

www.ijprems.com editor@ijprems.com INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)

Vol. 02, Issue 08, August 2022, pp : 106-109

e-ISSN : 2583-1062

Impact Factor : 2.265

A SOLUTION TO PROTECT THE INDIVIDUAL PERSON'S DATA BY USING EEG AUTHENTICATION METHOD

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ABSTRACT

We are reminded mobile phone hacking, IP address hacking are high level technology, but now what we think in mind we can do by remote sensor via BCI. It is the next level technology of google assistance, i think it is a extreme level technology also. Using EEG sensor it is really helps to physically challenged people. In our project, the people who have important data they can store their data and the authorized person's E-mail Id details in the cloud, that user's brain frequency is continuously conducted by the EEG sensor, when that user's brain can be dead then their stored data can be send to the person who can authorized by user via E-mail.

Keywords: Brain Computer Interface, Electroencephalography Electrocorticography, Magnetoencephalography, Functional Magnetic Resonance Imaging, Advanced Virtual RISC micro controller, Embedded Integrated Development Environment, Fast Fourier Transform, Discrete Fourier Transform.

1. INTRODUCTION

BCI allows user to communicate directly with external devices via brain signals. BCI has three types: 1.Invasive (neuro surgery), 2. Partial Invasive (EEG, MEG, FMRI), 3. Non – Invasive (ECoG). Normally, brain activities are in different wave length there are five types they are gama γ (30 hz-100 hz) when the human is in stress and problem solving mode, beta $\beta(12 \text{ hz}-30 \text{ hz})$ when the human is in active mode, alpha α (8 hz – 12 hz) when the human is in ideal mode, theta Θ (4 hz – 7 hz) when the human is in sleep mode.

In EEG, Electro means electric discharges encephalography means brain outer surface (encephalon). EEG sensor is used to record a brain wave forms. It may help identify the cause of certain symptoms in brain for example, Seizures(fits), memory problems, Brain tumor. In continous recording it also checks any abnormal wave forms discharge are activated in brain or not. 10/20 system is the world wide accepted system in EEG. When one human's brain was dead means organs donation is possible.

2. EXISTING SYSTEM

In BCI wearable computers, EEG headset captures the user thoughts by frequency signals in the brain, then the electrodes sends the signal to the programming language device, that device has pre-defined instructions sets using programming language like embedded IDE. It compare incoming signals to the pre-defined instruction set. Which instruction set is match to the user thought that activity can be produce to the user. For eample have to see figure 1.





Figure 1. Portable AR-BCI system. (a) Participant interacts with AR content via a Microsoft Hololens 2 device and an MI-based BCI. The brain signals are recorded with Brain Product's MOVE system. (b) AR content is seen projected into the participant's view as an overlay on top of a real table.

Therefore, almost all results involving in BCI wearable computers Transmit visual images to the mind of a blind person, allowing them to see. Transmit auditory data to the mind of a deaf person, allowing them to hear. Allow a mute person to have their thoughts displayed and spoken by a computer. EEG relatively low cost. Can measure brain



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activity on the order of milliseconds. Challenges is Electrodes outside of the skull can detect very few electric signals from the brain. EEG poor spatial precision, Limited ability to accurately record from structures deeper than the cortex.

3. PROPOSED SYSTEM

We complete a survey on Brain activity Extraction in IoT from various perspectives to check the brain signals are active stage or dead stage, including EEG based IoT models. Three major development trends of virtual brain development system, which are EEG, IoT, and cloud computing. The virtual brain module contains EEG sensors, signal conditioning circuits, amplifier circuits, threshold and noise removal, AVR microcontroller AT Mega 328, UART, IoT board, TFT display.





IoT cloud system



Figure 3. Receiving section in the architecture of the new solution to protect the individual person's data by using EEG authentication method.



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4. METHODOLOGY

In this various methodology were used, to identify the brain is in active condition is EEG sensor, it is hardware device used to find out the brain's frequency by electrodes it sends the signals to the signal conditioning circuit signal conditioning doing three basic works they are amplify, threshold, noise removal. The signal from the sensor is very low level or high level or noisy signals. So here signal conditioning is essential. AVR microcontroller AT mega 328 used to monitors the conducted signals are normal or abnormal signal conditions. UART serial communication is also used to connect the AVR microcontroller AT mega 328 and IoT devices.

