**Introduction:**

Emotion is a way for every human being to express their mood, reaction and situation without using any word. This is a natural process and is very important in day to day life interaction. As our objective is to work with human emotions, there rises the first question. How the emotions are formed?

There are two major perspectives on the origin of emotions. According to one, emotions are the products of natural selection. They are evolved adaptations, best understood using the explanatory tools of evolutionary psychology. According to the other, emotions are socially constructed, and they vary across cultural boundaries. There is evidence supporting both perspectives. In light of this, some have argued both approaches are right. The standard strategy for compromise is to say that some emotions are evolved and others are constructed. The evolved emotions are sometimes given the label “basic,” and there is considerable agreement about a handful of emotions in this category [1]. So we can conclude that these basic expressions are controlled by human subconscious mind on which the influence of conscious mind is very little. As a result the patterns of basic emotions are the same among various race of human. There are six basic emotions which are universal and biological [1]. These emotions are happiness, sadness, surprise, fear, anger and disgust. (Ekman, 1982).

There is a number of systems which are used to recognize the human emotional status. Some of the important and popular systems are EEG (Electroencephalography) [3], fNIRS (functional Near-Infrared Spectroscopy), fMRI (functional Magnetic Resonance Imaging), GSR/EDA (Galvanic Skin Response / Electrodermal Activity), EMG (Electromyographics), ECG/PPG (Heart rate monitoring system), blood-pressure, audio-visual, bodily expression, and facial expressions. [4]

Most of these need heavy and complex bio medical equipment and need a physical connection with the subject to classify their emotion. But as we know the emotion are physiological and can be sometimes controlled by the subject himself. Or the subject may hide his real emotion and can make up a fake one at the time of the experiment, so that his real emotion cannot be identified. As this emotion recognition system can be used in various fields, we should be careful not to go through a process where the subject’s real emotion can be changed. And this is where facial expression, audio-visual and bodily expression come into play. The examiner can record a short video clip or some image frame of a subject without making him notice that the subject’s pictures has been taken for analyze. Then we can be certain that the subject’s condition hasn’t been changed through the process. So we can hope for a better result. And as the image processing is in the domain of modern computer science it is easier for us to do research on this system.

Our prime mission with this research lies in the creation of a system which can function in real time conditions and can classify the emotion with a very good probability. And for this primarily we are going to use only the facial expressions to classify emotions.

In this context we are going to analyze some popular existing applications which claim to recognize human emotion. We are going to use this applications in different situations like different exposer of light, color image, gray scaled imaged, multiple character in one image and so on. Not only that we will perform a case study on those applications. From these experiments, we are going to compare between their performances and try to dig into the methodology. At first it might seem like a black box testing but eventually we will try to find out the working algorithms or the brain behind it. So in the end, it’s more likely to treat this as a Gray box testing rather than a Black box testing.