A

Major Project

On

CALORIE INTAKE TRACKER

(Submitted in partial fulfillment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

By

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CMR TECHNICAL CAMPUS

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2017 -21

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project entitled "**CALORIE INTAKE TRACKER"** being submitted by **K.Anirudh Sai (177R1A0582) , M.S. Ravi Krishna (177R1A0586) & K.Uttej (177R1A0585)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide work carried out by him/her under our guidance and supervision during the year 2020-21.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

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Submitted for viva voice Examination held on ________________

ACKNOWLEGDEMENT

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ABSTRACT

This project is titled as “Calorie Intake Tracker”. This Application provides facility to capture the image and get to know the calories of the food in the image. This project uses machine-learning methods and computer vision to get the calories. We used convolutional neural networks The main purpose of this app is to allow people the ability to know calories of the food that they are consuming, at any given moment, this app not only gives a fairly accurate estimation of the calories that the user is going to consume–or is consuming–but it also lets the user whether he/she has exceeded his target of calories which is set prior to capturing image for the current day.

LIST OF FIGURES

LIST OF SCREENSHOTS

TABLE OF CONTENTS

1. INTRODUCTION

1. INTRODUCTION

1.1 PROJECT SCOPE

This project is titled as “Calorie Intake Tracker”. This Application provides facility to capture the image and get to know the calories of the food in the image. This project uses machine-learning methods and computer vision to get the calories. We used convolutional neural networks The main purpose of this app is to allow people the ability to know calories of the food that they are consuming, at any given moment, this app not only gives a fairly accurate estimation of the calories that the user is going to consume–or is consuming–but it also lets the user whether he/she has exceeded his target of calories which is set prior to capturing image for the current day.

1.2 PROJECT PURPOSE

The main purpose of the project is to track the calorie consumption at any moment of time by just clicking a picture through application which returns the number of calories the food has. A person can simply run the application which will prompt for an image of your food item by camera. This would be helpful for a person to be health conscious to reduce obesity.

1.3 PROJECT FEATURES

The main features of this project are the calorie tracker progress bar and capturing multiple items in an image by camera and returning their calories through an android application A warning message is shown when the progress bar is filled and the color of the progress bar turns to red.

2. SYSTEM ANALYSIS

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SYSTEM ANALYSIS

System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

2.1 PROBLEM DEFINITION

A detailed study of the process must be made by various techniques like Image processing, feature recognition etc. The data collected by these sources must be scrutinized to arrive to a conclusion. The conclusion is an understanding of how the system functions. This system is called the existing system. Now the existing system is subjected to close study and problem areas are identified. The designer now functions as a problem solver and tries to sort out the difficulties that the enterprise faces. The solutions are given as proposals. The proposal is then weighed with the existing system analytically and the best one is selected. The proposal is presented to the user for an endorsement by the user. The proposal is reviewed on user request and suitable changes are made. This is loop that ends as soon as the user is satisfied with proposal.

2.2 EXISTING SYSTEM

In the existing system either we need to calculate manually by measuring weight and their respective of the food for each item separately. We do not have any system or application to measure or estimate the calories intake for multiple food items in single image and other medical softwares are costly and are conventional methods to calculate them.

2.2.1 LIMITATIONS OF EXISTING SYSTEM

- Inaccurate measurement of calorie.

- Time consuming if calculated manually.
- Computational complexity is high.
- Not so efficient, since the techniques used are conventional.

To avoid all these limitations and make the working more accurately the system needs to be implemented efficiently.

2.3 PROPOSED SYSTEM

- We propose a smart system, build an application to measure and monitor the daily calorie intake for obese and overweight patients. Via a special technique, the system records a photo of the food before and after eating in order to estimate the consumption calorie of the selected food and its nutrient components. Our system presents a new instrument in food intake measuring which can be more useful and effective.

2.3.1 ADVANTAGES OF THE PROPOSED SYSTEM

The system is very simple in design and to implement. The system requires very low system resources and the system will work in almost all configurations. It has got following features

- Automatic Work.
- Simple camera enough.
- Greater efficiency.
- Simple Hardware.
- No prior knowledge needed.
- Minimum time required.

2.4 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. Three key considerations involved in the feasibility analysis are

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.4.1 ECONOMIC FEASIBILITY

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also all the resources are already available, it give an indication of the system is economically possible for development.

2.4.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. The developed system must have a modest requirement, as onlyminimal or null changes are required for implementing this system.

2.4.3 BEHAVIORAL FEASIBILITY

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?

The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

2.5 HARDWARE & SOFTWARE REQUIREMENTS

2.5.1 HARDWARE REQUIREMENTS:

Hardware interfaces specifies the logical characteristics of each interface between the software product and the hardware components of the system. Thefollowing are some hardware requirements.

- Processor : Snapdragon 400 or more
- Hard disk : 40MB
- RAM : 1GB

2.5.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface andsoftware components of the system. The following are some software requirements,

- Operating system : Android 8
- Languages : Python, JAVA
- Frameworks : Tensorflow ,Open CV

3. ARCHITECTURE

3.ARCHITECTURE

3.1 PROJECT ARCITECTURE

This project architecture shows the procedure followed for calorie intake tracker ,starting from input to final prediction.

