



# Developing a Brain Control Interface Using SSVEP

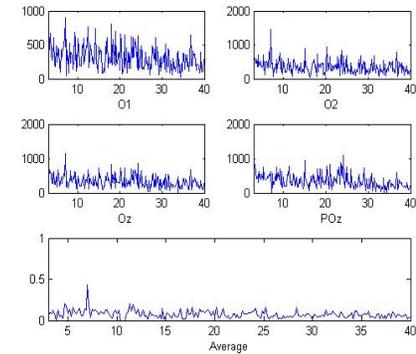
## Introduction

The purpose of having BCI systems is to establish a connection with another object or program just by using signals from the brain. This technology could make robotic surgery more accurate, bring motion back to those who have become paralyzed, and even be used as a video game controller.



## Results

For my experiment the up arrow (7Hz) was focused on. As you can see each electrode was plotted and weighted based on its accuracy. Based on these results O2 held the most weight and outputted that the 7Hz is focused on. This is known because that is where the location of the peak is.



## Experimental Method

The experimental method used is known as SSVEP or Steady State Evoked Potential. In this method if the user is looking at a light flashing at a specific frequency the brain will take in this information through the visual cortex and send out a electric signal in the time domain. By observing this electric signal it can be shown what the frequency that the user is looking at is.



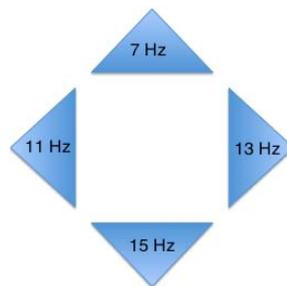
## Implementation

Currently I am designing a robotic arm to be synced up with the BCI headset B-alert X24. The arrows will be modified to specific maneuvers but the concept will be the same. The two standard servos will move the wrist left and right and the rotary servo (the all black one) will extend or retract the arm. As you can see the led's generate the flashing frequency to be interpreted by the brain.



## Analysis

If I had four arrows each flashing at a different frequency, I should be able to know which direction the user desires based on the arrow they are looking at. When the user focuses on a specific arrow there will be a peak in the frequency domain at that frequency. So for each arrow there is a check to see of the user is looking at 7Hz, 11Hz, 13Hz, or 15Hz.



## Conclusion

Overall, not only could this BCI technology improve the quality of life for hundreds of people, it can bring a better understanding to the way the human neurological system works.

I have seen promising results using 7Hz. Next I shall use try the remaining 3 frequencies as well as see how many more the human brain can pick up.