arrangements in genuine scale operational conditions. Besides, business and pilot deployments are logically showing the importance of IoT stages in complex utilization situations. What is Brain IoT? Brain IoT centers around complex situations where activation and control are helpfully upheld by populaces of IoT frameworks. Let’s discuss the components of the project. Here the components used are EEG, AVR Microcontroller, UART, and IoT Modem. 1. EEG (Electro Encephalogram) is used to sense the brain, whether the brain active or not. 2. AVR Microcontroller is used for utilizing the fast sign handling activity inside an implanted framework., this microcontroller has already all features and is built into a single chip.3. UART (Universal Asynchronous Receiver Transmitter) is used for transmitting and receiving the information and it’s being connected with the IoT. 4. BCI (Brain computer Interface) As the above named itself explained it is the connection of the Human Brain and computer. Few are intended for highthroughput put thick and long extend neuron investigation at the phone level, which is basic understanding cerebrum circuits and for contrasting solid and unhealthy minds. High throughput and low dormancy investigation of mind information will require fast databases and programming interfaces agreeable to enormous scope diagram examination.

2. Literature Review
[1] N. M. Neihart and R. R. Hasrison IEEE Internet Computing, vol. 19, no. 4, pp. 60–67, 2018. This paper has explained about the Best in class neural chronicle frameworks require gadgets taking into account transcutaneous, bidirectional information move. As these circuits will be embedded close to the cerebrum, they should be little and low force. This paper gained a Utilizing a parasitic radio wire under 2 nm long, a got power level was estimated to be - 59.73 dBm a way of one meter. The problem occurred in this paper not receiving proper brain signals. [2] R. Polana R. Nelson, Springer, 2018, pp. 85–121. This paper explains about BCI frameworks measure explicit highlights of mind action and make an interpretation of them into control flags that drive a yield. The paper gained in this paper are sensors modalities that have most normally been utilized in BCI contemplate have

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been electroencephalographic (EEG) chronicles from the scalp and single-neuron accounts from inside the cortex. The problem is occurred in this paper are no facility of storing the document. [3] B. Gosselin, 2017. This paper has introduced a method called BTC communication. The paper gained BTC frameworks give another option correspondence channel to perform activities and detecting in brilliant articles utilizing orders sent by clients from their controlled mind exercises. The problem occurred in this paper are blurred image of receiving the signals. [4] L. H. Miranda and T. H. Meng, Applications and Services (Healthcom), 2017 IEEE 19th International Conference on. IEEE, 2017, pp. 1-5 This paper describes about configurable, 3.6 to 7.5 GHz beat UWB transmitter IC focused for neurological inserts with high information rate prerequisites. The paper gained is Each pattern of the RF beat is carefully programmable in plentifulness and span, empowering a truly adaptable forming of the transmitted PSD signal, without the utilization of a yield channel. The problem occured in this paper receiving information by a particular needs more time.

3. Methodology
Methodology is a model to explain the methods or techniques used to design, develop or plan a project. This chapter explains about the software and hardware that will be used for developing this project further. The results are going to be analyzed to achieve the objective of this project.

3.1 System Overview
In this paper, implement the BCI (Brain-computer interface) approach. The below diagram is the demonstration of the project. The components used in this project are EEG, AVR Micro controller, IoT Modem, UART wire, and power supply is enabled. The main usage of this AVR micro controller is to provide high-speed signal processing. The AVR Micro controller is connected with the EEG sensor and IoT modem. The transformer is used in this experiment since the 240v can be converted into 5v. The transformer is connected with AVR Micro controller. Above the Micro controller TFT (Thin Film Transmitter) display is used. It is used for display purposes. Let's discuss about the experimentation of the project. When the power supply is getting ON, have to hold the EEG sensor on the side of the forehead and touch with hands. When it holds it results as Brain active else the brain is not active. So in that TFT display, it shows as Brain dead.

