EMG Monitoring using Android System

Pooja Jagtap[1], Sonal Pawar[2]

BE, E&TC AISSMS IOIT, Pune, India[1,2]

Abstract: Electromyography (EMG) is the scientific investigation of electrical movement delivered by skeletal muscles. EMG is a case of present day human interface which can be utilized as a part of the field of medical and engineering. Through this paper we will examine about standard parameters which can be utilized to investigate EMG-Surface EMG (SEMG)/surface checking EMG signals in light of the fact that these parameters mirrors the physiological action of the engine unit. In this paper, we will likewise examine the historical backdrop of EMG, sorts of EMG, qualities of EMG signals, muscles engaged with developments of hand, parameters which are used to investigate EMG signal, assortment of uses where EMG signs can be utilized. This paper will give the specialists a decent comprehension of EMG signal and its investigation. This information will help them to grow all the more effective and proficient applications.

Keywords: EMG, SEMG, Android system, Microcontrollers, Bluetooth.

I.   INTRODUCTION

Electromyography is the system for the recognition and investigation of EMGs. With cathodes put on the surface of the skin or embedded in the muscle tissue, it is conceivable to examine how the controlling summons, issued by rowers or figure skaters, convert into muscle initiation. For evident reasons, the utilization of surface terminals turned out to be more acknowledged in clinical and physiological applications. In any case, the translation of surface EMGs urges mind. This survey orchestrates boss angles concerning the location and use of surface EMGs and depicts how the utilization of varieties of surface terminals adds to the present learning of the neuromuscular. Late surveys announcing itemized issues on the identification, preparing and use of intramuscular and surface EMGs are accessible to the intrigued reader. EMG signal is the electrical articulation caused by neuromuscular initiation amid strong compression, delineating the current distinguished at the particular area that is created by the ionic stream crosswise over muscle fiber layers and transmitted through interceding tissues. The motor unit is the most basic utilitarian unit of a muscle, producing an motor unit activity potential (MUAP) when enacted. Rehashed constant initiation of engine units creates motor unit activity potential trains (MUAPT) that are superimposed to frame the EMG signal. Gathering electromyographic (EMG) signals radiated from the human body utilizing anodes have turned into a standard technique both in restoration building and therapeutic research. The idea of my electric control to control a fake hand utilizing EMG signals from contracting muscles was proposed in the late 1940s and the colossal advance has happened since the mid 1960s. These days, distinctive sorts of assistive gadgets, for example, remotely fueled prostheses and electrically fueled wheelchairs are controlled utilizing EMG signals.

II.   PROPOSED SYSTEM

The two noteworthy elements of amplification and filtering process are the boost of the signal to noise proportion and the minimization of the distortion of the signal. Despite the fact that there have been numerous reports and methodologies about the outline of intensifiers and channels for EMG signal procurement, better circuit structure and advanced plan are as yet the focal point of further research for precise and solid EMG signal driven systems. This project focused on small size amplification and filtering circuit design for processing surface EMG signals. The project made a study on the commonly used methodologies for EMG signal processing and circuitry design and proposed a circuit design for EMG signal amplification and filtering. To acquire the signal data directly on our android phone so that we can check the result anytime.

1. Microcontroller

The PIC18F4550 consists of up to 13 channels for analog to digital converter. The converter accuracy quantities to ten-bit to convert analog to digital sign particularly. It is well matched to work with unique inner and outside clock resources. It comes with 4 built-in timers or an external oscillator may be interfaced for clocking. The frequency range is from 31 kHz to 48 MHz respectively. The microcontroller PIC18F4550 comes with ADC comparators and different such peripherals.
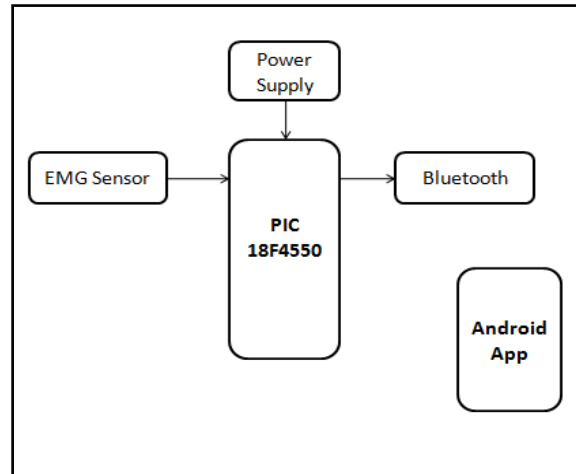
Figure 1: Block Diagram Of System

