INTRODUCTION
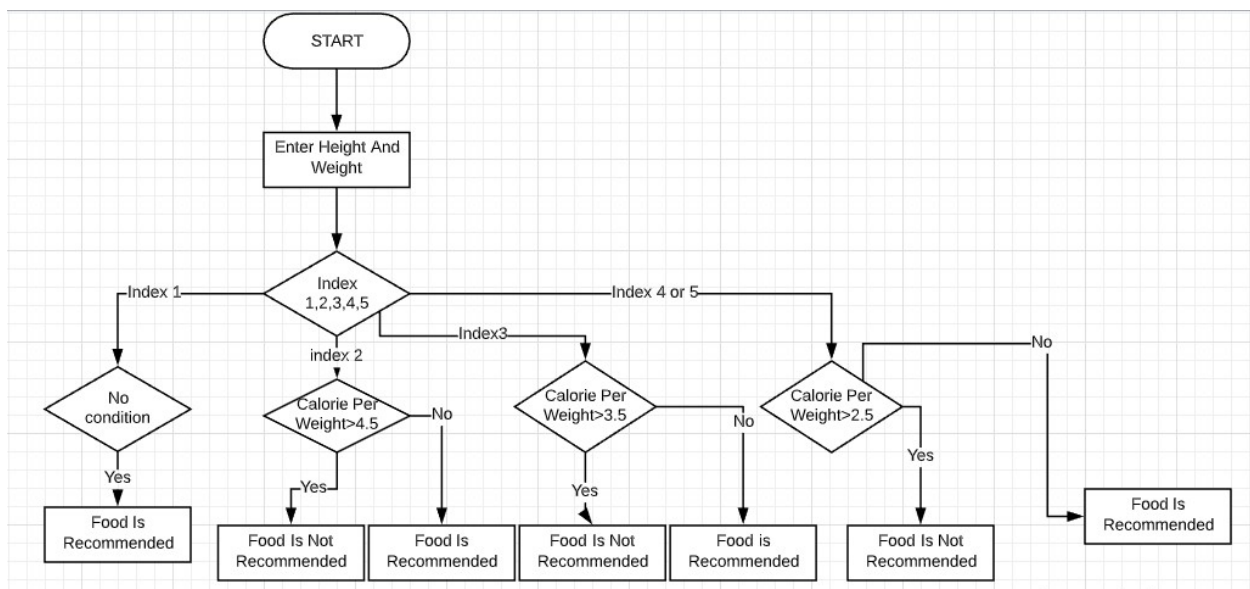
High calorie intake has proved harmful worldwide,as it has led to many diseases However,dieticians have deemed that a standard intake of number of calories is essential to maintain the right balance of calorie content in human body.Most of the disease is spread due to intake of high calorie.About 11 million people died due to Bad diet which is greater then the people who died due to smoking So,diet control , maintain and play important and major role in our daily life.As a planet we don't maintain what to eat when and which type of food is harmful for our health and how much calorie did person intake.As Research the diets of people in 195 countries the impact of poor diets on the risk of death from diseases including heart disease,various cancer,diabetes and many more.And what if you control your diet even if your are out of home.This project helps you to protect yourself from bad diet even if you are out for a meal .So, This project is based on Food detection and recommendation through machine learning,wherein from height and weight parameter, we will recommend wether the particular food calorie harmful for your body or not This particular Model shows 78% in accuracy we test data on 101 food category, This Project is also used in restaurants where it detects the calorie level of the regular customer and recommend them on basis of there previous order observations and if the consumer is new it will save the customer details and the food details which they ordered,into database Likewise they work for both regular and new customers.We can use this in restaurant also when it start detecting the old customer and generate a menu card on the bases of previous order they made with the calorie mention on the menu card and wether that food is good for the customer health or not. This project also remove confusion of customer what to eat and what is best to eat in Restaurant.

PROPOSED SCHEME

This is an AI food recommended system. In this we train 101 food which detect that food and save them into database. It also detect the calorie of that food and recommend the person whether they have to take that food based on body mass index(BMI).If the customer is an old customer it will generate a menu card based on there like and dislike with the help of previous order.

If customer is new it will store face encoding to database and order that the customer make.

