CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Electromyography (EMG) signal is a signal recording process that translates the electrical signal into graphs, sounds and also numerical values using EMG sensor. It will measures the electrical signals that generated in the muscle of human body during any of muscle contraction. It is also a signal that we used for clinical and biomedical applications. EMG signal is a signal used to check health of the muscle and also check nerves that control the muscles. This signal acquired advanced methods for detection, decomposition, processing and classification. The signal is being analyzed from upper limb muscle. This signal can be used in various condition such as electrode placement, muscle contraction, angle measurement, different age, different gender and different position.

EMG is often used for a person who is in a condition of weakness, pain or any abnormal sensation. This device can directly tell the muscle’s condition, muscle’s problem and even muscle’s diseases. EMG will also act as a translator which will
translates the electrical signal into graphs, sounds and also numerical values that can be interpret by a specialist.

EMG is a device that use tiny devices called electrodes used to transmit or detects any electrical signals. EMG has three types of electrodes that are surface electrodes, intramuscular electrodes and needle electrodes. Surface electrodes is an electrode being taped to the skin that use to measure the speed and strength of the electrical signals occur. The electrode will detect the signal on the surface of the skin. Intramuscular electrodes is a condition where the signals are being detect with wires insert into the muscles. Needle electrodes is when the electrode was inserted directly into a muscle thus record the muscle activity in that muscle.

This research will determine the effects on the EMG signal from upper limb muscle during two conditions that is when a person in a conscious condition and sub-conscious.

1.2 PROJECT BACKGROUND

Upper limb muscle movement are always used in our daily life for various activities. Almost all people in this world having their daily life and done most of their routine with the movement of the body muscle such as upper limb muscle forearms and biceps including the disable person. For this analysis, EMG signal are used for the condition of conscious and sub-conscious in order to observe the results and the effects of the EMG signal.
For this two different conditions, the effects on EMG signal will be analyzed where it will be placed on the upper limb muscle while a person in a state of conscious and sub-conscious. Conscious is a condition where a person’s focus are fully give. Sub-conscious is a condition where a person starting to loss his focus where half of his focus are already gone. From the EMG results we can study the muscle movement through the electrical signal and also can find out the force, torque and angle from the muscle movement.

1.3 UPPER LIMB MUSCLE

Movement of human body are linked with muscular system. It was about 700 named muscles that were attached to human’s bones of skeletal system. Some of the muscles are upper limb muscles such as muscle in anterior compartment of the forearm, muscle in Posterior compartment of the forearm, muscle of the arm, muscle of the hand and muscle of the shoulder region. In this project, the muscle that have been choose are forearms and biceps brachii for upper limb muscle.

1.4 CONTRACTIONS

Muscle of human body can generate force through contractions. There are many types of muscle contractions in order for muscle to generate force that are isometric where the muscle is static but have pressure, eccentric where muscles are often active while the muscles are lightening, concentric such as a person holding dumbbell