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Rating and Classification of Small Scale Shops using Machine Learning

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ABSTRACT

Time and money are primary parameters which are considered while purchasing from any shop. When customers visit any shop, the visit should be convenient for that purpose many on-line rating applications are been made which helps the customer to know about that shop. Merchants can make a lot of promises to their customers but at the end of the day, consumers know merchant's goal is to make a sale and understand that they will always showcase their products and services in their best light. For exactly this reason, we are going to implement one system which gives customers rating for particular small-scale shop. Using this system any customer with a smart phone or mobile device can give a rating to a particular shop or can make a decision depending on that rating which is already given by other customers. Product ratings are generally understood as the evaluation by using stars or points.

Keywords: Machine Learning, OCR (Optical Character Recognition, Tensor flow, Sickle-learn.

1. INTRODUCTION

Nowadays so many small-scale shop and restaurants are there, so it is difficult to choose between them according to our needs. Currently, there is no system which provides information about small shops, its rating and other information about the shop. Our system will help users to overcome such problem and help the user to save time and money.

In this project, we will be developing an android application which will take shops board image or name directly as input from the user and its GPS location and give a rating for small-scale shops.

This project will be implemented over a period of two semesters. The main objective of this project is to use machine learning to read words from an image taken from the camera. The predictive model is created using artificial neural networks with help of tensor flow machine learning library in python.

2. SYSTEM ARCHITECTURE

The main objective of the project is to create an application that will show user ratings of small-scale shops to give user power to choose according to his needs. As shown in Fig 1 the application works by taking an image of the shop as input. After taking shop's board image as input it will pre-process the image that converts the image to grayscale to reduce its size. And using hog detector extract image part that contains text to reduce size. After that image will be inverted and it will be passed to OCR engine for prediction.

Following figure 1 shows an architectural diagram of the system.

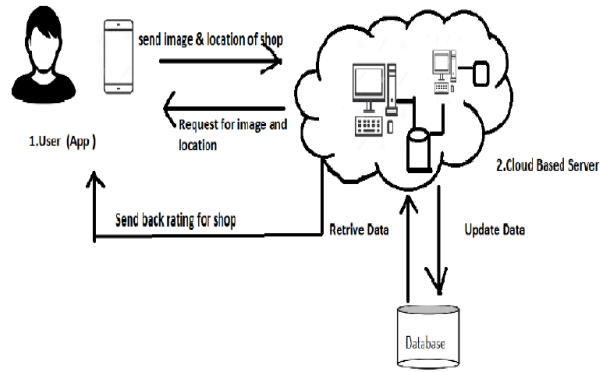


Fig1: Architecture Diagram of System

The proposed system consists of total two modules which are as follows:

- A. User module**
- B. Server side**

A. USER MODULE:

User module is an android application which works in two phases named as:

- I. Phase 1
- II. Phase 2

I. Phase 1:

In the user module in which an Android application is provided to each user to access the related search. Firstly user needs to login into the app and then enter the image of the shop. Then the user module gets connected to the server module for further information about ratings. The user request is sent to the server and according to the image given by the user, it will check for the rating for that shop. The image which is been given by the user, on that image some processing is being done and after that location along with rating is being made available to the user. Following figure 2 shows a flow diagram of user module phase 1.

In phase 1 of the user module, the application gets started and ask the user for GPS and camera permissions. After that user needs to sign in. After signing in, it will user needs to point phone camera to shop's name board and take a picture. This taken picture will be processed by OCR engine and name of the shop is extracted from the image. Then, the application will record user's GPS coordinates that are altitude and longitude. For further processing application will send these text and coordinates to the server where Server Module will perform its operations.

In phase 1, Image capturing and Pre-processing, Text Segmentation, Text Recognition are the important steps.

a. Image Capturing and Pre-processing:

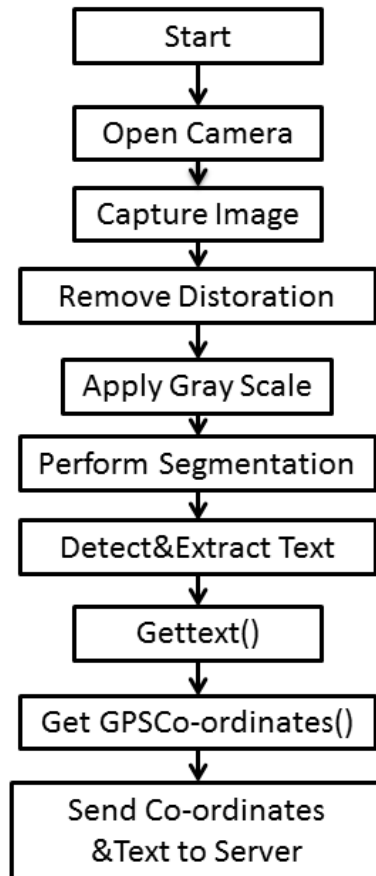
Firstly, the image is captured in this phase by a camera, the camera captured images may contain noise because of the environmental reasons and the low brightness of the image. Therefore, there are some techniques like image enhancement, binarization, and noise reduction to be done in the processing phase to increase the performance and accuracy of a character recognition system.

b. Text Segmentation:

Extraction of correct character boundaries is very important for recognizing a character. The segmentation of a binary image in a regular sequence can be categorized into lines, words, and characters. There are many well-known segmentation methods available which are projection, region growing and tracing contour etc.

c. Text Recognition:

In recognition process, once the image is segmented, it is normalized by removing noise. At last, OCR extracts the character and recognizes it. There are several problems in OCR such as light condition, text skew, perception distortion, misalignment of text and blur etc.