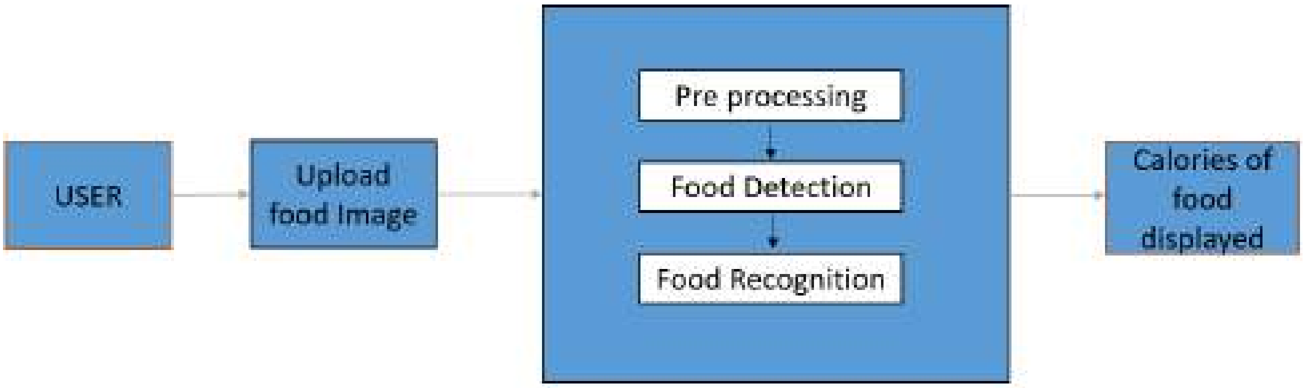


Figure 3.1: Project Architecture

3.2 DESCRIPTION

Input Data: Input image is generally captured in camera through application.

Separating Features: In this following step we are going to separate the features which we take to train the model by giving the target value i.e. 1/0 for the particular of features.

Normalization: Normalization is a very important step while we are dealing with the large values in the features as the higher bit integers will cost high computational power and time. To achieve the efficiency in computation we are going to normalize the data values.

Training and test data: Training data is passed to the classifier to train the model. Test data is used to test the trained model whether it is making correct predictions or not.

3.3 USE CASE DIAGRAM

In the use case diagram we have basically two actors ,the user and the application. The user has the rights to access to resources and to view calorie intake details. User can capture image through application camera and get calories .He can view the list of intake calories in application.

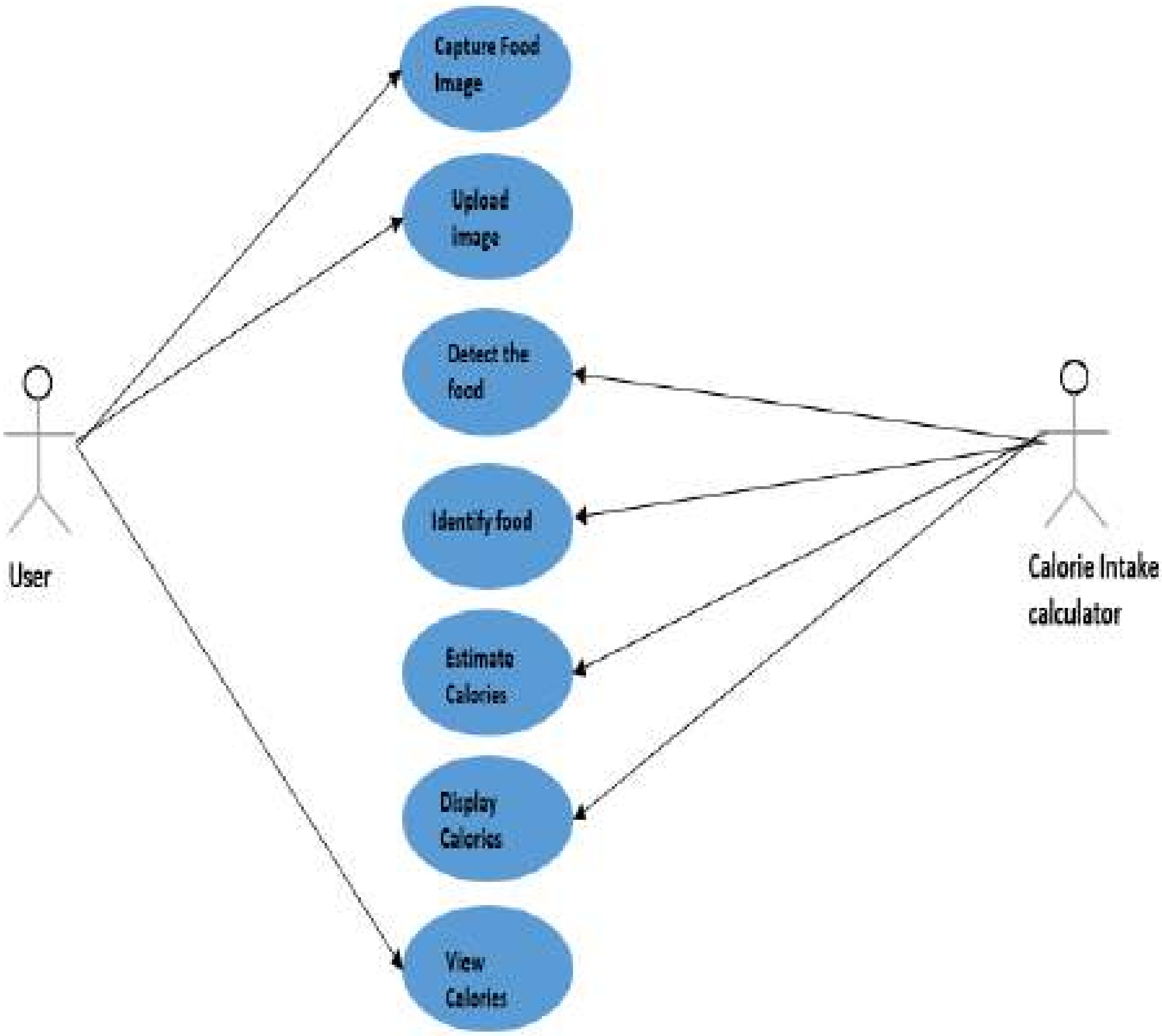


Figure 3.2: Use Case Diagram for user for Image Classifier to Identify Dog Breeds

3.4 CLASS DIAGRAM

Class Diagram is a collection of classes and objects.

