Brain Monitoring Net (Brainternet)

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Abstract. The Recent trend in connecting Brain and Internet leads to the study of Brainternet. It has been a sci-fi creation until the last decade, but scientists now created a way to connect them using certain devices (microcontrollers) like Raspberry Pi, Arduino, etc. that allow us to monitor, control and view at any time. The Raspberry Pi or any other microcontroller senses the brain waves from the Human brain through EEG signals and analyse the gathered data and upload it to the internet.

1. Introduction
Brainternet is the process of connecting the Human Brain with the Internet. The researchers augmenting the human brain waves and the internet to develop Brain monitoring internet. The researchers collecting the Electro Encephalon Gram (EEG) signals from the human brain. Those gathered signals are uploaded in a real time programming interface [1-4]. The Brain monitoring Internet does the work of converting the brain waves into an open source brain live stream. Internet and its network is multiple and fast growth of development of visualising and analysing the complex of human brain and complication system. We claim that the Universe is a global brain or a computer claim by Dmitri Krioukov, the growth of the universe and complex networks insist that surprise similar laws govern the dynamics of these very different complex systems. Complex supercomputer simulations of the universe. The structure of space and time for normal network is explained using a graph which is always complex network in nature. Some of the important available networks are social, internet and biological network. This is also the first time to upload the brain activity in real time to the internet. After initializing the connection between them, it is necessary to enabling the activity between the real time internet and the brain waves. For Example, the user shoots a stimulus and observes the response [5-9]. In the upcoming future scenario, we can also able to upload and download data’s to and from the brain using the Internet. It will also provide crystal clear accurate testing under electrotherapy of neurological diseases.
2. Working Principle
The Brain Monitoring Internet uses Raspberry Pi as a programming interface to collect and process data from the users Brain through EEG signals. Electroencephalography (EEG) Figure 1 is an efficient method to acquire brain signals that corresponds to various states from the human brain.

![EEG Signal](image1)

**Figure 1. EEG Signal.**

Figure 2 shows the Raspberry Pi kit which is a series of small single-board computers basically developed for teaching computer science by the Raspberry Pi Foundation, United Kingdom. It has an inbuilt controller that collects and process all the data received through Brain signals and send/upload it to the Internet for online streaming and storage.

![Raspberry Pi kit](image2)

**Figure 2. Raspberry Pi kit.**

Thus the Brainternet gathers the data from the Human brain through EEG i.e., brain waves and it is collected and analysed by the Raspberry Pi programming interface. After analysing it is then uploaded to the internet for open data streaming.

3. Problem and its Solution
Thus such kind of connection between the User’s Brain the Internet raises the bioethics concern in terms of internet privacy, security and authentication. The common issues present in this emerging technology is that for ensuring the privacy of individual user’s neural data. The another issue is that to ensure the physical security of the human brain at the time of connecting it into the internet and How to prevent threats like, If hacker places a piece of wrong information in the individual’s mind which
affect the person’s behaviour and decision making or steals the confidential information from the user? All of them overcome by implementing “Neuro-Cybersecurity” if this Brain internet will be implemented in the future. Despite some concerns, these types of technologies are currently advancing in the fields of medicine. Detection of human brain tumour is a very difficult task and to reach the targeting place is also very difficult in an autonomous manner with modifying shape, size and location point. So this proposed work deals with multi-modality system for the transforming brain with both the Cancerous & non-cancerous tumour from Multi Resonance images of the brain. To attain this, various implemented. Figure 3 shows the block diagram of the proposed method. The multi resonance images are initially pre-processed to eliminate the noises which are already present in the input images. This pre-processed image is segmented using Chan Vese model. After segmentation technique, the features of the images are extracted using wavelet transform. This extracted images are used to identify the cancerous and non-cancerous tumour cells in the human brain.

![Figure 3. Block diagram of proposed methodology.](image)

The segmentation algorithm is used to detect the tumour cells in the human brain using MR images. Those tumours are segmented using the support vector machine algorithm. To check and proposed segmentation aftermath and the available methodology were verified. The comparative verification found that wonderful then available segmentation algorithms It supports & reduced time the doctors to diagnose brain tumours effectively.

Two Yardstick data are BRATS and Brain web. These are used to check the efficiency of the proposed methodology. The main advantage of using BRATS database is that of reunite from the net along with registration. Those datasets have an images with various dimensions with varying sizes with image resolution. The figure 4 a and figure 4 b shows the MR images of normal and abnormal condition.
Figure 4. (a) Normal MR image of brain (b) Abnormal MR image of brain.