In AVR microcontroller AT Mega 328 using FFT algorithm, make the computation of DFT faster FFT algorithm. The FFT algorithm can be used in real time applications, takes 30ms to complete the calculation. By using Arduino mega accuracy can be improved. Before apply the FFT fuction give sample size of 2^n for example 2, 4, 8, 16, 32, 64, 128, 256... floats out_r and out_im will take a high amount of memory. FFT function float FFT (int in[], int N, float frequency). The data type of N changed to integer to support > 255 sample size. If the sample size is <= 128, byte data type should be used. In the cloud, Fog is present in the next layer of the cloud. Fog computation were used to send the required generated data to the cloud and it is used to security purpose also.

5. ANALYSIS

S.no	Human brain's different wavelength	Graphs
1	theta	
2	delta	
3	^{gama}	
٠	beta	
5	alpha	
6	cerebral death	

Figure 4. Human brain's different wavelength.

In this analysis, Electroencephalograph is the instrument used to record the human brain's wavelength . Electrodes are of two types, unipolar and bipolar electrodes. While using bipolar electrodes, both the terminals are placed in different parts of brain. When unipolar electrodes are used, the active electrode is placed over cortex and the indifferent electrode is kept on some part of the body away from cortex. There are five different wavelength in human brain they are alpha (8 hz - 12 hz), beta (12 hz - 30 hz), gama (30 hz - 100 hz), delta (0 hz -4 hz) theta (4 hz - 7 hz). Here, analyze the wavelength of the brain to check when the brain is dead. that user's stored data in the cloud can send to the authorized person who can declared by the user.

6. RESULT

As the results, when the brain is dead. that user's stored data in the cloud can send to the authorized person via email, who can declared by the user.



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7. CONCLUSION

Protect the owner data using EEG sensor has been conducted the owner's brain wavelength. The owner has successfully logged in to save their data, owner who choose the authorized person their mail id can be connected to the owner's page. Fog computing authenticated and identified the owner's login. Finally, our proposed model has protect the owner's personal data safely.

8. FUTURE WORK

In future enhancement, A New solution to protect the individual person's data by using pulse rate EEG authentication method to increase the storage capcity to store large amount of data and files.

9. REFERENCES

- [1] G. Borghini et al., "EEG-based cognitive control behaviour assessment: An ecological study with professional air traffic controllers," Sci. Rep.,vol. 7, no. 1, p. 547, 2017. [Online]. Available: https://www.ncbi.nlm.nih.gov /pmc/articles/PMC5428823/pdf/41598_2017_Article_633.
- [2] M. Salvaris and F. Sepulveda, "Visual modifications on the P300 speller BCI paradigm," J. Neural Eng., vol. 6, no. 4, 2009, Art. no. 046011.
- [3] L. Bi, X.-A. Fan, and Y. Liu, "EEG-based brain-controlled mobile robots: A survey," IEEE Trans. Human– Mach. Syst., vol. 43, no. 2,pp. 161–176, Mar. 2013.
- [4] J. Höhne, M. Schreuder, B. Blankertz, and M. Tangermann, "A novel 9-class auditory ERP paradigm driving a predictive text entry system," Front. Neurosci., vol. 5, p. 99, Aug. 2011.
- [5] A.-M. Brouwer and J. B. Van Erp, "A tactile P300 brain-computer interface," Frontiers Neurosci., vol. 4, p. 19, May 2010.
- [6] M. Nakanishi, Y. Wang, Y.-T. Wang, Y. Mitsukura, and T.-P. Jung, "A high-speed brain speller using steady-state visual evoked potentials," Int. J. Neural Syst., vol. 24, no. 6, 2014, Art. no. 1450019.
- [7] Y. Luo et al., "EEG-based emotion classification using spiking neural networks," IEEE Access, vol. 8, pp. 46007–46016, 2020.
- [8] D. Wu, V. J. Lawhern, S. Gordon, B. J. Lance, and C.-T. Lin, "Driver
- [9] drowsiness estimation from EEG signals using online weighted adaptation regularization for regression (OwARR)," IEEE Trans. Fuzzy Syst., vol. 25, no. 6, pp. 1522–1535, Dec. 2017.
- [10] C. Han, G. Xu, J. Xie, C. Chen, and S. Zhang, "Highly interactive brain-computer interface based on flicker-free steady-state motion visual evoked potential," Sci. Rep., vol. 8, no. 1, pp. 1–13, 2018.
- [11] J. Xie, G. Xu, J. Wang, F. Zhang, and Y. Zhang, "Steady-state motion visual evoked potentials produced by oscillating newton's rings: Implications for brain-computer interfaces," PLoS ONE, vol. 7, no. 6,2012, Art. no. e39707.