

# Facial Expression Recognition Based Scoring System for Restaurants using Deep Learning



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**Abstract:** Now a days, the technology has been increased. Hence this is a tool for the advancement of the earlier things. So we are making use of the technology for restaurant scoring system. The fame of unmanned restaurants is the hot topic in society. Because of the absence of the staff, there is no direct contact with the customers to take feedback of the restaurant. This paper represents the automated rating system for the restaurants by detecting the facial emotions with the help of Convolutional Neural Network [CNN]. It consists of web server and a pretrained CNN and detection of facial expression.

**Keywords:** CNN, Facial Expression Recognition, web server, Restaurant Scoring.

## I. INTRODUCTION

Facial emotion is most powerful and natural signs for human beings to express their emotional States and feelings. Numerous studies have been conducted on automatic facial emotion analysis, since it is most important in social robotics, medical treatment, driver fatigue surveillance and many other human computer interaction systems. Through the proper vision of machine learning, variety of facial expression recognition systems have been invented to encode the expression information from facial representations as early as the twentieth century. Ekman and Friesen [3] defined six basic expressions based on Cross Culture Study [4] which indicated that human perceive certain basic feelings or emotions regardless of culture. These prototypical facial expressions are anger, disgust, fear, happiness, sadness, and surprise. Contempt was subsequently added as one of the basic emotions [2]. Recently, advanced research on neuroscience and psychology argued that the model of six basic emotions are culture-specific and not universal [3].

In this project we are going to give the rating for the food and the environment of the restaurant by just inputting the image. The designed platform receives the image and detects the facial expression of the image and displays the emotion whether we are happy, satisfied or disappointed with the food or with the environment. For this we are using a platform for input and output.

### 1.1 OBJECTIVES

1. Avoids errors in the data input process and show the correct direction to the management for getting correct information from the computerized system.

2. User-friendly screens for the data entry to handle large volume of data.  
3. Unmanned task can be done by just detecting the Facial emotion of the person.

### 1.2 REQUIREMENT ANALYSIS

The project involved analyzing the design of few applications so as to make the application more users friendly. To do so, it was really important to keep the navigations from one screen to the other well ordered and at the same time reducing the amount of typing the user needs to do. In order to make the application more accessible, the browser version had to be chosen so that it is compatible with most of the Browsers.

#### 1.2.1 Software Specification

For developing the application the following are the Software Requirements:

##### i. Python

Python is an interactive, object oriented and simple syntax programming language. This programming language express concepts in lesser number of lines. Python interpreters are available for many operating systems. Python supports for multiprogramming paradigms which includes object oriented, functional and imperative library to code the concepts.

##### ii. Django

Django is the the web server that uses python platform. It is a open source web framework which encourages clean design. It takes care of web development, so we can focus on writing source code. It is maintained by Django foundation. Django main goal is to simplify the creation of complex database driven websites. Django highlights reusability and pluggability of components. Python is even used to set files and data models.

#### Operating Systems supported

1. Windows 7
2. Windows XP
3. Windows 8

#### Technologies and Languages used to Develop

1. Python

#### Debugger and Emulator

Any Browser (Particularly Chrome)

#### 1.2.2 Hardware Specification

1. **System** : Pentium IV 2.4 GHz.
2. **Hard Disk** : 40 GB.
3. **Floppy Drive** : 1.44 Mb.
4. **Monitor** : 14' Colour Monitor.
5. **Mouse** : Optical Mouse.
6. **Ram** : 512 Mb

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## II. LITERATURE SURVEY

### 2.1 EXISTING SYSSYM

As there is no staff available in unmanned restaurants, it is difficult for the restaurant management to estimate how the concept and the food is experienced by the customers. Existing rating systems, such as Google and TripAdvisor, only partially solve this problem, as they only cover a part of the customer's opinions. These rating systems are only used by a subset of the customers who rate the restaurant on independent rating platforms on their own initiative. This applies mainly to customers who experience their visit as very positive or negative [8].

