RV College of Engineering®, Bengaluru – 59
Department of Information Science and Engineering
Database Design Laboratory (18CS53)

Innovative Experiment on Mini Project

TITLE: FOOD COURT MANAGEMENT SYSTEM		
TEAM	USN:1RV18IS034	Name: Prakhar Kant Kushwaha
	USN: 1RV18IS040	Name: Raman Kumar

1. Experiment Details:

In this Experiment, we present a novel system based on **machine learning** that automatically performs accurate **classification** of food images and estimates **food nutrition value**.

The main objective of this experiment is to detect food in real-time. We will be using **CNN** and **deep learning** to detect food images. Deep learning is very useful in image processing, whether it be lane detection, object detection or even food detection and after the food is detected it will generate a nutrition value chart for the corresponding food which is detected.

About data set:

Food 101 is a labelled data set with 101 different food classes. Each food class contains 1000 images. Using the data provided, a deep learning model built on Keras/TensorFlow is trained to classify 101 classes in Food 101 dataset.

Steps Followed:

- Data collection
  → Defining the problem and assembling a dataset (1)
- Data preparation
  → Preparing your data (4)
- Choose model
- Train model
  → Developing a model that does better than a baseline (5)
- Evaluate model

→ Choosing a measure of success (2)
→ Deciding on an evaluation protocol (3)

- Parameter tuning
  → Scaling up: developing a model that overfits (6)
  → Regularizing your model and tuning your parameters (7)
- Predicting food from images

Model:

In machine learning, Convolutional Neural Networks (CNN or ConvNet) are complex feed forward neural networks. CNNs are used for image classification and recognition because of its high accuracy. It was proposed by computer scientist Yann LeCun in the late 90s, when he was inspired from the human visual perception of recognizing things. The CNN follows a hierarchical model which works on building a network, like a funnel, and finally gives out a fully-connected layer where all the neurons are connected to each other and the output is processed.

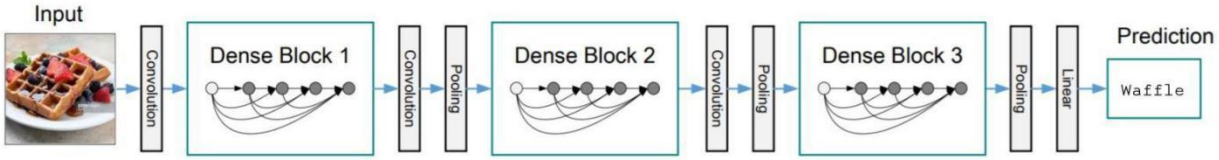
Image Preprocessing

Pytorch provides the API for loading and preprocessing raw images from the user. However, the dataset and the images in the raw state as obtained aren't suitable for further processing. Consequently, successive transformations are used to preprocess the training dataset. In our implementation, these transformations include: Random rotation ,Random resized crop, Random horizontal flip, Imagenet policy and at the end Normalization.

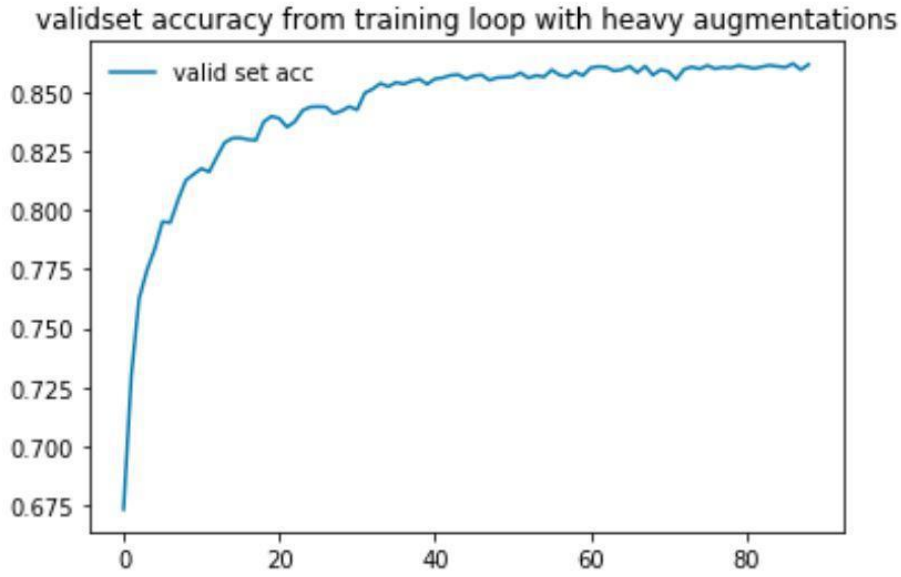
These preprocessing transforms are used to mitigate the disparities in image properties due to different image backgrounds; to help the model learn faster; and to improve the output accuracy.