User Model

Fig 2: Flow diagram for User Module Phase 1

II. Phase 2:

In phase 2 of User, Module application will either receive the ratings for the requested shop from the server if ratings are already available for that shop in server database or server will create a new entry for a new shop with its name and location in server database or ask the application to store new ratings for that shop. Following figure 3 shows the flow diagram of user module in phase 2.

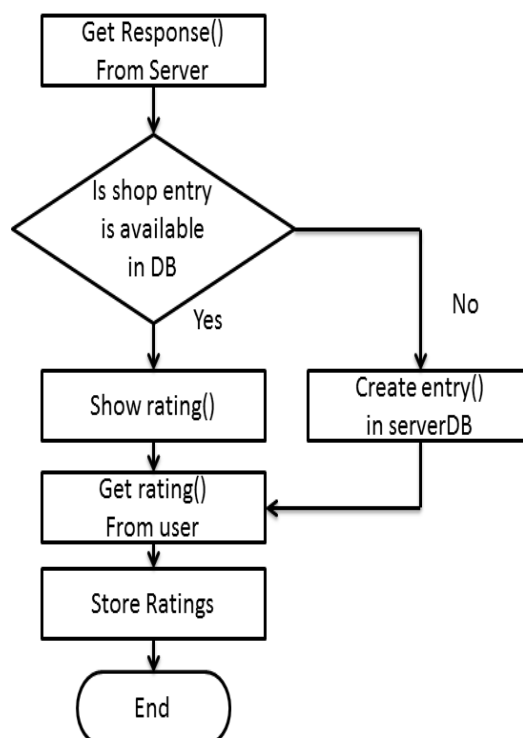
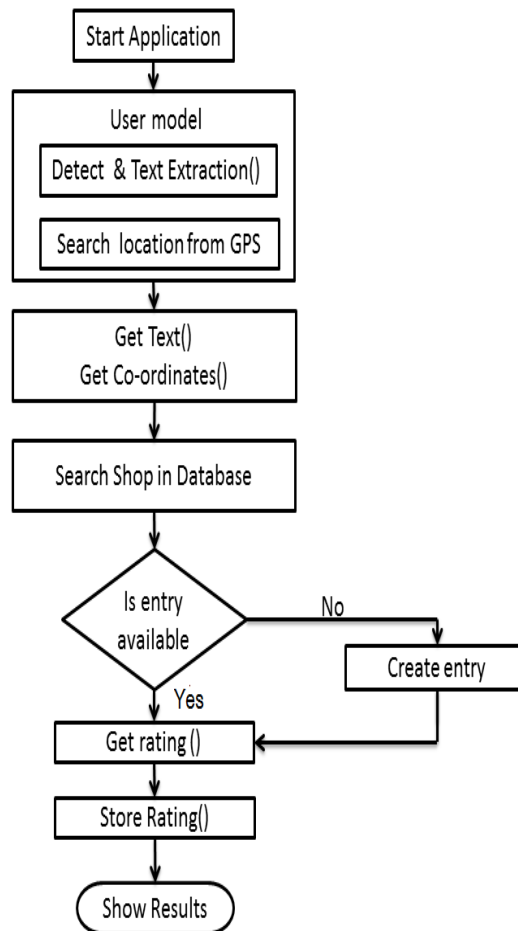


Fig 3: Flow diagram for User Module phase 2

B. SERVER MODULE:

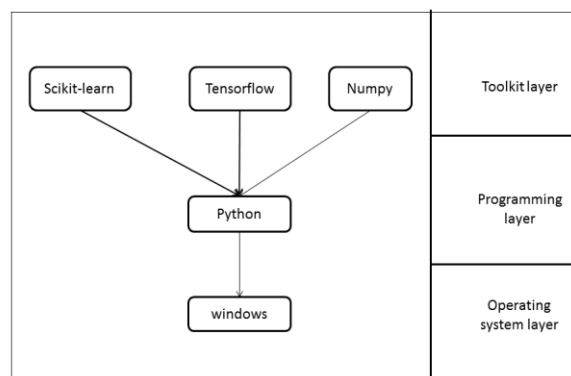
In Server Module, one to many relationships is established between the single server and multiple client applications. Every particular entry is updated in server database as per the ratings provided by the user. After the user creates its ratings, the server calculates the average ratings in case of a particular shop. The server is also responsible for creating new entries if the client requesting shop is not present in the database.

Whenever the user requests for a particular shop’s ratings, the server accesses its database and send the appropriate ratings if available. If the user requested shop is not available in the database then the server will create a new entry in the database for that shop and request the user to provide ratings for it.



3. CHOSEN TECHNOLOGY

The technology that we have used for completion of this project are Python to create a predictive model using the convolutional neural network. Tensorflow is the machine learning library used to create a convolutional neural network. Numpy is used for the creation of arrays. OpenCV is used for taking input from the camera. Android studio is used for the creation of the android application. Scikit-learn is also machine learning library which is used in training and testing predictive model.



4. FUTURE SCOPE

The proposed system in future can be expanded to provide various other services like menu translation from one language to another language. The main concept that is OCR can be further utilized for other propose also i.e. the image of menu taken of the particular restaurant can be stored digitally to database for better price comparison and providing good services.

5. CONCLUSION

Our system will help to save users money and time. The system will capture an image of the shop at any location. All the current information is stored on the server and it is retrieved to a remote user via the android based application. The user can freely get a rating of small scale shops which provide interactive interface environment, so by using this application user can find shop according to his needs. This project presents a system which provide high practical value in a modern fast era

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