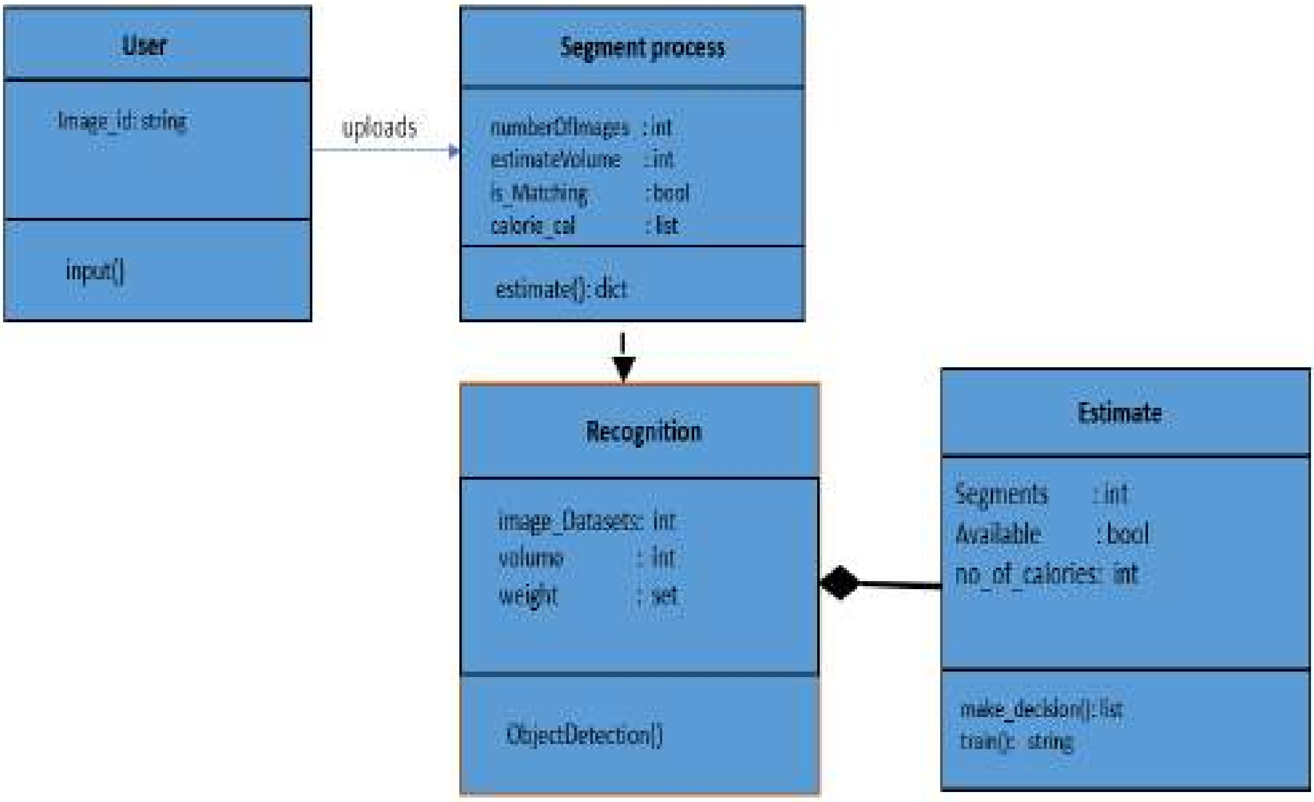


Figure 3.3: Class Diagram

3.5 SEQUENCE DIAGRAM

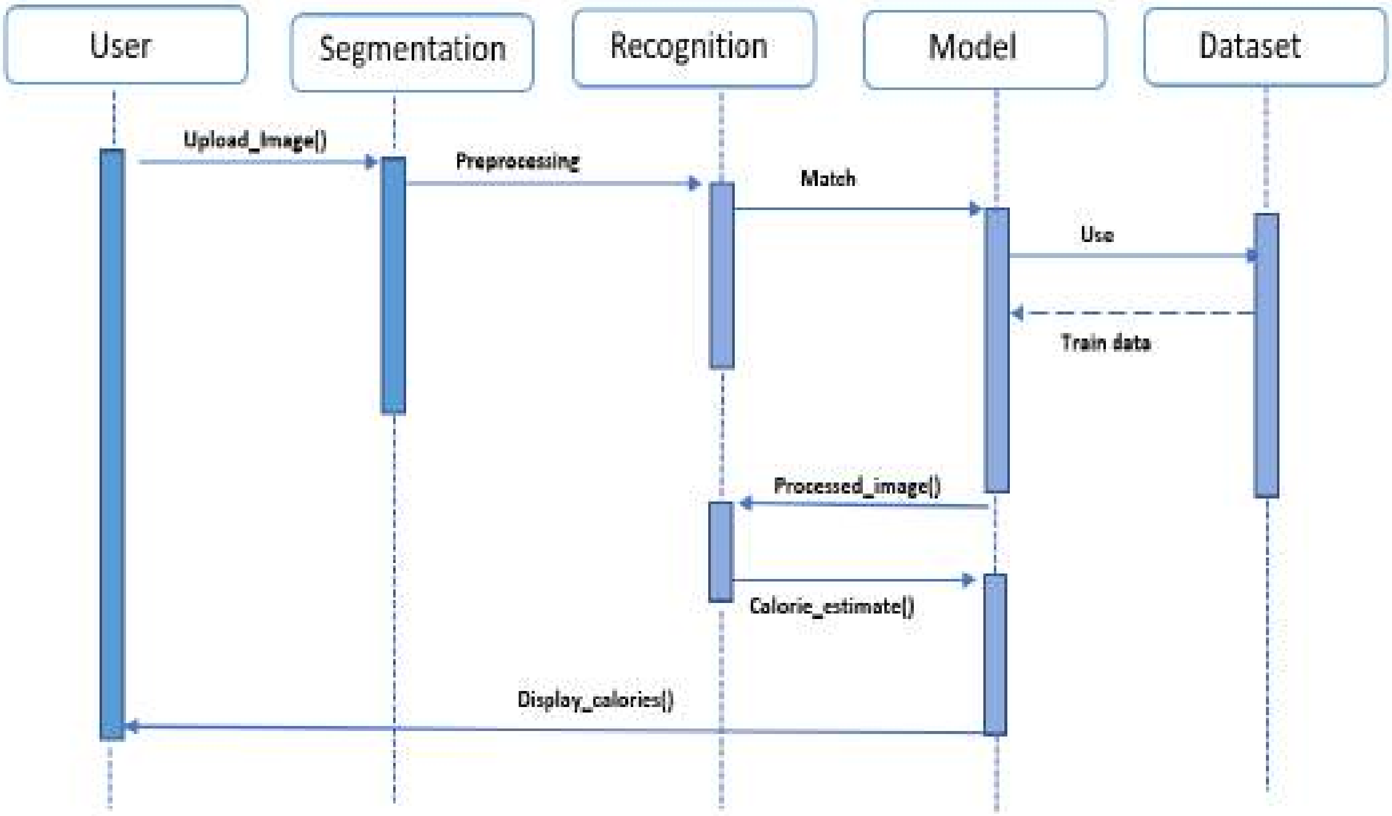


Figure 3.4: Sequence Diagram

3.6 ACTIVITY DIAGRAM

It describes about flow of activity states.

