**ABSTRACT**:

Facial Detection and recognition research has been widely studied in recent years. The facial recognition applications plays an important role in many areas such as security, camera surveillance, identity verification in modern electronic devices, criminal investigations, database management systems and smart card applications etc. This work presents deep learning algorithms used in facial recognition for accurate identification and detection. The main objective of facial recognition is to authenticate and identify the facial features. However, the facial features are captured in real time and processed using haar cascade detection. The sequential process of the work is defined in three different phases where in the first phase human face is detected from the camera and in the second phase, the captured input is analyzed based on the features and database used with support of keras convolutional neural network model. In the last phase human face is authenticated to classify the emotions of human as happy, neutral, angry, sad, disgust and surprise. The proposed work presented is simplified in three objectives as face detection, recognition and emotion classification. In support of this work Open CV library, dataset and python programming is used for computer vision techniques involved. In order to prove real time efficacy, an experiment was conducted for multiple students to identify their inner emotions and find physiological changes for each face. The results of the experiments demonstrates the perfections in face analysis system. Finally, the performance of automatic face detection and recognition is measured with Accuracy.

# 1. INTRODUCTION

Human computer interaction is a common trend and innate ability to distinguish among multiple faces. Until recent past computer vision problems were quite challenging but advent of modern technologies has trivially improved from the problems of varying light, changed by age, hair and other accessories [1]. However, face recognition applications are used improve access to identify and verify the people by their face features. Hence interpreting the facial features and their actions is much required. As these features and expressions helps in classify the emotions of human face. Recent advances in technology has resulted in the use of Artificial intelligence system as these systems are capable to understand and realize the emotion recognition through facial features. Hence this is an attempt to prove the existence of latest technological developments for human-computer interaction using deep learning or Convolution neural network models [2]. To recognize and classify the human face various methods are required but deep learning technique outperforms other methods by its large capabilities of different datasets and fast computation capabilities. Usually the process of face recognition and classification involves various steps such as preprocessing, detection, orientation, extraction of features and classification of emotion. These tasks are easily performed with deep learning keras model which outperforms the handy computations. Deep learning technique is a standard paradigm to represent the working of human brain with neurons [3]. This learning usually consists of neural network model where neurons act as inputs and each of them are connected to move as outputs. Deep learning is the subset of machine learning in which the algorithms are integrated similar to machine learning, but there are innumerable levels of these algorithms, each of which provides a different interpretation of the data they insert. This network of algorithms is called the network of artificial neurons, because their operation is a source of inspiration, or we could say; an attempt to mimic the function of human neural networks in the brain [7]. Several hidden levels allow deep neural networks to study data functions in the so-called functional hierarchy, since simple functions, such as two pixels, combine from one level to another, forming, for example, functions that are more complex.Low level networks are not much capable of processing mathematical operations than multilevel networks as these networks are able to perform deep data processing. Deep learning models have very good characteristics of calculating the intensive calculus and has great demand in the form of minute chip called Graphical processing unit [9].There are three different phases of this work such as facial detection, recognition and emotion classification which are outlined briefly in the below sections.

## 3. SYSTEM ANALYSIS

**3.1 EXISTING SYSTEM:**

Research has been widely studied in recent years. The facial recognition applications plays an important role in many areas such as security, camera surveillance, identity verification in modern electronic devices, criminal investigations, database management systems and smart card applications etc. This work presents deep learning algorithms used in facial recognition for accurate identification and detection. The main objective of facial recognition is to authenticate and identify the facial features.

**3.2 PROPOSED SYSTEM:**

The proposed work presented is simplified in three objectives as face detection, recognition and emotion classification. In support of this work Open CV library, dataset and python programming is used for computer vision techniques involved. In order to prove real time efficacy, an experiment was conducted for multiple students to identify their inner emotions and find physiological changes for each face. The results of the experiments demonstrates the perfections in face analysis system. Finally, the performance of automatic face detection and recognition is measured with Accuracy.

## 5. SYSTEM REQUIREMENTS

**5.1 HARDWARE REQUIREMENTS:**

* System : Pentium Dual Core.
* Hard Disk : 120 GB.
* Monitor : 15’’ LED
* Input Devices : Keyboard, Mouse
* Ram : 1 GB

**5.2 SOFTWARE REQUIREMENTS:**

* Operating system : Windows 10
* Coding Language : python
* Tool : PyCharm
* Database : MYSQL
* Server : Flask