This project also remove the confusion of the customer what to order because menu card is generated on the bases of what they order previously and wether that food is suitable for the customer or not based on BMI.

```
                    START
                      |
              Enter Height And
                  Weight
                      |
   Index 1----    Index     ----Index 4 or 5----------------
      |        1,2,3,4,5                                |        No
      |         Index3                                  |         |
      |        index 2                                  |         |
      |          |                                      |         |
     No       Calorie Per  No    Calorie Per  No    Calorie Per   |
  condition    Weight>4.5       Weight>3.5         Weight>2.5     |
      |          |                   |                  |  Yes    |
     Yes        Yes                 Yes                 |         |
      |          |         |         |         |        |         |
   Food Is    Food Is    Food Is  Food Is    Food is  Food Is   Food Is
Recommended   Not        Recom-   Not        Recom-   Not       Recommended
           Recommended  mended  Recommended  mended Recommended
```

About Fowchart:-

We compute Body mass index on the bases of person weight and height and we

Create 5 categories on bases of BMI.

If BMI lies in (0-18.5)kg/m^2.then it lie in index 1.

If BMI lies in (18.5-25)kg/m^2.then it lie in index 2.

If BMI lies in (25-30)kg/m^2.then it lie in index 3.

If BMI lies in (30-35)kg/m^2.then it lie in index 4.

If BMI lies in (35-40)kg/m^2.then it lie in index 5.

If person lie in index 1 then there is no restriction person eat whatever person want.

If person lie in Index 2 then if food calorie is greater then 4.5 its high recomedation to not to eat that food.

If person lie in Index 3 then if food calorie is greater then 3.5 its high recomedation to not to eat that food.

If person lie in Index 4 then if food calorie is greater then 2.5 its high recomedation to not to eat that food.

If person lie in Index 5 then if food calorie is greater then 2.5 its high recomedation to not to eat that food.

RESULTS

IMAGES

This is made by Food 101 dataset in which there are 101 categories of food are avaliable. This dataset contain 101000 image including train and test. We can download from here https://www.vision.ee.ethz.ch/datasets_extra/food-101/

The 101 categories are 'Apple pie', 'Baby back ribs', 'Baklava', 'Beef carpaccio', 'Beef tartare', 'Beet salad', 'Beignets', 'Bibimbap', 'Bread pudding', 'Breakfast burrito', 'Bruschetta', 'Caesar salad', 'Cannoli', 'Caprese salad', 'Carrot cake', 'Ceviche', 'Cheesecake', 'Cheese plate', 'Chicken curry', 'Chicken quesadilla', 'Chicken wings', 'Chocolate cake', 'Chocolate mousse', 'Churros', 'Clam chowder', 'Club sandwich', 'Crab cakes', 'Creme brulee', 'Croque madame', 'Cup cakes', 'Deviled eggs', 'Donuts', 'Dumplings', 'Edamame', 'Eggs benedict', 'Escargots', 'Falafel', 'Filet mignon', 'Fish and chips', 'Foie gras', 'French fries', 'French onion soup', 'French toast', 'Fried calamari', 'Fried rice', 'Frozen yogurt', 'Garlic bread', 'Gnocchi', 'Greek salad', 'Grilled cheese sandwich', 'Grilled salmon', 'Guacamole', 'Gyoza', 'Hamburger', 'Hot and sour soup', 'Hot dog', 'Huevos rancheros', 'Hummus', 'Ice cream', 'Lasagna', 'Lobster bisque', 'Lobster roll sandwich', 'Macaroni and cheese', 'Macarons', 'Miso soup', 'Mussels', 'Nachos', 'Omelette', 'Onion rings', 'Oysters', 'Pad thai', 'Paella', 'Pancakes', 'Panna cotta', 'Peking duck', 'Pho', 'Pizza', 'Pork chop', 'Poutine', 'Prime rib', 'Pulled pork sandwich', 'Ramen', 'Ravioli', 'Red velvet cake', 'Risotto', 'Samosa', 'Sashimi', 'Scallops', 'Seaweed salad', 'Shrimp and grits', 'Spaghetti bolognese', 'Spaghetti carbonara', 'Spring rolls', 'Steak', 'Strawberry shortcake', 'Sushi', 'Tacos', 'Takoyaki', 'Tiramisu', 'Tuna tartare', 'Waffles'.

Datasets:-

bmi_level.csv: data consist of obesity level on the basis of height weight and gender.