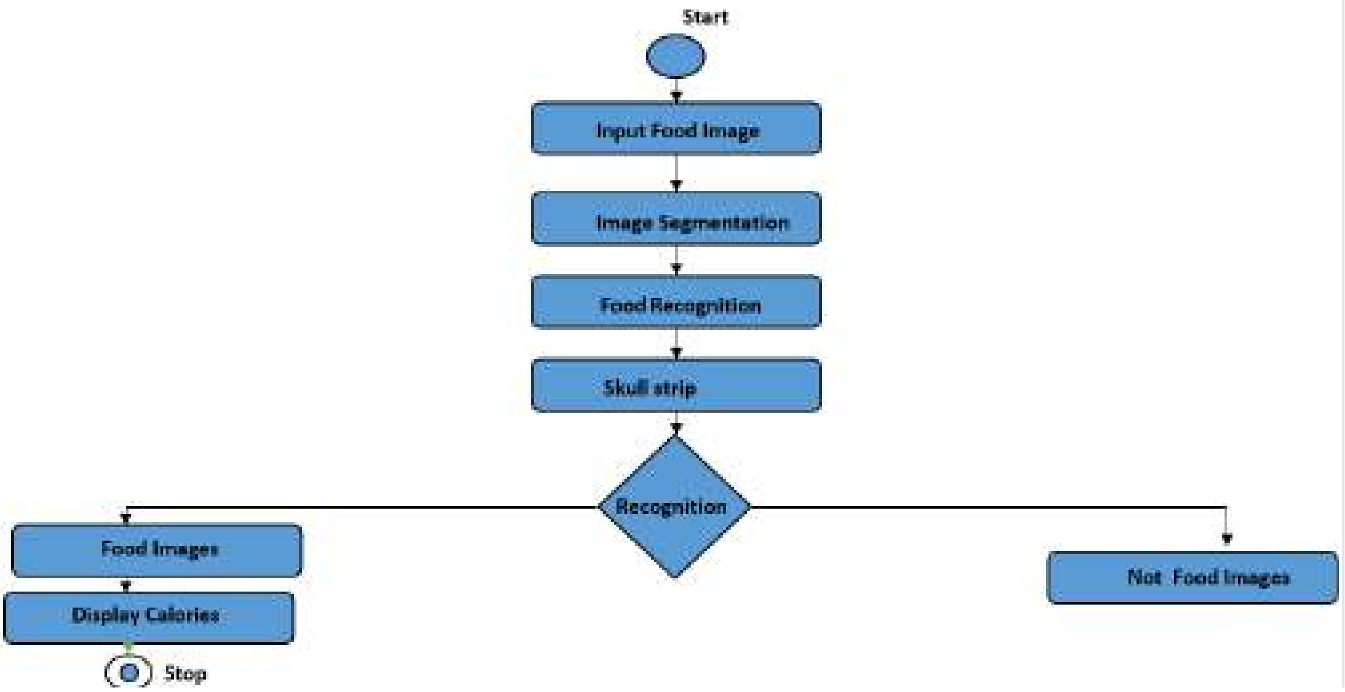


Figure 3.5: Activity Diagram

4. IMPLEMENTATION

4. IMPLEMENTATION

4.1 SAMPLE CODE

```
import tflearn
from tflearn.layers.conv import conv_2d, max_pool_2d
from tflearn.layers.core import input_data, dropout, fully_connected
from tflearn.layers.estimator import regression
import tensorflow as tf

def get_model(IMG_SIZE,no_of_foods,LR):
  try:
    tf.reset_default_graph()
  except:
    print("tensorflow")
  convnet = input_data(shape=[None, IMG_SIZE, IMG_SIZE, 3], name='input')

  convnet = conv_2d(convnet, 32, 5, activation='relu')

  convnet = max_pool_2d(convnet, 5)

  convnet = conv_2d(convnet, 64, 5, activation='relu')

  convnet = max_pool_2d(convnet, 5)

  convnet = conv_2d(convnet, 128, 5, activation='relu')
  convnet = max_pool_2d(convnet, 5)

  convnet = conv_2d(convnet, 64, 5, activation='relu')
  convnet = max_pool_2d(convnet, 5)


  convnet = conv_2d(convnet, 32, 5, activation='relu')
  convnet = max_pool_2d(convnet, 5)

  convnet = fully_connected(convnet, 1024, activation='relu')
  convnet = dropout(convnet, 0.8)

  convnet = fully_connected(convnet, no_of_foods, activation='softmax')
  convnet = regression(convnet, optimizer='adam', learning_rate=LR, loss='categorical_crossentrop
y', name='targets')

  model = tflearn.DNN(convnet, tensorboard_dir='log')

  return model
```

Android Code

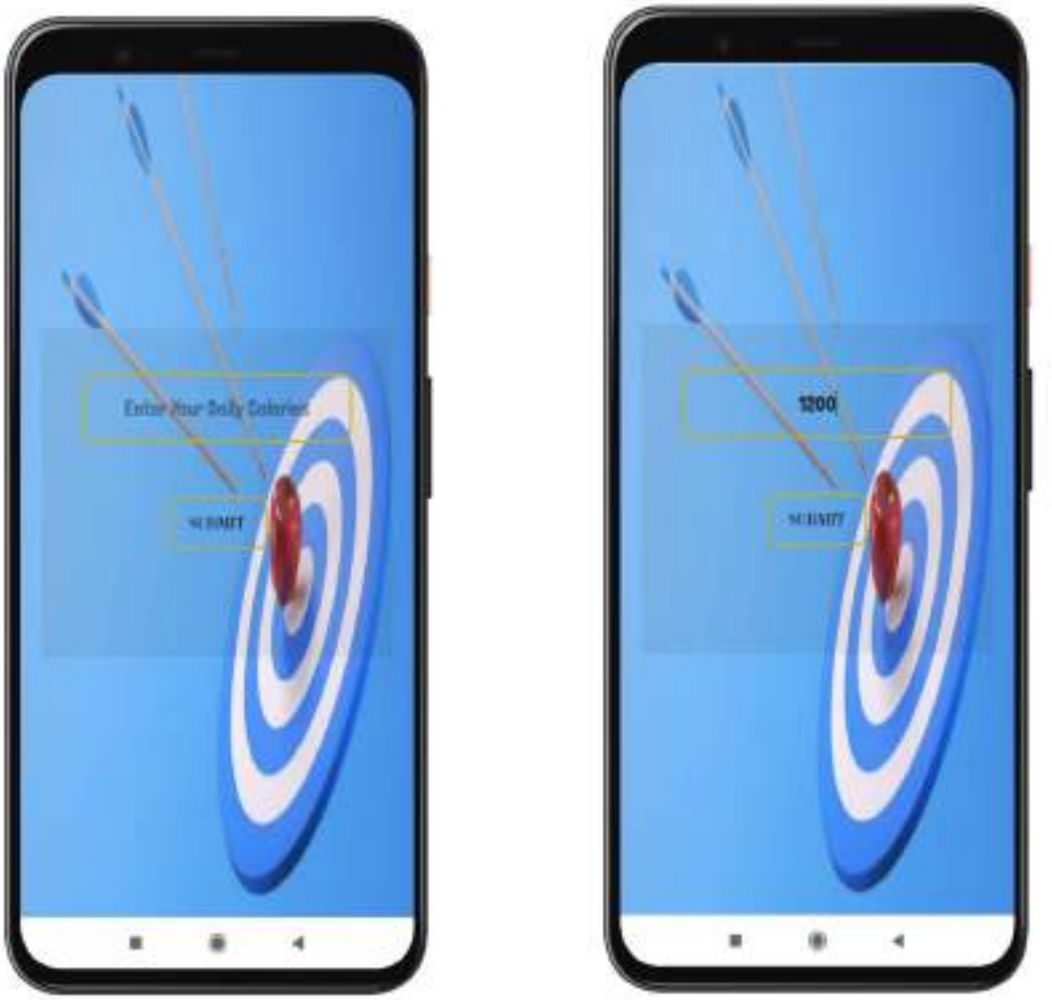
Home.java

```
package com.example.caloriestracker;

import android.app.Activity;
import android.content.Intent;
import android.os.Bundle;
import android.view.Gravity;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.ProgressBar;
import android.widget.TableLayout;
import android.widget.TableRow;
import android.widget.TextView;
import android.widget.Toast;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;

import com.google.android.gms.tasks.OnCompleteListener;
import com.google.android.gms.tasks.Task;
import com.google.android.material.floatingactionbutton.FloatingActionButton;
import com.google.firebase.firestore.FirebaseFirestore;
import com.google.firebase.firestore.QuerySnapshot;

import org.jetbrains.annotations.NotNull;

import java.util.*;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
import java.text.SimpleDateFormat;
import java.util.HashMap;

public class Home extends AppCompatActivity {
    Button b;
    EditText e;
