**Facial Emotion Analysis**

**A Minor Project Synopsis Submitted to**



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## **SYNOPSIS**

1. **TITLE**

**Facial Emotion Analysis**

1. **INTRODUCTION**

Facial expression analysis has been attracting considerable attention in the advancement of human machine interface since it provides a natural and efficient way to communicate between humans. Some application areas related to face and its expressions include personal identification and access control, video phone and teleconferencing, forensic applications, human-computer interaction, automated surveillance, cosmetology, and so on.

Most of the facial expression recognition methods reported to date are focused on recognition of six primary expression categories such as: happiness, sadness, fear, anger, disgust and grief. For a description of detailed facial expressions, the Facial Action Coding System (FACS) was designed by Ekman and Friensen in the mid 70s.

## 2.1 PROJECT BENEFITS

Detecting emotions with technology is quite a challenging task, yet one where machine learning algorithms have shown great promise. By using Facial [Emotion Recognition](https://sightcorp.com/emotion-recognition/), businesses can process images, and videos in real-time for monitoring video feeds or automating video analytics, thus saving costs and making life better for their users.

## 2.2 PROJECT SCOPE

The scopes of this project are –

* Analysis of human face.
* Evaluating the emotion of the face.
* Predicting the correct expression displayed as per the given input
* Storing the results in a database so that it can be viewed later.

1. **PROBLEM STATEMENT**

There is an inaccurate location and tracking of facial points. Also Pose, movement and rotation of the test person are limited. Glasses may hinder classification, especially thick and dark frames in detecting emotions. Face Reader can analyze one face at a time. Face Reader cannot classify facial expressions in test persons with a partial facial paralysis. Humans are well trained in reading the emotions of others,in fact, at just 14 months old babies can already the difference between happy sad. But can computers do a better job than us in accessing emotional states?

To answer this question we are going to design a CNN that gives machine the ability to make inferences about our emotional states.

## OBJECTIVES

The main objective of this project is to build an automated system by using Convolutional Neural Network and Deep learning capable of accurately recognising the human emotions based on the live images or pre-captured images.There are many systems similar to this, but our objective is to create a system with better accuracy and improved results.

## INTENDED USER

* IT professionals.
* HealthCare Organisations.
* Gaming Industries.
* Automobile Sector.
* Banking Services.

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## EXISTING SYSTEM

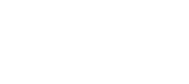
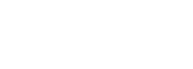
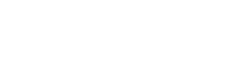
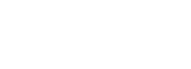
There are works that used CNN for emotion recognition. Lopes et al.(2015) created a 5-layer CNN which was trained on Cohn-Kanade (CK+) database for classifying 6 different classes of emotions. A lot of pre-processing steps such spatial and intensity normalisation were done before inputting the image to the network for training in this method.

Arushi and Vivek (2016) used a VGG16 pretrained network for this task. Hamester et al. (2015) proposed a 2-channel CNN where the upper channel used Convolutional filters, while the lower used Gabor-like filters in the first layer.

Xie and Hu (2017) proposed a different type of CNN structure that use Convolutional modules. This module, to reduce redundency of same features learned, considers mutual information betwenn filters of the same layers, and processes the best set of features for the next layer.

Several projects have already been done in this field and our goal will not only be to develop an Automatic Facial Emotion Recognition System but also improving the accuracy of this system comapred to the other available systems.

## 6.1 PROCESS FLOW



Raw Image

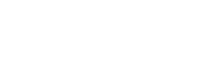
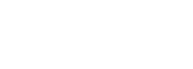
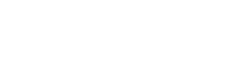
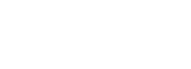
Normalization

CNN Train

CNN

Weights

*Fig1:* **Training Phase**



CNN

Weights

Raw Image

Normalization

CNN

Facial

Expression

*Fig2:* **Testing Phase**

## 6.2 LIMITATIONS

Some limitations of the existing system are:

* + - * For better results image should be noise free or with minimal noise.
      * When two emotions look quite similar for ex- “Disgust” could also be classified as sadness or “Surprise” can be classified as “Happiness” and so on. So, we must see how can we increase its efficiency and accuracy.

## PROPOSED SYSTEM

In this project facial expression recognition system is implemented using convolution neural network. Facial images are classified into seven facial expression categories namely Anger, Disgust, Fear, Happy, Sad, Surprise and 'Neutral. Kaggle dataset is used to train and test the classifier.

## SYSTEM FEATURES

Our system will first recognize the human face then it will analyze the face.

Then using the image samples from kaggle dataset using convolutional neural network, we are going to identify emotion exhibited by the user. With the aim of precision and accuracy we are going to use multi-level CNN for getting better results.

## HARDWARE REQUIREMENT

* System Processor: Inter Core i3
* Bus: 64-Bit.
* RAM: 4 DDRRAM.
* Hard drive: 500 GB.
* Display: SVGA Color.
* Key board: Windows compatible.
* Web Camera

## SOFTWARE REQUIREMENT

* Operating System: Windows7/8/10
* Python 3.6 Editors.
* WAMP

## CONCLUSION

The facial emotion recognition system presented in this project contributes a resilient free face recognition model based on the mapping of behavioral characteristics with the physiological biometric characteristics. The physiological characteristics of the human face with relevance to various expressions such as happiness, sadness, fear, anger, surprise and disgust are associated with geometrical structures which restored as a base matching template for the recognition system.

The behavioral aspect of this system relates the attitude behind different expressions as property base. The property bases are aligned as exposed and hidden character in genetic algorithmic genes. The gene training set evaluates the expressional uniqueness of individual faces and provide a resilient expressional recognition model in the field of biometric security, HealthCare, Automobile Industry, Gaming sector, Banking and many more.

## LIMITATIONS

* + 1. The application would be less reliable in case of images taken in insufficient light
    2. Mistaken identity.

## 8.2 FUTURE SCOPES

* With ML-powered recognition software helping to decide when patients necessitate medicine or to help out physicians determine the optimal treatment for the patient.
* It makes sense for car manufacturers to use ML to help them understand the human emotions. Using facial emotion detection smart cars can alert the driver when he is feeling drowsy.
* Using facial emotion recognition can aid in understanding which emotions a user is experiencing in real-time as he or she is playing without analyzing the complete video manually.

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