Figure 5. (a) Simulated pathological MR brain image with 100th slice: 0% noise T1-weighted (b) Simulated T2-weighted MR brain image, 100th slice: 0% noise.

Figure 6. a,b,χ vectorial. The seed point is in red circle and Colored label map for 20 seed points.

The automated method for segmentation from fuzzy logic mechanism and adaptive growth mechanism. The size of easy image is 181 x 217 x 181 pixels with the spatial resolution of 1 mm. The 100th Brain slice of multiple sclerosis diseases with the elimination of noise is shown in Figure 5. The
proposed method produces the connected map with final intensity which is derived from fuzzy logic mechanism. The connected map is produced from the combination of $\chi_1$ and $\chi_2$ maps. In the CSF region, the seed point is placed which is shown in Figure 6a. From this figure it is inferred that the initial research of minimum connectivity is carried out. The final label map with all the label values is described in Figure 6b with RGB image for easy visualization. The digital volumetric segmentation and its segmentation divisions are converted into required connected subsets and it totally automatic. The main benefit of this fuzzy logic algorithm is that automatic segmentation would be done in an iterative manner at the time of running. This algorithm need not require human interruption. In order to evaluate different characteristics, the proposed method is applied in a multi parametric volumes to achieve the objective. By using the statistical parameters, the robustness of this technique has been estimated and proved. So the Magnetic Resonance Image segmentation using Fuzzy logic algorithm is proposed without human intervention is proposed in this research. This was performed with various phases until the stop condition occurs. In this research, by continuing with the already existing work, the additional steps involved in the work are 3D extension, automatic selection of seed point and integration of multi parametric volumes. In addition, with this, evaluating session is also generated with robustness in selection of seed point in a random manner is also included. The existing method does not carry out any training phase for supervision with phase estimation. It is due to the independence of image content and due to image resolution independence. This proposed method is applicable for all kind of images such as multi modal and multi temporal image and its integration. As well as, this method is suitable for changing the location of independence in the image content and image resolution.

4. Future Arrangements

By using this present approach, the defence department of America is funding a large amount in the research of neural network. Using this methodology, they are going to record the information from more than one trillion neurons present inside the human brain. This methodology contains the wireless transmitter which is physically layered on the human brain and record the data or information by noticing the multitude of neurons inside the human brain. In addition to this, it also consists of holographic microscope with flexible circuits.

This type of technology would advance the amount of information transfer between the internet and the human brain. Along with this, the also improves the signal extraction from the human brain. For example, by using this connection to the part of the human speech centre of the brain, the scientists will easily find what the person is thinking and can also detect and rectify speech disorders. Thus the American administration is financing for researchers like “Targeted Neuroplasticity Training (TNT)” by Defence Advanced Project Agency, (DARPA). The goal is to boost the function of Brain so that it could be used in Military training by reducing the training period of soldiers.

The task which is funded by the American government is mainly used to improve the state of data extraction from the human brain and also for neuro stimulation of the brain. Once this process is integrated with the Internet, it will allow the researchers to detect and influence the brain more accurately by means of electrical stimulation.

5. Pros of Brainternet

Being able to upload and download information from and to the internet, it will be helpful for people to Gain the knowledge and upload their memory to prevent the loss of memory. The merits of Brainternet is that it is not that much invasive & it provides a linear flow of data that purposely might create a data set for some deep learning algorithm to make some smell out of it. It would require more persons involving it for some require span of time to create a data lake with an enough number of data to hope for the emergence.
6. Cons of Brainternet

Devices (regular) connected to the internet less security features, this can be hacked & turned into botnets for a Distributed Denial of Service (DDoS) attack. Universal elevation dynamics of intricate networks & usual networks are at more times the similar, simply the structural similar between these networks. Synthesising research developing maths, physics and computer science surprising ways by SDSC Director Michael Norman.

Human brains are linked to the internet and few important issues are privacy and potential hacking is happening. Said by Adam Pantanowitz, a lecturer University of the Witwatersrand and in Johannesburg, South Africa. Where data can be uploaded to a brain instead of just transmitted. Advised segmentation aftermath and the available method of working were developed using comparative method. Competitive methods demonstrate that the results and its closeness to detect the brain tumour using this segmentation is more suitable as compared with the already existing conventional methodologies. These proposed algorithm is very useful for the doctors to identify the brain tumour in an efficient way and also can free their priceless time.

Human brain attack will take the stream and non-desirable way would be a disaster for the involved individual and more risk.

To Genetic Mapping, personal information from the brain will be collected and stored by the hacker. The upright to neural privacy will become much more significant, extraordinary if hackers can mine information.

7. References

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