EEG Based Switch

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Abstract—**A major issue in the care of the severely disabled is the dependence on other people to perform basic tasks. A person who lost the use of their limbs is unable to manipulate most basic objects which people use in their everyday lives. The purpose of this project is to design an EEG headset that can be used to control a simple switch only using brain waves. Even just the ability to operate a simple switch can grant the disabled a large degree of autonomy.**

I. INTRODUCTION

PROVIDING autonomy to the disabled has long been a goal of doctors and other medical professionals, and with advances in technology that goal is closer than ever. Those who are severely physically disabled may not be able to operate simple devices we take for granted, such as TV remotes, thermostats, and light switches.

Recent advances in EEG technology have provided a possible avenue to accomplish this; instead of being required to physically manipulate devices, such as switches, new devices can read brain waves and manipulate devices for the patients. The idea of literally controlling devices with one's mind has gradually progressed from science fiction to medical devices.

The system we develop will use a MindWave Mobile headset to read the patient's brainwaves. It will receive the data from the headset, interpret it into a useable form, and then output signals to a remote control. This remote control can then control various devices.

II. METHODS

Our initial methodology will include a MindWave Mobile headset as the interface device, with plans to use it to control a switch. This headset reads various brainwaves (alpha, beta, delta, gamma, and theta) and outputs raw data via Bluetooth.
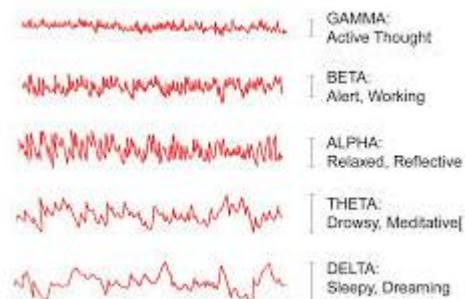
We will first determine how to read the data provided by the headset. This will require the design of a device that can receive bluetooth data, and a chip that can receive the data, process it, and output a signal. We will build this on a breadboard, and possibly make a PCB once we have a working layout. The coding for the chip will be done in C or C++.

Once we are able to successfully read data from the headset, we will determine exactly how granular the data is, and how many different meaningful measurements we can receive via the headset. It may be possible that we can only provide a meaningful binary output (such as turning the switch on and off), but hopefully we can do more than that.

We will then connect our signal receiver to a television remote control and attempt to control multiple features of said remote with the headset. Ideally, we will be able to change the channel and manipulate the volume through the headset.