Atrributes of bmi_level dataset are: Gender, Height(in cm),Weight(in kg),Index, Gender_Number.

Calorie_data.csv: Data consist of calories weight and calorie per weight and categories of 101 food

Details.csv:Data consist of attribute mobile_Number ,Name and food order.

```
Python 3.6.5 (v3.6.5:f59c0932b4, Mar 28 2018, 17:00:18) [MSC v.1900 64 bit (AMD6
4)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: E:\final project\Food_AI_Recommender_System\restaur_recomnd_food\fod_r
ecmond_dbase.py
Hi  himanshu
Recommend the food
burger
>>>
```
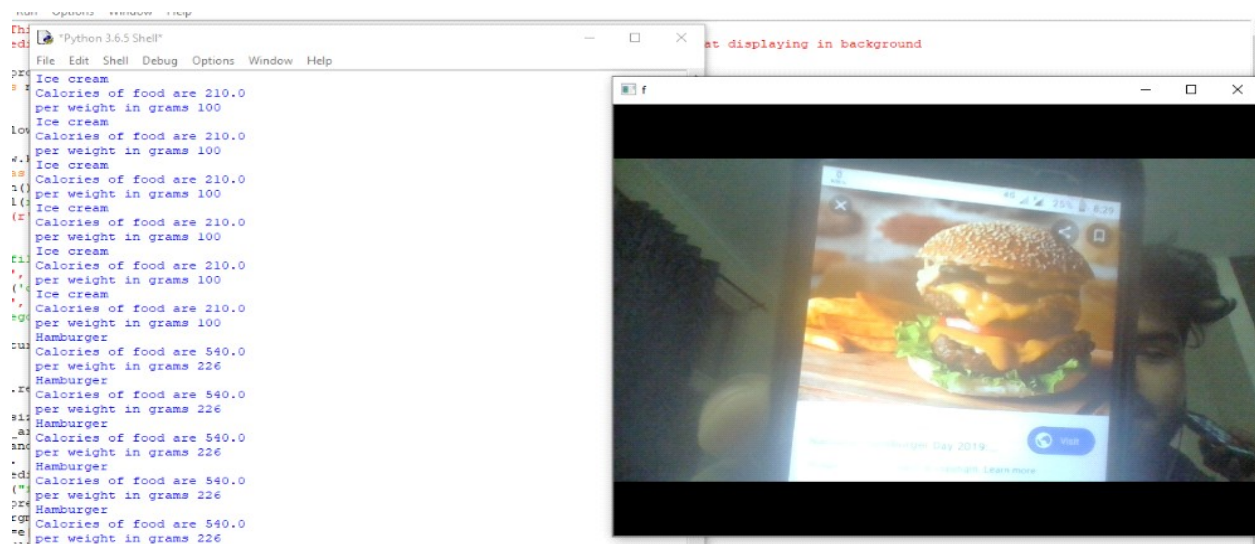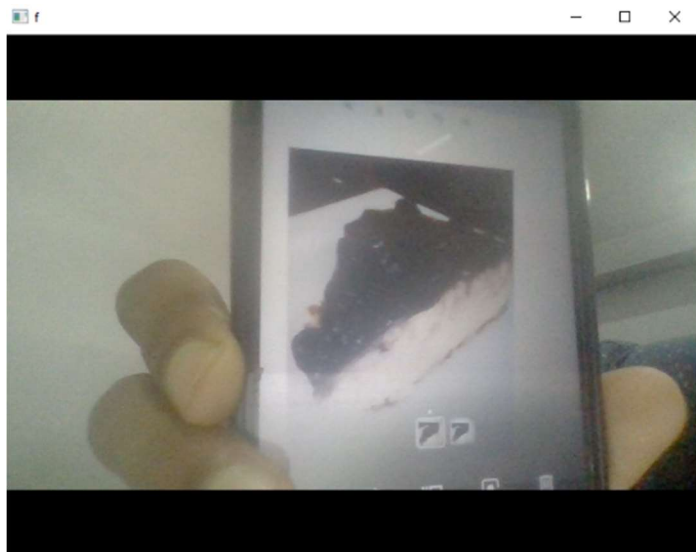
A	B	C	D	E
mobileno	name	foodorder		
892	himanshu	burger,Chocolate cake		
967	dheeraj	french fries,Chocolate cake		


```
Chocolate cake
Calories of food are 424.0
per weight in grams 109
Chocolate cake
Calories of food are 424.0
per weight in grams 109
Hamburger
Calories of food are 540.0
per weight in grams 226
enter ur height175
enter ur weight75
enter ur gender M for Male and F for FemaleM

Warning (from warnings module):
