Chapter 3

Traditional Gujarati Food Dataset (TGFD)

This chapter discusses the dataset that has been created for the implementation of the proposed work. The chapter ends by discussing the data augmentation technique that has been applied to the proposed dataset.

3.1 Traditional Gujarati Food Dataset

As found from the literature survey there is no dataset available for Gujarati food and hence, a new dataset has been created. There are many Gujarati food items, from which some of the famous food items have been selected in such a way that they all are single items and have almost the same color with minor variations. Minor variations among the items make it more challenging to develop a model that classifies them correctly. Initially the dataset is created with five food items, namely Dhokla, Handvo, Khakhra, Khandvi and Patra and it named as Traditional Gujarati Food Dataset (TGFD). Fig. 3.1 shows sample images of these five food items.

Dhokla Handvo Khakhra Khandvi Patra

Fig. 3.1 Sample Food Items from Traditional Gujarati Food Dataset

This dataset consists of unique images collected from the internet, pictures taken using mobile phones and real images captured by visiting different restaurants. While collecting photographs various positions, rotations, lighting and forms have been considered to take images from multiple perspectives. Table 3.1 shows names of food classes and the number of images per food class in TGFD.

Table 3.1 Number of images per Food Class in TGFD

Item Name	Number of Images
Dhokla	377
Handvo	367
Khakhra	295
Khandvi	419
Patra	306

There are total of 1764 images with at least 300 images per class in the dataset. As deep learning is data hungry, it requires large amount of data to achieve good performance. The number of images in the dataset has been increased by implementing different augmentation techniques as discussed in the following section for better performance of the model.

3.2 Data Augmentation

An effort is made with extraordinary augmentation techniques to expand the dataset artificially in order to achieve high accuracy and avoid overfitting. The images are resized to 224x224 before processing. To provide proper predictions from any angle, the photos are randomly rotated at 45,90,135 and 180 degrees. The weight_shift_range and height_shift_range are set to 0.3 after multiple experiments, which helps to view incomplete images more clearly and predict correctly. To transform the orientation of image, the shear_range and zoom_range are set to 0.3 after multiple experiments. To predict different patterns and increase accuracy, the horizontal flip parameter is set to true to flip the images horizontally.

The total number of images after applying data augmentation techniques are 37,044, which are divided into training, validation and testing with 70%, 20% and 10% ratio, respectively using the python library Splitfolders. Split () is a function in the Splitfolders library that takes as input a source directory containing the dataset and splits it into the desired number of subdirectories based on provided ratios as given below.

Splitfolders.ratio(input_folder,output_folder,ratio,seed) (3.1)

In the above command, the input folder shows actual path of input dataset. The output folder is the desired path where the split dataset to be saved. The ratio specifies the proportion of the data to allocate for training, validation, and test sets, respectively. A validation dataset has been introduced to fine-tune the model hyperparameters and to avoid overfitting [37,38]. This means the model occasionally sees the data but never learns from it. The seed is an optional argument which ensures that the dataset splitting is done consistently, resulting in the same train-validation-test split configuration.

Concluding Remarks: A new dataset named Traditional Gujarati food items (TGFD) has been created, having five food classes and a total of 1764 images in the dataset. An augmentation technique have been applied to expand the dataset artificially in order to achieve high accuracy and avoid overfitting.

Images obtained from the internet or taken with cameras contain a lot of noise and other unwanted objects. It is necessary to reduce or remove noise from images so that important information can be highlighted. The next chapter will discuss the proposed method for image pre-processing that is helpful to remove noise from images.