    String cal;
    int x;
    FirebaseFirestore db;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_home);
        b = (Button) findViewById(R.id.button);
        e = (EditText) findViewById(R.id.et);
```

```
        b.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String cal1 = e.getText().toString();
                int x1 = Integer.valueOf(cal1);
                Toast.makeText(Home.this, String.valueOf(x1), Toast.LENGTH_SHORT).show();
                if (x1 < 100 || x1 > 5000 || x1 == 0) {
                    Toast.makeText(Home.this, "Invalid Calories", Toast.LENGTH_SHORT).show();
                } else {
                    Date c = Calendar.getInstance().getTime();
                    Calendar f = Calendar.getInstance();
                    System.out.println("Current time => " + c);
                    SimpleDateFormat df = new SimpleDateFormat("dd-MMM-yyyy",
Locale.getDefault());
                    String formattedDate = df.format(c);
                    HashMap<String, String> hm2 = new HashMap<>();
                    hm2.put("cnt", String.valueOf(x1));
                    db.collection("CaloriesMaximum").document(formattedDate).set(hm2);
                    x = 10;
                    Intent it = new Intent(Home.this, MainActivity.class);
                    it.putExtra("calories", x1);
                    startActivity(it);
                }
            }
        });
    }
    @Override
    protected void onStart() {
        super.onStart();
        String formattedDate;
        db = FirebaseFirestore.getInstance();
        Date c = Calendar.getInstance().getTime();
        Calendar f = Calendar.getInstance();
        System.out.println("Current time => " + c);
        SimpleDateFormat df = new SimpleDateFormat("dd-MMM-yyyy", Locale.getDefault());
        formattedDate = df.format(c);
        db.collection("CaloriesData").document("1").collection(formattedDate)
                .get().addOnCompleteListener(new OnCompleteListener<QuerySnapshot>() {
            @Override
            public void onComplete(@NonNull @NotNull Task<QuerySnapshot> task) {
                if (!task.getResult().isEmpty()) {
                    Intent i = new Intent(Home.this, MainActivity.class);
                    startActivity(i);
                    finish();
                }
            }
        });
```

