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Food Image to the Recipe Generator

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Abstract - *We intend to use image classification to detect which food dish it is and recommend recipes based on that detection. When it comes to food, there are lots of options and unexplored dishes people might not be aware of. While there are applications that can recommend users with recipes that they search for, ours will use image classification to identify the food dish and suggest related recipes based on its image.*

It is possible to capture the input image or to choose it from food images already present in the mobile device's camera. Deep learning convolutional neural network will be used for the classification, as well as for the recipe recommendation.

It can be implemented through a hybrid system that employs a recommendation approach.

1.INTRODUCTION

People these days are increasingly aware of the importance of what they eat, so that they will make better nutritional decisions pertaining to their health, livelihood, emotions, and culture. Food is a fundamental part of the human experience. It impacts our health, our livelihood, our emotions, and our culture. Despite this, many people do not know where to start.

In order to help people achieve their health goals, we created an application to help them better understand and control their food consumption. We are creating a system that accepts an image of a meal as input, and then outputs recipes and nutritional data that are closely related to it. A user can choose from several related recipes given a particular input image in Snap-N-Eat, and each of these recipes are accompanied by nutritional information in order to assist people in making better nutritional decisions.

In addition to creating a more sophisticated understanding of health and diet, the platform could allow users to express themselves with new recipes and cooking techniques.

1.1 Dataset

Datasets related to Indian food are included in this dataset. The most commonly used recipe is selected from Kaggle.

This database includes 4000 images categorised in 80 different classes or categories. As Indian cuisine consists of a variety of regional and traditional cuisines native to the Indian subcontinent. Given the diversity in soil, climate, culture, ethnic groups, and occupations, these cuisines vary substantially and use locally available spices, herbs, vegetables, and fruits.

Using Jupyter Notebook, we cleaned and built the model.

1.2 MobileNet Model

In terms of mobile vision, MobileNet is a CNN architecture model for image classification applied to mobile devices. There are other models as well, but what makes MobileNet different is that it requires very little processor power to run and applies transfer learning.

This makes it a great fit for mobile devices, embedded systems, and computers without fast graphics processors or low computational efficiency without sacrificing accuracy significantly. This method also works well with web browsers since they are limited by computation, graphic processing, and storage.

MobileNet Architecture

- In this paper, MobileNets are proposed for embedded vision and mobile applications, which use depth-separable convolutions for building lightweight deep neural networks.
- There are two simple global hyper-parameters that enable latency and accuracy to be traded off efficiently.

MobileNet's core layer is Depthwise Separable Convolution, which is an array of depthwise separable filters. Another factor that contributes to performance is the network structure. Lastly, the width and resolution can be adjusted to trade off latency with accuracy.

```
results = model.evaluate(test_images, verbose=0)
print("Test Accuracy: {:.2f}%".format(results[1]*100))
```

```
C:\ProgramData\Anaconda3\lib\site-packages\PIL\Image.py:975:
  warnings.warn(

Test Accuracy: 65.27%
```

Fig1: Shows the accuracy of the User's Input

```
plt.figure(figsize=(30,30))
sns.heatmap(cm, annot=True, fmt='g', vmin = 0, cmap='Blues', cbar = False)
plt.xticks(ticks=np.arange(33)+0.5, labels =test_images.class_indices, rotation = 90)
plt.yticks(ticks=np.arange(33)+0.5, labels =test_images.class_indices, rotation = 0)
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.title('Confusion Matrix')
plt.show()
```