### 2.2 PROPOSED SYSTEM

In order to solve the above problem, all customers must be motivated to give a rating. This paper introduces an approach for a restaurant rating system that asks every customer for a rating after their visit to increase the number of ratings as much as possible. This system can be used in unmanned restaurants; the scoring system is based on facial expression detection using pre-trained convolutional neural network (CNN) models. It allows the customer to rate the food by taking or capturing a picture of his face that reflects the corresponding feelings. Compared to text-based rating system, there is much less information and no individual experience reports collected. However, this simple fast and playful rating system should give a wider range of opinions about the experiences of the customers with the restaurant concept.

### ARCHITECTURE

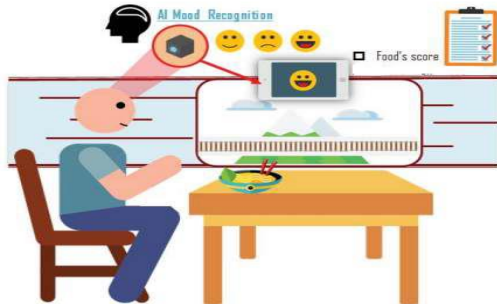


Fig.1 Detection of facial Expression

An interface was created between the user and the admin. Through the interface the user can upload the image. From the image of the person our designed platform detects the expression and displays the output in the form of rating and emotion of the person.

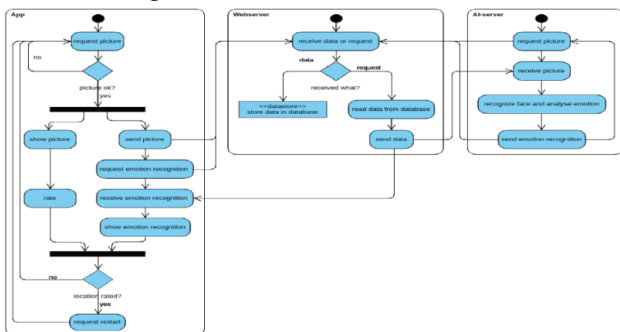


Fig.2 Data Flow Diagram of Restaurant rating system.

The Fig 2 shows how we input the image of the person and then how the server detects the image person and gives output as the emotion of the person and the rating.

## III. RESULTS AND DISCUSSION

### 3.1 FACE DETECTION

Face expression detection is the most important phase for image classification since, the principal component analysis of nose, mouth, eyes are needed for the classification. Facial detection algorithms are classified based on knowledge feature template models. This paper uses object detection algorithm for facial expression recognition. In this algorithm, Haar Cascade Classifier is used based on this input image is detected with the help of Haar features.

### 3.2 Facial Expression Recognition Sclassification:

The last step of facial expression recognition is to classify the given input image into any one of the basic emotions such as happy, sad, angry etc. Instead of feature extraction step, the feature classification step are independent. FER is performed in end to end way. Especially, the last layer is added to the networks and to monitor the errors. [7]

We have design this as a web application using python DJANGO web server. This application can run on user browser where he can upload his photo with rating, uploaded photo will be sent to webserver where machine learning algorithm will be used to extract expression from photo and then saved result to MYSQL database. Another user called 'admin' can login to application and see all users visited to restaurant and can view all customer feedback with facial expression and photo. By seeing this result admin can understand whether customers are happy with their services and foods or not [9][10].

To run this project install MYSQL and then create database by copying content from 'DB.txt' file and paste in MYSQL. Install python and then install DJANGO web server and deploy code on DJANGO. After deployment start server and run the code from browser.

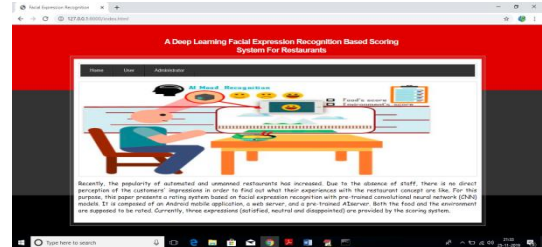


Fig. 3 Home page of rating system

In Fig 3, click on 'User' link to get below screen where user can upload photo and give ratings