The virtual brain is accelerating the development of inexpensive real-time brain-computer interface (BCI). Hardware requirements that increase the capability of the virtual brain. The advantage of the proposed system is an
i. An affordable technology with high-end advantage.
ii. User relatives get remind on particular time.
iii. Ability to share current and saved information of the user.
3.2 Block diagram

![Block diagram of the system](image)

Fig. 1 System overview

The following are the modules that are divided into four based on the work done in the proposed system. The modules are,
- Virtual brain module.
- Privacy information module.
- Access privilege module.
- Remainder module.

3.3 Virtual brain module
In this module, the modules are getting organized. It consists of components like EEG (Electro Encephalogram), AVR microcontroller, IoT modem, Transformer, UART(Universal Asynchronous receiver Transmitter) board, and finally a TFT display. The AVR microcontroller is connected with TFT display and transformer. UART board is connected with IoT modem and all these connected with power supply.

3.4 Privacy information Module
In this module, Entering the username and password this screen is revealed. By clicking the options like document mail id and phone number, the user can type the things and stored them in the cloud. The information which store in this module will be very safe and secure.
3.5 Access privilege Module
In this module, the user can enter a username and password. This module is connected with the EEG (Electro Encephalogram) device and computer. By entering the username and password it can enter into the next screen. All users must have a unique username and password. The user can enter information which want to convey to their family, friends or neighbor can type in the message option also there is a saved option to save the information.

3.6 Remainder module
When the user feeds the privacy information in the cloud, an alert will be sent to the registered user. The document in the cloud is safe and secured. Once the user or person is not alive the registered things can be automatically sent to the registered mail id or phone number.

Cloud computing
Cloud computing, the practice of using a network of remote servers hosted on the internet to store, manage, and process the data to local servers or computers.
Fig. 4 Login page

The above snap is the login of the Digital brain. It consists of a user name and login. The software side of the proposed system is designed by using a hypertext preprocessing code. It is a server-side scripting language, also it is ease of balancing and it is not much complexity. It is a backend language and in the proposed system, it needs a large amount of storage so hypertext preprocessing is apt for that. As designed of a one-one page, it can be created. By combining all the pages the hypertext preprocessing language is ease. It can also be used as cost or free of cost depend on the user.

Fig. 5 Sign-in page

As per the rules, we can enter the username and password. So that it sign up and get into the next page. By using PHP code, these websites and pages can be designed. Since it is a cloud computing it is made-up of username and password and it cannot be accessed by Third-party. We can securely make up the design and website while coding.
The above snap represents the brain status log details of the user. When the user is normal or when the user is dead, the database accurately noted the date and time of the user’s. For example, on the date of February 25, the user must have worn the device on that day and show the status is normal. And the other example the user’s brain is dead or the person is no more, the status log is get updated with the accurate date and time. The status database gets updated accordingly.

4. Result and discussion
In this proposed system, the result can accurately sent to the user’s mail id or phone number. If the user is alive, then the user uses to type the information which he/she want to convey to the favorite or
particular person. As the result clearly shows it is the BCI (Brain-Computer Interface). Wearable devices have made possible several new software framework for developers to use and create applications combining BCI and IoT. The document or information can be easily received by a particular person without any delay. In that note, this proposed system is more efficient.

![Digital Brain Image](image)

**Fig. 8 Message received by the user.**

The above figure 8 snap clearly explains that once the brain is not active, it automatically send to the registered user.

5. **Conclusion**

In this paper, we clearly explain the digital brain and computer interface. Also, we introduce a method called BCI (Brain-computer interface) model. This experiment or project establishes and publishes the human memories and documents stored in the cloud are automatically sent to the registered user even the authorized person is no more. After the death of the human brain, this cloud act has the human. This project is mainly designed for all kinds of people. More strictly Amnesia patients will be used. In the future, it will be developed without power supply and also instead of login can use fingerprint. When compared to username and password the fingerprint will be useful and necessary for people. It can be used in day to day life. It cannot cause so much harm to the people.

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