Brain-computer interface and Arduino microcontroller family software interconnection solution

Brain-Computer Interface (BCI) is the modern approach to the construction of the Human-Machine Interface (HMI) that interconnects human brain and the machine and allows to send commands to the machine directly from the central nervous system (CNS) and especially the brain. Great popularity of the Arduino microcontroller board family and integration of its members into many projects including amateur, professional, industrial and scientific solutions impelled us to design software solution, that helps integrate Brain Computer Interface comprising Emotiv EPOC Neuroheadset with Arduino microcontroller boards. The paper introduces concept of the Brain-Computer Interface in its first section and possibilities of its use. Next section of the paper describes Emotiv EPOC Neuroheadset, which is the part of the BCI, with function of the electroencephalograph (EEG) that non-invasively monitors the electromagnetic manifestations of neural activity of the human central nervous system (CNS), mainly the brain. Using the proprietary software installed on the host computer software transforms acquired signals into the commands that are then executed via third party software. Another part of the paper introduces Arduino microcontroller board family and the last part describes proposed software solution that provides software interface between Emotiv EPOC Neuroheadset software and Arduino microcontroller boards.