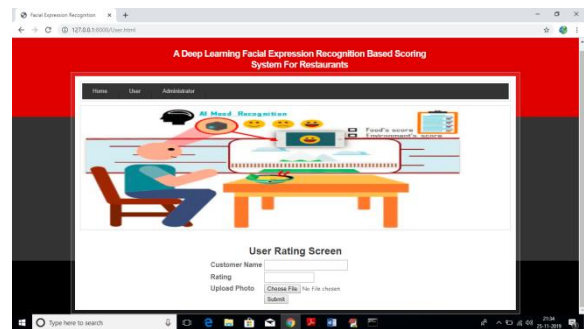


Fig 4 user rating system screen page

From the Fig 4, User will fill above from and upload photo



Fig 5 Uploading the image of the person

In Fig 5, user filled form and uploading one happy image and then click on ‘Open’ button and then click ‘Submit’ button to send data to webserver. After processing above data will get below results.

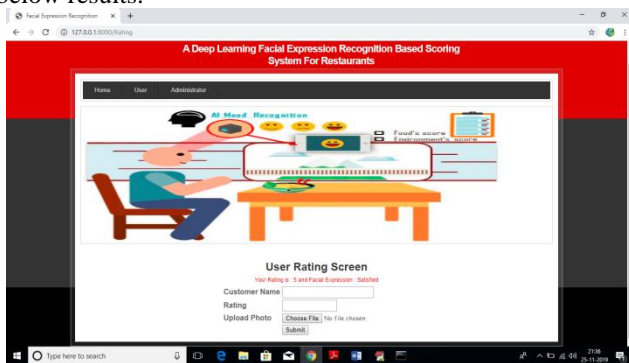


Fig 6 displaying the rating

In Fig 6, we can see output message as given rating and from photo extracted facial expression is satisfied. Now go to ‘Administrator’ link and login as admin by giving username as ‘admin’ and password as ‘admin’. See below screen.

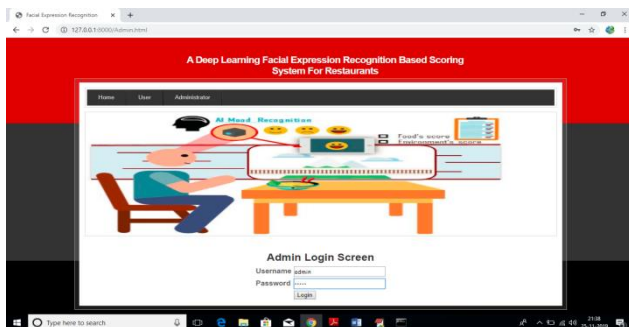


Fig 7 Admin login Page

From the Fig 7, Admin can login into his portal to view the ratings given by the different users.

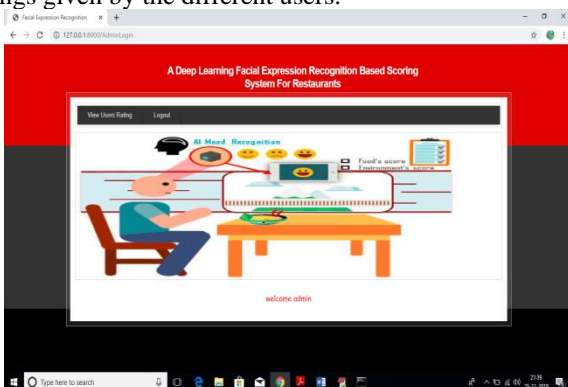


Fig 8 welcome page of admin

In Fig 8, admin can click on ‘View Users Rating’ link to get all customers feedback. See the Fig 9

Customer Name	Rating	Facial Expression	Photo	Date & Time
rahesh	5.0	Disappointed		2019-11-25 09:06:12
rahesh	5.0	Satisfied		2019-11-25 09:06:36
rahesh	5.0	Disappointed		2019-11-25 10:18:13

Fig 9 ratings given by various users

From the Fig 9, admin can see photos and their facial expressions

#### IV. CONCLUSION

In this paper, rating system for the restaurant was introduced by recognizing the facial expression by inputting the image scanned and principal component analysis was done and compared which Haar features. Now the image is classified and detected whether it is happy or sad or anger. In this paper basically for restaurant scoring we are recognising facial expression and classified into happy satisfied and disappointed.

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