2.   EMG electrode

Muscle activation is triggered by bioelectrical signals of very low amplitude sent from motor control neurons on our brain to the muscle fibers. Electromyography (EMG) enables the translation of these electrical signals into numerical values, enabling them to be used in a wide array of applications.

Figure 2: EMG Sensor

3.   Bluetooth

Bluetooth is a wireless technology standard for trading information over short separations from settled and cell phones, and building individual region systems. HC-05 Bluetooth Module: HC-05 module is a simple to utilize Bluetooth SPP (Serial Port Protocol) module, intended for straightforward remote serial connection setup. Serial port Bluetooth module is completely qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with finish 2.4GHz radio handset and baseband. It utilizes CSR Blue center 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).
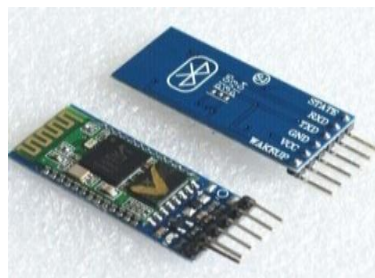

Figure 3: Bluetooth

III.   APPLICATIONS

EMG can be used to control of a virtual robot hand.
As we know electric power wheelchairs are important for elderly and highly disabled user which is normally controlled by joy stick but now we can control this wheelchair by EMG too. Two main methods can be used in it- pattern recognition and hybrid recognition system.

IV.   FLOWCHART
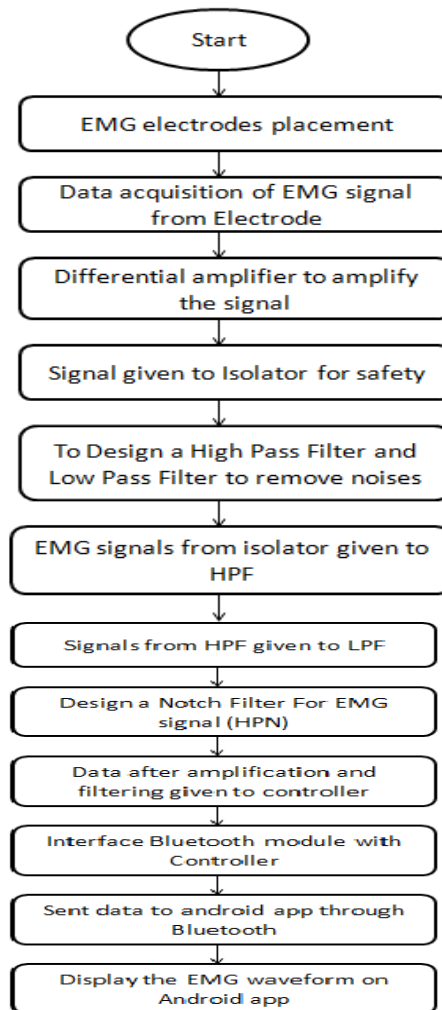
V.   CONCLUSION

In this paper, we depicted presentation, kinds of EMG, qualities of EMG signal, muscles associated with developments of hand, parameters which are utilized to examine EMG signal, assortment of utilizations where EMG signs can be utilized. . It began with a clarification of EMG at that point took after on to a portrayal of their writes. This paper will give the scientists a decent comprehension of EMG signal and its investigation. This information will help them to grow all the more capable and effective applications. At long last, the paper examined the utilization of EMG signals.

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