  File "C:\Program Files\Python36\lib\site-packages\sklearn\utils\validation.py", line 724
    y = column_or_1d(y, warn=True)
DataConversionWarning: A column-vector y was passed when a 1d array was expected. Please change the shape of y to (n_samples, ), for example using ravel().
You can eat that food It is of low calories
>>>
```
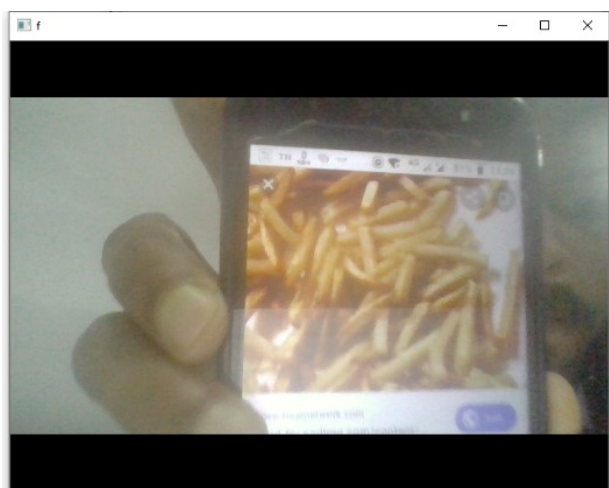


```
Chocolate cake
Calories of food are 424.0
per weight in grams 109
Chocolate cake
Calories of food are 424.0
per weight in grams 109
```
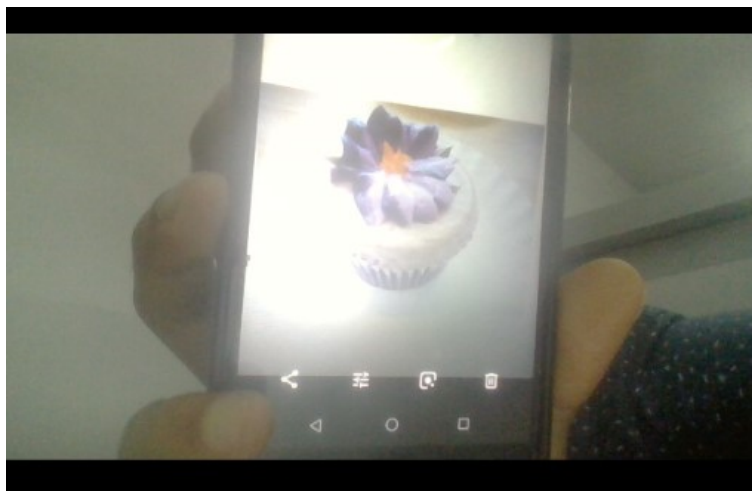
Cup cakes
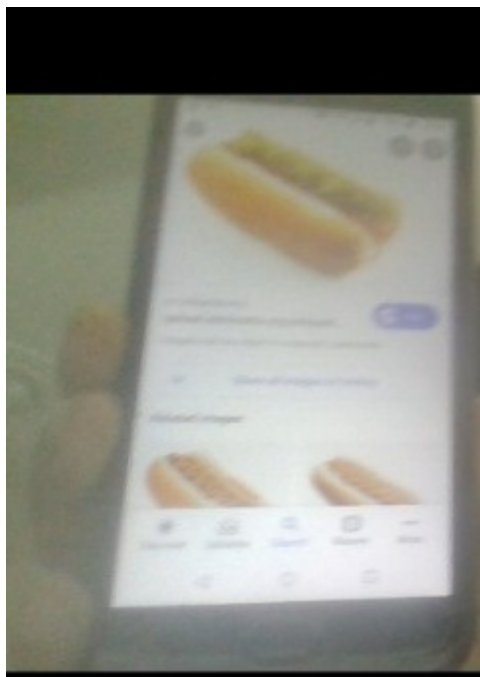Calories of food are 370.0
per weight in grams 100

French fries
Calories of food are 274.0
per weight in grams 100

Ice cream
Calories of food are 210.0
per weight in grams 100

Macarons
Calories of food are 404.0
per weight in grams 100
Hot dog

Hot dog
Calories of food are 290.0
per weight in grams 100

Churros
Calories of food are 210.0
per weight in grams 60

About Food_101 model:-Food 101 is a data set contain 101 food category and in each category there are 1000 images.

