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FOOD DETECTION AND RECIPE RECOMMENDATION

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Abstract: In the given paper, we design a mobile recipe recommendation system using image processing for various recipes and display the name of the recipe and the list of ingredients needed for cooking the recipe . The proposed system carries out recipe detection on the given dish or fruits and other recipes in a real-time way on an Android- based smart phone, and recommends cooking recipes and detects ingredients related to the recognized food recipe. By only pointing the native camera of a mobile device to the food which is placed on the dish, the user can obtain a recipe and ingredient list instantly. After detection of food user gets the details and facts of ingredients and recipe procedure as per the food image. Tensor-flow library is used to detect the recipe well as the ingredients using Tensor-flow Lite library.

Keywords *- Image processing, object recognition, recipe recommendation, Smart phone, tensor-flow*

I INTRODUCTION

The object recognition technology has made progress by leaps and bounds. Especially, generic object recognition, which solves the problem of identifying the categories of the objects in the photograph. At the same time, open source libraries on object recognition such as the Open Computer Vision library (OpenCV) has made a humongous impact and spread widely. With such libraries, we can easily implement object recognition system not only on Personal Computers but also on mobile devices such as Android smartphones. Due to major advancements in the working of mobile devices as well as their recent explosive spread, object recognition through mobile devices becomes possible. Based on these situations, in this paper, we propose a cooking recipe recommendation system on a mobile device employing object recognition for food recipes such as pizzas and few other recipes, the reason being the focus is on creating a state- of-art machine learning system that fulfills our motives . By pointing a mobile phone camera to the dish or a group of fruits, a user can get the name of desired recipe or the respective name of fruits. After the recipe is detected, users will receive a list of ingredients mentioned in the recipe and also the procedure of cooking the dish. This is possible with the help of image processing. Database plays an important role in the system as a central service implementation

II SURVEY

A. EXISTING SYSTEM:

Current methods primarily focus on perceptible food information for recognition while we represent visual information, textual details and attributes together to solve recipe oriented problems, such as multi-class classification .

B. FOOD RECIPE RECOM- MENDATION SYSTEM BASED OFF OF MACHINE LEARNING:

[5] Systems make use of user profiles and technologies to assist users to find suitable information over large volume of data. User's profile is important

for successful recommendations. Two approaches are presented to recommend recipes based on preferences of the user given in the form of either ratings or grading , and comparison is done between them to recognize which approach is suitable for the given dataset. The approaches included, are item based approach and user based approach to recommend recipes. For user based approach Euclidean Distance and Pearson Correlation are used. [3] We use similarity techniques of user based approach and introduce fixed size neighbourhood and threshold-based neighborhood to the same. The User based approach is found to be far more superior than item based approach. The performance for the All recipe data set is found to be better than the simulated dataset, reason being increased interactions between users and items.

C. ITEM BASED RECOMMENDATION:

[1] In item based collaborative filtering approach recommendations are based on how similar recipes are to recipes. This type of recommendation takes into account that the user has given a rating to the recipe or not. It does not assess the values of the ratings. The similarity values are used to provide a ranked list of recommended recipes. [4] To calculate the similarity, we apply two similarity measures namely, Tanimoto Coefficient similarity and Log-Likelihood similarity.

D. USER BASED RECOMMENDATION:

[2] User based recommendations are based on the preferences given by the user and how similar the users are according to the preferences given by them. The similarity values are used to acquire a list of recommended recipes. Our proposed system incorporates item-based as well as user-based recipe recommendation system. An implementation of this paper include calculating similarity based on the Euclidean distance between two users X and Y. Thinking of recipes as measurements and preferences or gradings as points on those dimensions, a distance will be calculated using all recipes (dimensions), where both users have indicated a preference for that recipe. Use based recommendation includes using the ingredients and then cooking the recipe.

III PROPOSED SYSTEM

Nowadays people who cook, use multiple online sites to obtain information on recipes. Our system proposes an Android application, developed for users to get all information about recipe including the ingredients and the procedure for preparing the recipes . The user interface is designed with the help of Extensible Markup Language (XML) and the native android code is written in Java. First stage is to validate the user by taking the registration information from the user in our proposed system. Clearly, Image processing plays a crucial role in this system. Tensorflow-lite library is used for recipe detection with the help of the OepnCV library. All the recipe or food data is already trained in Tensorflow-Lite file. So we have to use this dataset in our project. On focusing the inbuilt camera on the desired food item, the user will obtain the recipe. When the recipe name is detected by system, it displays the name of recipe on the screen, post the recipe detection, the actual ingredients list will be displayed. The system is designed using the WAMP stack, so the database used will be MySql, which is the central database for whole system. User table, Ingredient table, recipe procedure table are present inside database. The android application communicates with the MySql database through APIs (Application Programming Interfaces) , which is like a bridge between our android application and the database. The system works with HTTP request-response structure with GET and POST methods. In REST Application program interface (API), user makes the request first to resource server and the API calling server responds back to the android system with data in JSON object or JSON array. So APIs mainly work in login, registration, ingredient list, enlisting the recipe for bridging the gap between our android application and MySql database through WAMP server.