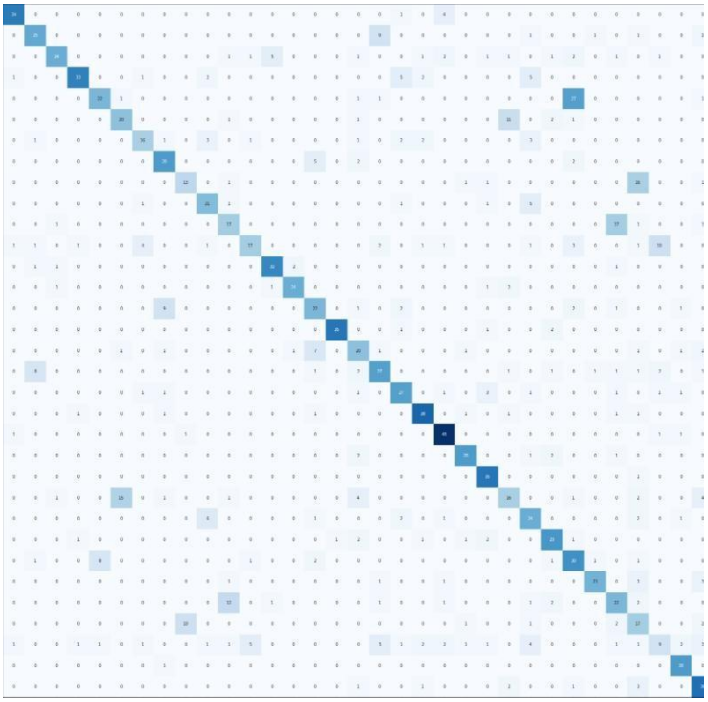

Fig2:Linear Graph

2. Deployment Model

The model was then converted to a tflite flite and saved into directory.

Furthermore, our mobile application is developed using Flutter, while we use web scraping to provide the recipes entered by our users. This model is loaded into our mobile application. And we are ready to help people and change their lifestyles with our app.

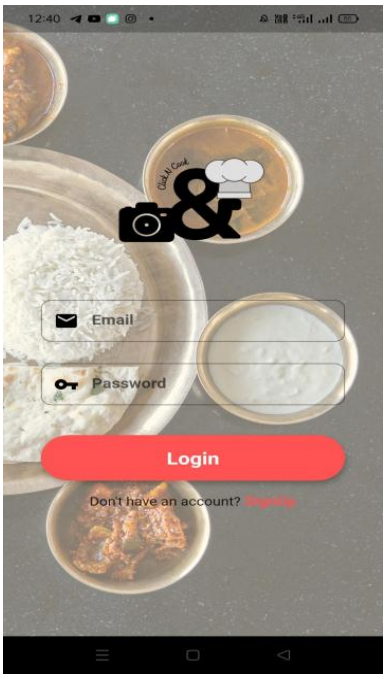

Fig3: Login Page

Fig4: SignUp Page

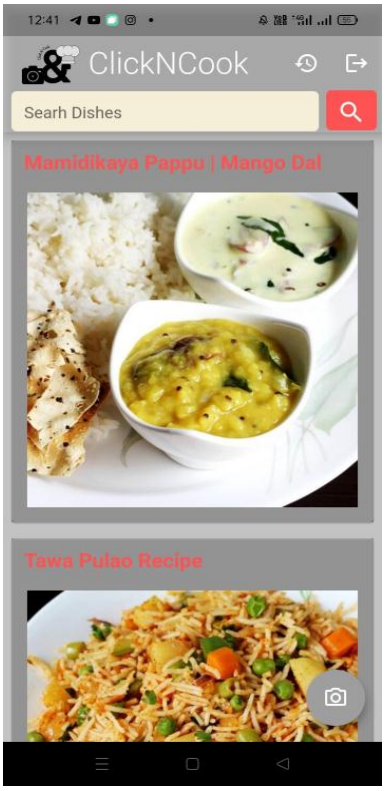

Fig5: Home Page

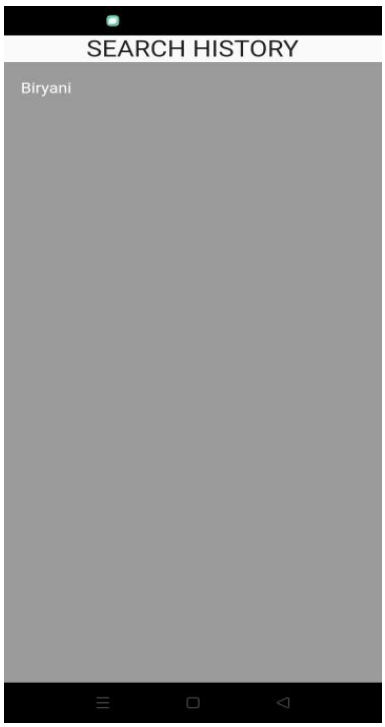

Fig6: Searching

Fig7: Result of desired Input

3.CONCLUSIONS

The goal of this project is to create software that will help people so that they will make better nutritional decisions pertaining to their health and lifestyle.

Finally we build a mobile application using the MobileNet model which is faster in performance and ideal for mobile applications. As a result of this report, we hope that people will be able to take one step closer to living a healthy life.

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