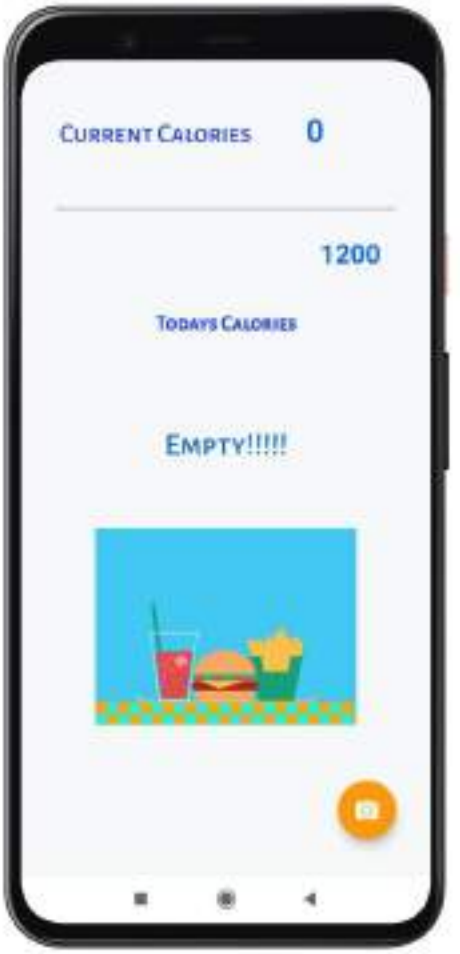
5. SCREENSHOTS

5.1 Target Calories



Screenshot 5.1: Target Calories

5.2 PROGRESS BAR



Screenshot 5.2: Home Page of application

5.3 CAM RESULT

In this screenshot we can see the result of food detection

Screenshot 5.3: Cam results

6. TESTING

6. TESTING

6.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discovere very conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

6.2 TYPES OF TESTING

6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes.

6.3 TEST CASES

6.3.1 UPLOADING IMAGES

Test case ID	Test case name	Purpose	Test Case	Output
1	User uploads image	Use it for identification	The user uploads the apple image	Uploaded successfully
2	User uploads 2nd image	Use it for identification	The user uploads orange image	Uploaded successfully

6.3.2 CLASSIFICATION

Test case ID	Test case name	Purpose	Input	Output
1	Classification test 1	To check if the application estimate calories for single fruit	Apple image is given	Apple calories predicted.
2	Classification test 2	To check if the application estimate calories for single fruit	Orange image is given	Orange calories predicted.
3	Classification test 3	To check if the application estimate calories for food image with multiple foods.	Group of food images is given.	Calories predicted for food images.

7. CONCLUSION

7. CONCLUSION & FUTURE SCOPE

7.1 PROJECT CONCLUSION

- The People across the universe are becoming more attentive towards their health. They are adopting various ways to keep themselves fit. One the way is to measure the calorie in the meal. A system is proposed which uses segmentation and classification using Deep learning to measure the calorie level in the meal. Our system is designed to aid dieticians for the treatment of obese or overweight people, although normal people can also benefit from our system by controlling more closely their daily eating without worrying about overeating and weight gain . System is cost effective and simple. Practical results of the system might boast the research in the field of food processing.

7.2 FUTURE SCOPE

In future we can increase ease of application by using latest technologies which can increase accuracy .Along with estimated calories ,we can also provide additional details of food items like carbohydrates, fats,.. all the nutrition details.

