

Brain Machine for Wrist Movement Using Robotic Arm

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Abstract—Brain Machine Interface (BMI) has made it possible for the disabled people to communicate with the external machine using their own senses. In the field of BMI, the invasive techniques have been widely used. This paper deals with the study of features of Electroencephalography (EEG), a non invasive technique that has been used for classifying two classes of movements, namely Extension and Flexion. Classification of movements is done on the basis of energy, entropy, skewness, kurtosis and their various combinations. The maximum accuracy of 91.93% has been obtained using discrete cosine transformation of energy and entropy. Finally the detected wrist movement is implemented on a mechanical Robotic Arm using ARDUINO UNO and MATLAB.

Keyword—Brain, EEG, invasive, interface, non-invasive, signals.



Sidhika A. Varshney is a native born of Aligarh city, India. She is in her final year of graduation pursuing Bachelors of Technology in electronics from Zakir Husain College of Engineering and Technology, AMU, Aligarh, India. She has worked with GOOGLE on the Google Word of Mouth project in India for two months. She has published one paper in the year 2013 i.e. F. Ghani, B. Gaur, S. Varshney, O. Farooq and Y. U. Khan, “Detection of Wrist Movement using EEG signal for Brain Machine Interface” Proceedings 2013 International Conference on Technology, Informatics, Management, Engineering & Environment (TIME-E 2013), Bandung, Indonesia, June 23-26, 2013, pp 5-8. She has shown great zeal in the biomedical field and has developed Railway signaling System and Autonomous Robotic Arm. Currently she is working on the development of voice controlled home automation embedded system.



Bhoomika B. Gaur is an electronics engineering student at ZH College of Engineering and Technology, A.M.U., Aligarh, India. She was born at the same place in July 14, 1992. She has acquired her higher secondary as well as senior secondary education from A.M.U., Aligarh. At present she is pursuing Bachelor of Technology in the field of electronics and communication and will graduate in 2014. The areas of her research work include Brain Computer Interface, Speech Processing and Applications and Embedded Systems. She is also trained in Robotics and Telecommunications. She has authored a research paper - F. Ghani, B. Gaur, S. Varshney, O. Farooq and Y. U. Khan, “Detection of Wrist Movement using EEG signal for Brain Machine Interface” Proceedings 2013 International Conference on Technology, Informatics, Management, Engineering & Environment (TIME-E 2013), Bandung, Indonesia, June 23-26, 2013, pp 5-8. She has also developed an embedded system entitled “Speed Control of Vehicles in Speed Limit Zones”. At present she is working on the development of voice controlled home automation embedded system.