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## REMOTE DIET TRACKING FOR DIABETES PATIENT USING TENSORFLOW AND MOBILENET

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### Abstract

Technology provides solution to many of the problems which we face today. High blood sugar level is one of them. People with diabetes have to maintain good diet in order to reduce the blood sugar level in their body. Patients with diabetes can face the problems of heart disease, liver cancer, kidney damage, eye damage. Carbohydrates plays an important role in diabetes. Controlling carbohydrates intake would helps to reduce blood sugar level in diabetes patients. Hence the patient must know the carbohydrates level intake present in the food.

This system provides a solution to the above problem. The system uses tensorflow/Keras and mobilenet algorithm for recognizing the food and specify the carbohydrates level. Tensorflow analyses the image by dividing them into different convolutional filters and combining the filter to find the accurate prediction. By using this system the user can provide the image of the food and check which food group it belongs to and what is the percentage of carbohydrates level present in the same food.

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### I INTRODUCTION

When body cannot produce insulin the blood sugar level increases and leads ti diabetes. This results hyperglycemia where patients blood sugar level increases and leads to coma. Type1 diabetes is caused ny auto immune system in our body and attacks the pancreas. Almost may people aroun world faces type 2 diabates which is caused due to obesity and aging.

Among various algorithms that is used for the above purpose, few popular algorithms are discussed here. Algorithms such as Tensor flow/Keras and Mobile net is used to recognize the food and matplotlib library in python is used to showcase the data visualization of the dataset

containing different foods and its corresponding carbohydrates level. This systems enables the user to be aware of the carbohydrates content in their food and maintain perfect diet so that it reduced blood sugar level in the body.

Tensorflow is an open source deep learning library that operates in many languages like python, java, c++ etc. Architecture of tensorflow consists of three parts: Data preprocessing, Model building , training and estimating the accurate model. Mobile net provides an easiest way for image processing using neural networks and providing convolutions on each pixel.

## II RELATED WORK

In paper [1], carbohydrates plays a very important role in mainataing sugar level in the body. A smart phone application known as BEAR provides a accurate estimations of amount of carbohydrates present. This application was also used by many diabetes patients to control sugar level in the body.

In paper [2], convolutional neural networks is applied to detect the food by using parameters present in the dataset of frequently occurring food in food logging system. Along with cnn support vector machine provides high accuracy in food detection.

In paper[3], using SIFT and machine learning techniques korean and japanese foods were recognised in the datasets considering color and its presentation as an important feature.

In paper[4], SVM and bounding box techniques are used in an android application to classify top 5 categories of food. The classification rate obtained was 81.5 %. This recognition was directly done by the camera application present in android mobile by the users themselves. This provides accurate object detection using many machine learning techniques.

In paper[5], using bag of features BOF model food is recognised and the use of computer vision in food recognition provies higher accuracy in detecting carbohydrates in food. Almost 5000 images of food were classified into 11 classes and then the food was identified. K means clustering is used to cluster the foods and among each cluster svm algorithm is used to classify the foods using image dataset.

## III METHODOLOGY

**Step 1: Data is Imported/Generated:** TensorFlow Models depends heavily on the huge amount of Data. Either you can import your own dataset or TensorFlow also comes with the collection of datasets ready to use.

**Step 2: Data Normalization :** If data is not appropriate the normalization techniques is used.

**Step 3:** Set parameters to the model like width length convolutions etc.

**Step 4:** initialize the variables to provide the points in the graph in tensorflow.

**Step 5:** Creating a model deciding the operations it must hold.

**Step 6:** Calculate the loss function that specifies the difference between predicted and actual values.

**Step 7:** Training the model with variables to help tensorflow to recognise the object.

**Step 8:** Evaluating the performance of the model by testing with new data.

**Step 9:** predict the outcome by passing the unseen data.

#### **IV IMPLEMENTATION**

**Experimental setup :** Anaconda Navigator with python 3.6 is installed and packages like tensorflow, keras, matplotlib, Numpy, opencv was used in the project.

##### **Method to Run this project**

1. Download anaconda navigator and install in the system.
2. Import libraries required and load images (system loads image in different ways).
3. Resizing the image and providing image as a input to the mobilenet.
4. Using image\_utils to decode the result and provide accurate result.
5. Finding the length and width.
6. Using the reference measurement to measure the object.
7. Show the measurements and plot a graph to provide data visualization of project.

##### **Experimental Results**



## V CONCLUSION

Tensorflow and mobilenet provides a very effective to recognize the object (food) in a easier way. The data visualization of the dataset which contains different food with corresponding carbohydrates level is provided by the system which is efficient.

Keeping diet for diabetes patients will be better using this system with more future works. The future work may consist a module to send notification to the user regarding carbohydrates consumption. And Monthly reports can be analysed and sent to personal doctor easily through this system. By doing this, maintaining good health and regular check ups would be very easier for the diabetes patients.

Calculating carbohydrates level in food may change the life style of many people in today's world to bring about healthy body and activeness. This system might provide accuracy in maintaining good health and providing better service to doctors to constantly test diabetes patients.

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