The objective is to prepare a mobile system which categorizes the foods or dishes and provide the ingredient details and recipe details. We assume that the proposed system works on a smart phone which has built-in cameras and Internet connection such as Android smart phones.

The working screenshot of our object detection output is presented on the mobile device as follows:

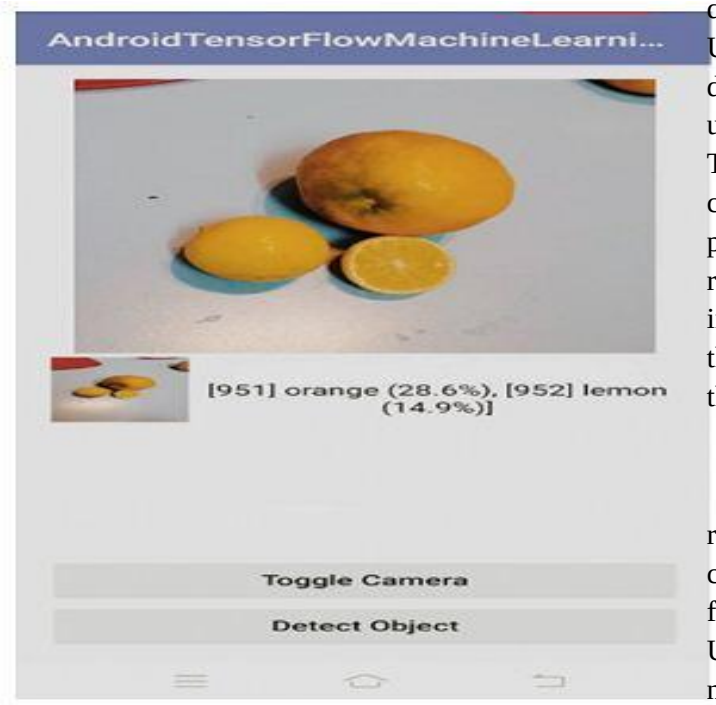

Figure 1 : Object Detection

IV SYSTEM ARCHITECTURE

System's Architecture Diagram :

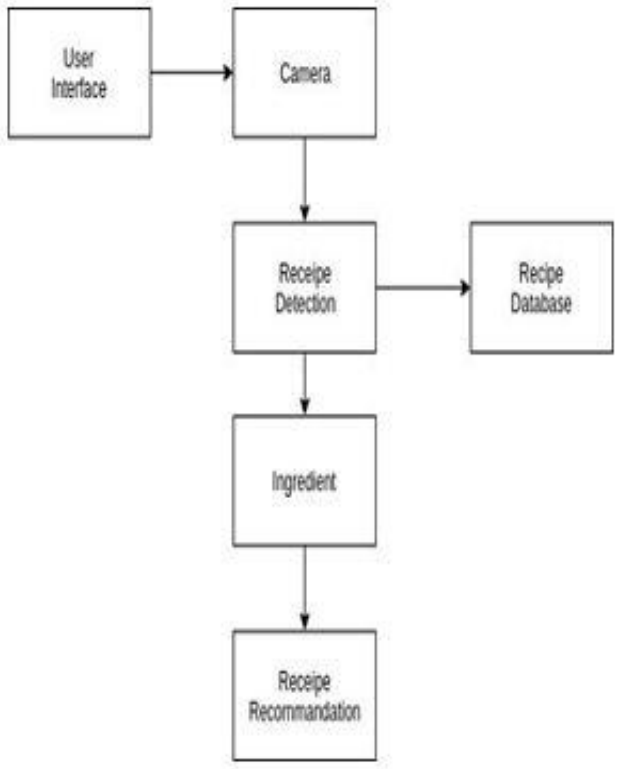

Figure2: System Architecture

The development environment used is Android studio with work being done in the first official language for android, that is, Java. User interface is designed using Extensible Markup Language (XML). User login and registration is done with the MySql database for user authentication. The In-App Camera is used to detect food using image processing via the Tensorflow library, so when the desired image is captured by the camera it detects the food or recipe present in the image. After successful detection of the recipe, data is passed to the MySql database to fetch ingredients and further required recipe data. Based on the detected food, the ingredients list is displayed on the screen.

V CONCLUSION

This application allows the user to detect the recipe from the live camera with image processing concepts. Tensorflow library is used to detect the recipe from inputting live images with the help of camera. The User gets the ingredient list from database as per the name detected and views recipes that contain those ingredients. These ingredient lists are stored under the MySql database in table format that can be sorted and filtered to get the proper ingredients for particular recipe. The user can display the name of recipe and by clicking that recipe, the ingredient list and all the recipe procedures are fetched from the database. Recipes can be added along with new ingredients. The recipes also show step by step procedures that can help the user make a better choice as per the image processed by system. This application was highly-developed to solve one of the difficulty faced by most people, what could be produced from the available ingredients

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