

## Paralysis Aid

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**Abstract:** *The project is aimed at developing an aid for people suffering from partial paralysis on the symmetrical sections of the body like hand, legs etc.*

*The project works by using EMG waves which study the muscular activity and then processing it to perform required actions like opening up hands etc.*

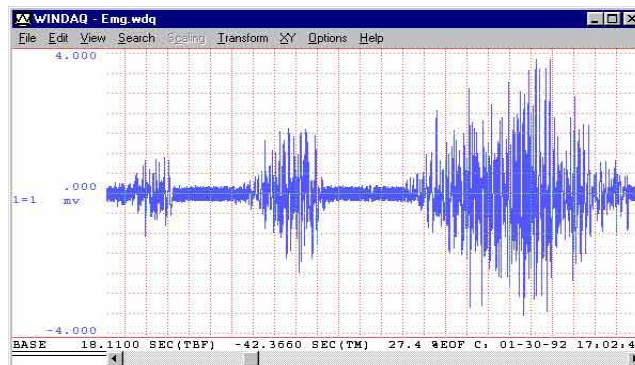
### Introduction:

For development and demo purposes we consider a scenario where a person suffers partial paralysis on hands and he has lost the complete control of his right palm.

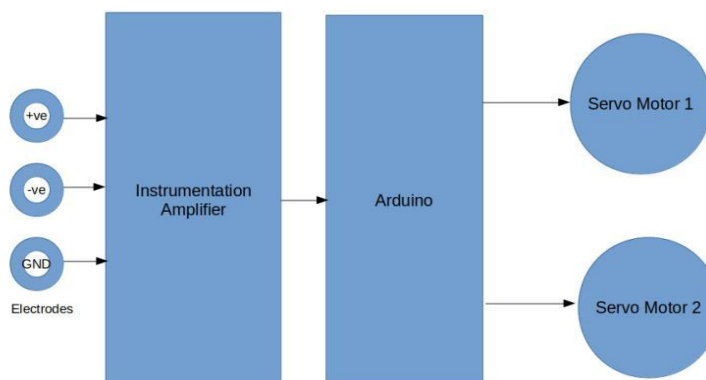
The principle is to capture EMG waves from his left hand or right hand and making the paralyzed hand move synchronized with his palm movement.

### EMG waves:

Electromyography (EMG) is an electrodiagnostic medicine technique for evaluating and recording the electrical activity produced by skeletal muscles. EMG is performed using an instrument called an electromyograph to produce a record called an electromyogram. An electromyograph detects the electric potential generated by muscle cells when these cells are electrically or neurologically activated. The signals can be analyzed to detect medical abnormalities, activation level, or recruitment order, or to analyze the biomechanics of human or animal movement.



### Block Diagram:



### **Proposed Design:**

The EMG signals are captured from hand using **Electrodes** from left hand forearms. Since the signals are very weak & are in nano voltage ranges, these signals are sent to an instrumentation amplifier. Here Instrumentation amplifier is an AD620 which is a low noise instrumentation amplifier. This is done because arduino cannot process signals in nano voltage range & the noises also has to be avoided for further accurate processing.

The filtered signals from AD620 are sent to Arduino. Arduino processes the signals. It compares the signal amplitudes to a reference value and instructs the servo motors.

When a movement in the hand where electrodes are placed occurs a change in amplitude of signal occurs. If the amplitude change occurs it triggers the movement of servo motors.

The servo motors are placed on a glove and this glove is to be wore on the paralyzed hand of the person. Thus the gloves begins to move with respect to the movement of the servo motor and the hand also begins to move simultaneously

### **Phases Of Development**

- The first phase prototype is mentioned above
- In the Second Phase of development, instead of using a glove, we could capture the signal from and replay it at the required position. It is based on the principle that when the body part receives the signal at the required place it will begin to do the respective action.
- Third phase includes using micro electrodes which are powered by body temperature or electrical activity from the body

### **Conclusion**

This paper has given a brief overview on EMG and its biomedical applications. This idea helps paralyzed people use this in their day to day life. The main advantage of this project is that its construction cost is very low and its implementation is also very easy.

This paper has further research options and has a large scope for further development in future.

### **References**

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