2. Proof of execution:

How it predicts?



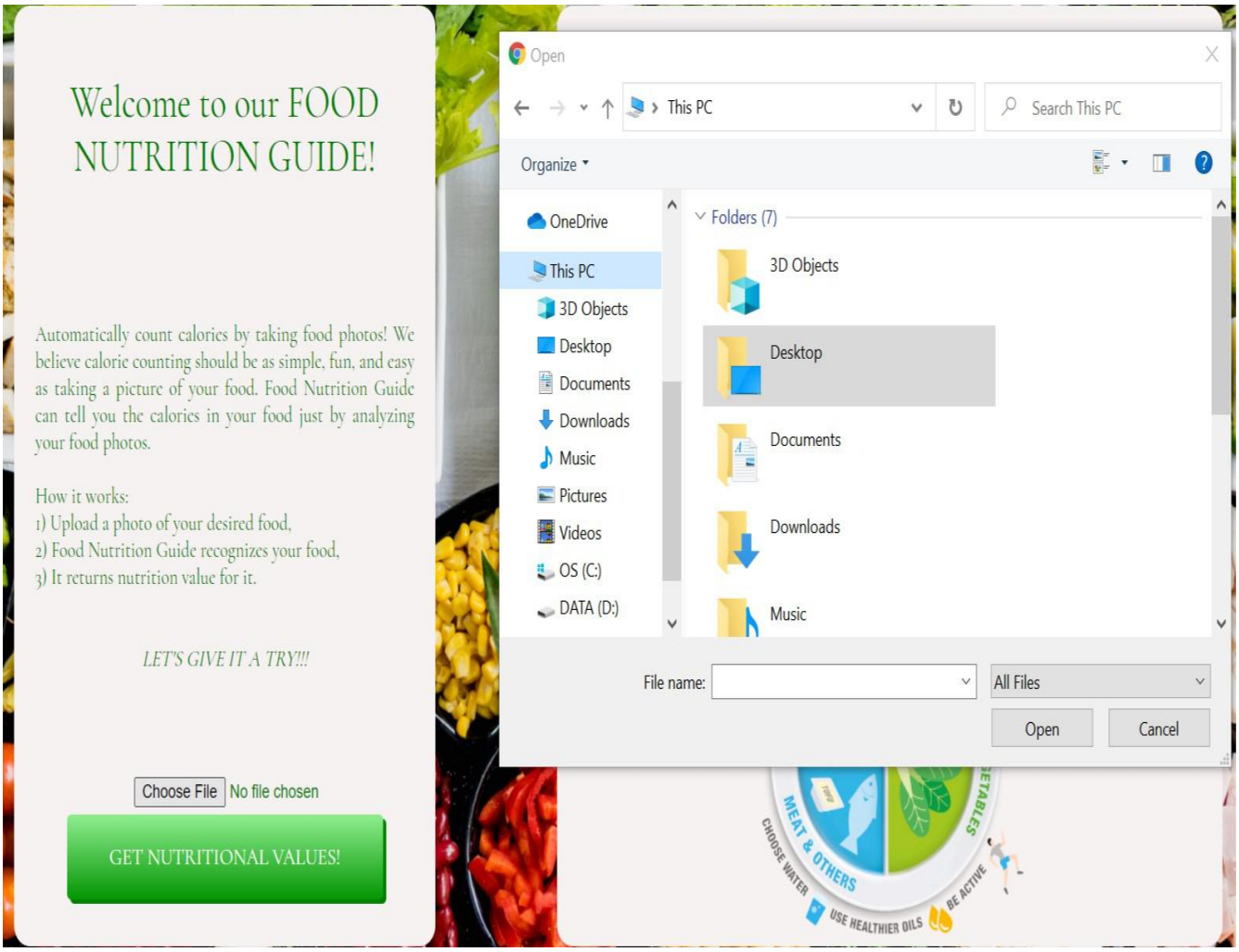
- **Here is an illustration depicting the progress due to heavy augmentation and overall accuracy achieved from the model.**



Screen-shots of executions:

1. Here we are giving image as input and then our model is predicting nutritional contents from the food by first detecting it.

2. Now choose the Food image for classification:



3.Click on the **GET NUTRITION VALUES** to predict food and its nutrition value.