Utilizing EEG Signals for Wireless BCI Applications
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Abstract

The aim of this project is to develop a user-friendly, mind-controlled device that utilizes EEG signals to wirelessly control the operation of different systems. This device, also known as Brain-Computer Interface (BCI), is an interface that creates a direct communication between the mind and an external device.

Towards this goal, we used a non-invasive brain imaging method, called electroencephalography (EEG), to obtain the required signals and developed a working system which is capable of turning on and off LEDs with number of eye-blinks given as the control measure.

Vision

Our vision in this project stems from an interest in aiding people with motor disabilities and freeing them from the inability to perform simple tasks in their homes on their own.

Design

As a representative of practical applications, we used LEDs, and implemented a system to control their turn on and off with eye-blinks.

The design included both hardware and software aspects:

- **EEG Controlled BCI System**
  - **Hardware**
  - **Software**

**HW**

- **EEG Amplifier**
- **9V Power Source**

**SW**

- MATLAB
- Arduino

**Future Work**

In regards to the future of our project, we ultimately hope that interest was generated in this field of study to further develop this idea and help people who have difficulty with motor functions. One possible future development that would be necessary is the ability to program our device for real-time applications. Another good development that could be made is the ability to toggle numerous devices, not just one as we demonstrated in our design with a single green LED. As noted earlier, we simply hope that more people see the potential in this field to innovate much more advanced BCIs to enable disabled people way beyond turning on and off machines.