7.3 GITHUB LINK

https://github.com/anirudh-sai007/Major_Project.git

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WEBSITES

- http://neuralnetworksanddeeplearning.com/chap2.html

Calorie Intake Tracker

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***Abstract*: The calorie intake tracking is used for getting accurate calorie information from food image and adding the no.of calories captured to the progress bar if the user exceeds the no. of calorie target which was previously given by him then he/she need to be warned. The objective of this work is to develop a model which can predict the calories from the food image taken by the user and add the calories to the daily progress bar. This work can be done using a Convolution Neural Networks model using a dataset with cross-validation technique to identify food items from image. With this model, we overcome the problems of over-eating, obesity etc. The calorie intake tracking is important as it helps user to be conscious of what they are consuming**

***Keywords*: CNN ML Algorithm, Android, TensorFlow, TensorFlowLite.**

1. Introduction

Recent studies have shown that overweight people are overweight they may have serious conditions such as high blood pressure hypertension, heart attack, second-degree polygenic, high steroid alcohol, and respiratory problems.. Therefore to lose weight in a very healthy way, you continue to maintain healthy weight of traditional people, daily diet food should be weighed. With this page, we have the tendency to propose the app to live calories and nutrients to use a Smartphone or other mobile device fitted with a camera and captures a photo of before and after feeding to sustain life calorie consumption of food and nutrient components. Therefore, in order to lose weight in a very healthy way, in terms of indigenous peoples who should take care of the healthy weight daily diet should be weighed . Excessive treatment requires the patient to be aware of it the amount of daily food, but in most cases, it is not easy for patients to survive or manage their own daily diet due to food insecurity, education or self-control.

2. Proposed System Our proposed approach works as follows. User submits a photo of the food item to the system. Based on visual features of the image and in a monitored way , our app is able to predict what kind of food is this. Predicts the size of food item and based on these predictions' values and actual features of the image, we predict the number of calories in the food item. At that point picture will be resized in suitable arrangement then it will be transferred on which a calculation is carried out utilizing Convolutional Neural Network Each Convolutional Neural Network engineering is isolated into two sections initially is include extraction and second is grouping and has four primary segments.

1. Convolutional activity.

2. Max-pooling (Down examining)

3. ReLu (Non Linear Function)

4. Dropout

When picture is reached to app accurately estimate the value calories in a given food item depending on the image only. While there have been some previous attempts to predict the amount of calories in a food item given its image, according to our knowledge, this is not the same as previous attempts. In every Layer image is very well may be passed to completely associated layer for example classifier after each layer we apply ReLu for example non linearity so tackle complex issue like order. After this the machine learning code is converted in tflite file which is kept in the asserts folder in android studio and a text file is created . The Image which is captured by the user is taken in the form of bitmap and it is compared with the images in tflite file and the result is computed accordingly .The proposed model was evaluated based on Food, which achieved around 95% accuracy.
This ML model consists of three major parts :
Building and creating a machine learning model using TensorFlow with tflearn
Deploying the model to an Android application using TFLite.
The references are mentioned at the end of the paper.

3. Methodology

A.. System Architecture

This part portrays the means associated with making and conveying the classifier. Arrangement by CNN is partitioned into three stages that tackle separate undertakings. They are convolutional layers, pooling layers, and activation function Layers, ordinarily Rectified Linear Units (ReLUs). The number of layers utilized, their plan, and the presentation of other handling units differ starting with one design then onto the next, deciding their particularity.

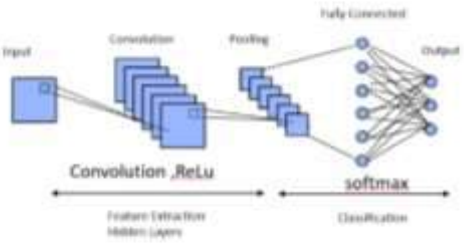

Fig. 1: CNN architecture

Below are the layers used in CNN along with activation functions like Softmax, ReLU. Each Convolution Layer is followed by a Max-Pooling Layer with different number of features . It also contains a Fully Connected Layer and a Dropout Layer.The hidden Layers use ReLu as Activation function and the output Layer uses Softmax function. After classifying using CNN the food object the system then calculates the total amount of food portion on the plate in order to estimate the calorie value. The constraint here is that the calorie estimation is calculated based on the food image captured by the user

conv2d (Conv2D)
max_pooling2d (MaxPooling2D)
conv2d_1 (Conv2D)
max_pooling2d_1 (MaxPooling2D)
conv2d_2 (Conv2D)
max_pooling2d_2 (MaxPooling2D)
conv2d_3 (Conv2D)
max_pooling2d_3 (MaxPooling2D)
conv2d_4 (Conv2D)
max_pooling2d_4 (MaxPooling2D)
FullyConnected
Dropout

Fig 2: layers of CNN

b. Dataset

Food dataset has 13,500 food pictures of 15 different types of food classes. This dataset food images with noise in background and each picture contains just one food item. It likewise accompanies preset preparing/testing subsets which we continue in this investigation. We use this dataset in two distinct manners, first to train and then to test the training and testing datasets are split into 70% and 30% respectively i.e; 9,450 samples for training and 4050 sample images for testing class. For each food there are nearly 800 samples and a total of 1.3GB Dataset as a whole. We gathered from all accessible food items from kaggle. Once the model file is generated from the training, we load it into the application and test it against the images captured and submitted by the user. The system then performs the image recognition process and generates a list of probabilities against the label name. The label with the highest probability is prompted to the user in the dialog box, to confirm the object name. Once the object name is confirmed, the system performs the calorie computation part by calculating the size of the food item with respect to the finger in the frame. It finally prints the output to the user with the required calorie. We trained the system using the deep neural network model by 15 categories with various classes of food samples.

S.No	Food Item	Calories
1	Apple	95
2	Orange	45
3	Banana	105
4	Grape	62
5	Hamburger	354
6	Doughnut	195
7	Hot dog	151
8	Sandwich	340

Fig 3 : Dataset of Food items

C.MACHINE LEARNING 1) Stage one:-

Stage one means to explore the impact that picture size has on model execution. Altogether, five pictures estimated are tried going from 150 x 150 to 400 x 400. As a default of move learning, all layers with the besides of the last two layers are frozen. These contain new loads and are explicit to the plant illness characterization task. Freezing permits these layers to be illness independently prepared, without back-propagating the inclinations. In precisely thusly, the 1cycle approach is utilized to prepare the last layers. With this total, the leftover layers are delivered. To help the calibrating interaction, a plot showing learning rate versus misfortune is produced and investigated. From this, appropriate learning is chosen, and the model is run. With results recorded, the model is re-made to the extra four picture sizes.

