**Modules:**

**Face Detection:**

Face detection or localization is an important step for image classification since only the principal component of face such as nose, eyes, mouth are needed for classification. Face detection algorithms can be broadly classified into feature, knowledge, template and appearance

based methods. Our proposed system uses Viola Jones object detection algorithm for face localization which comes under feature based classification. Viola Jones object detection algorithm uses Haar featurebased cascade classifiers. The Haar Cascade classifier is extremely important element of the face detection. The presence of the features in any of the input image is

determined by the Haar features.

**Facial Expression Recognition classification:**

After learning the deep features, the final step of FER (Facial Expression Recognition) is to classify the given face into one of the basic emotion categories. Unlike the traditional methods,

where the feature extraction step and the feature classification step are independent, deep networks can perform FER in an end-to-end way. Specifically, a loss layer is added to the end of

the network to regulate the back-propagation error; then, the prediction probability of each sample can be directly output by the network. In CNN, softmax loss is the most common used function that minimizes the cross-entropy between the estimated class probabilities and the ground truth distribution.

**Convolutional neural network (CNN):**

CNN has been extensively used in diverse computer vision applications, including FER. At the beginning of the 21st century, several studies in the FER literature found that the CNN is robust to face location changes and scale variations and behaves better than the multilayer perceptron (MLP) in the case of previously unseen face pose variations, employed the CNN to address the problems of subject independence as well as translation, rotation, and scale invariance in the recognition of facial expressions.