Using this huge dataset a deep learning model built on keras/tensorflow

Which is used to classify 101 food categories live

The number of epoch is 12.

Batch_size=64

Data Analyse:- The quality of images are not very good

They are of different background,discimillar lightnings

The size of the images is also inconsistent.

Data Augmentation:-The dataset for each class is relatively small to train a good neural network,an image data generator from keras is used for image transformation to expand the dataset and to reduce the overfitting problem.

Model:- To create a CNN to classified the images,We are using keras sequential model.

Optimizers:-Adam final accuracy slightly out-performs RMSProp and also coverage to minima faster as it is similar to RMSProp+Momentum.

Activation Function:-ReLu activation function is used at convolution layers to produce a sparse matrix which require less computational power then sigmoid or tanh which produce dense matrix.

Initializers:-Kernal Weights are initialized using he normal initializers which help to attain a global minimum of the cost function faster and more efficiently.The weights differ in range depending on the size of the previous layer of neurons and this is a good inializer to be used with ReLu activation function.

Regularisation:-L2 regularisation is implemented aim to decrease the complexity of the model and minimise overfitting by weights and large magnitudes.

FOOD101-Inceptionv3

FOOD101-Inceptionv3
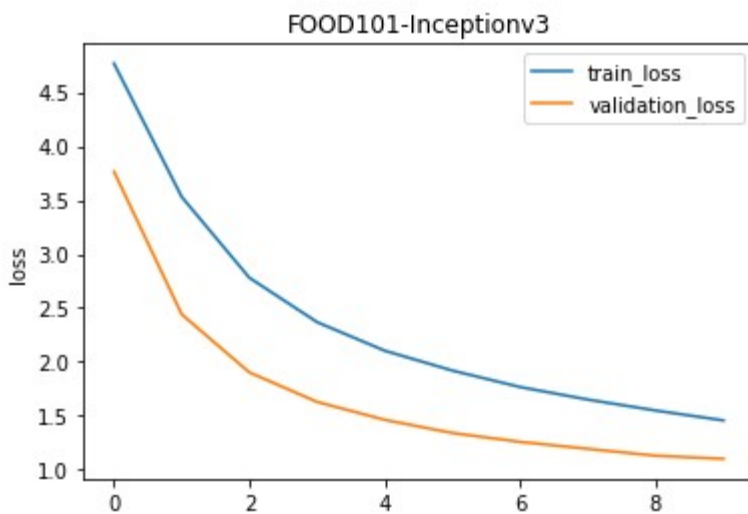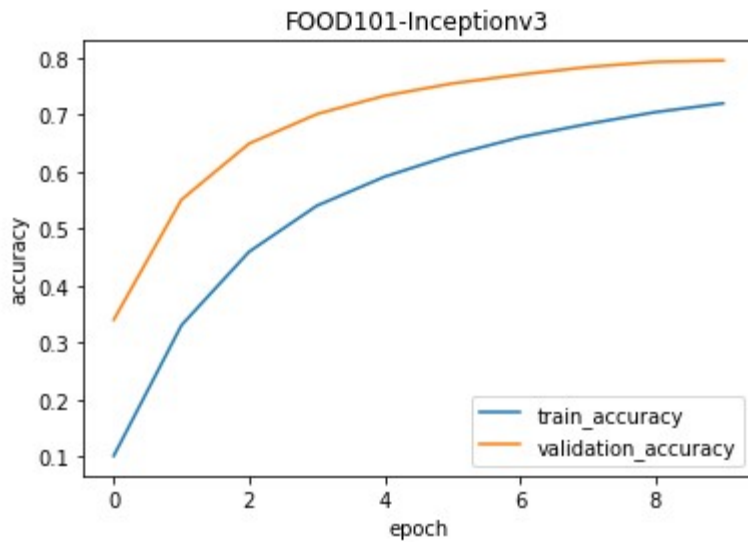
Model accuracy increase as we increase the epoch. Highest accuracy gain is approx. 79% on validate data.

In the data set some images look same but are in different category that's why in loss cross entopy is so high.