2) Phase two:-

Utilizing the most appropriate picture size, the Cnn model is advanced. To additionally improve the model's exhibition, extra expansion settings are added. Then, the last two layers are disengaged and prepared at the default learning rate. With this total, tweaking is performed, running numerous preliminaries to test a progression of learning rates and a number of epochs.

The convolutional layer is the fundamental structure square of the convolutional neural organization. The layer's boundaries are included a bunch of learnable pieces which have a little responsive field yet reach out through the full profundity of the information volume.

Each convolutional layer has M maps of equivalent size, Mx and My , and a piece of size kx, and ky is moved over the specific district of the info picture. The skipping factors Sx and Sy characterize the number of pixels the channel/portion avoids in x- and y- heading between ensuing convolutions. The size of the
yield guide could be characterized as

$$M_x^n = \frac{M_x^{n-1} - K_x^n}{S_x^n + 1} + 1,$$

$$M_y^n = \frac{M_y^{n-1} - K_y^n}{S_y^n + 1} + 1,$$

where n demonstrates the layer. Each map in layer Ln is associated with most maps Mn-1 in layer. Corrected Linear Units (ReLU) are utilized as an alternative for soaking nonlinearities. This enactment work adaptively learns the boundaries of rectifiers and improves precision at the insignificant extra computational expense. It is
characterized as

$$f(x) = \begin{cases} 0 & x < 0 \\ x & x >= 0 \end{cases}$$

ReLU Function

$$F(z_i) = \max(0, z_i),$$

where zi addresses the contribution of the nonlinear initiation function f on the ith channel. Profound CNN with ReLUs trains a few times quicker. This technique is applied to the yield of each convolutional and completely associated layer. Regardless of the yield, the info standardization isn't needed; it is applied after ReLU nonlinearity after the first and second convolutional layer since it decreases top-1 and top-5 mistake rates. In CNN, neurons inside a secret layer are divided into "include maps." The neurons inside a component map share a similar weight and predisposition. The neurons inside the element map look for a similar component. These neurons are extraordinary since they are associated with various neurons in the lower layer. So for the primary secret layer, neurons inside a component guide will be associated with various districts of the information picture. The secret layer is sectioned into highlight maps where every neuron in an element map searches for a similar component yet at various places of the information picture. Essentially, the component map is the consequence of applying convolution across a picture. Each layer's highlights are shown in an alternate square, where perception addresses the most grounded initiation for the gave include map, beginning from the first convolutional layer, where highlights go from singular pixels to straight lines, to the fifth convolutional layer where learned highlights like shapes and certain pieces of leaves are shown.

The development of CNNs allude to their capacity to learn rich mid-level picture portrayals instead of hand-planned low-level highlights utilized in other picture grouping strategies

Figure 4 shows detection of food image in each step. First input image is processed and converted to black and white image then its shape is predicted using skull strip algorithm od edge detection.

Fig. 4. Output Layers

D Performed tests: -

The basic methodology in estimating the execution of artificial neural organizations is parting information into the preparation set and the test set and afterward preparing a neural network on the training set and utilizing the test set for prediction. Accordingly, since the first results for the testing set and our model anticipated results are known, the exactness of our expectations can be determined.

4. Results and Discussions

The cnn architecture pictures the hidden layer output for each layer and its generated intermediate outputs are yields are summarized. In our trained model, a portion of the intermediate outputs in the shallow layers (Conv1, Conv5) feature the yellow and earthy colored injuries that are evident inside the picture . Be that as it may, in the more profound layer , attributable to the convolution and pooling layers, the picture size is too little to even think about interpretting whether such removed highlights have been held. Additionally, the worldwide normal pooling layer changes pictures over to a component vector that disposes of the spatial data, making it profoundly hard to see how the highlights are taken care of in continuing layers. It is hard to recognize whether the extricated includes decidedly add to the grouping of the info picture to the right infection class or are utilized for motivation to deny different potential outcomes Hence, understanding what the CNN has realized by just investigating the halfway yield is lacking.

Fig. 7. Main Page

After opening the application, the above page is displayed. There we can see two fields one is for target calories and the other is submit button. The users can select their target once in a day.

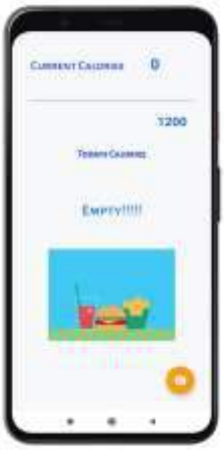

Fig 8: Home Page

Whenever user sets target, he enters into home page of application. User can select the camera option and scan food items and click ok. It will return to thus page and calories are predicted. Progress bar is there to check progress of calories. After reaching target calories progress bar is changed to red color indication calories are exceeded.

Fig. 9. Food Detection

User can scan the food items it detects multiple foods in single as shown in fig 9. Food image with name is given after detecting food item .User can also get a message as food detected .

Fig. 10. History

The application has a feature which saves the user past activity so that he can view it whenever needed. So that it can save his time.

5. Conclusion

- People across the universe are becoming more attentive towards their health. They are adopting various ways to keep themselves fit. One the way is to measure the calorie in the meal. A system is proposed which uses segmentation and classification using Deep learning to measure the calorie level in the meal. Our system is designed to aid dieticians for the treatment of obese or overweight people, although normal people can also benefit from our system by controlling more closely their daily eating without worrying about overeating and weight gain . System is cost effective and simple. Practical results of the system might boast the research in the field of food processing.

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