Sprint-1

Dataset Collection & Image Preprocessing

Date	19 Nov 2022
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Project Name	Classification of Arrhythmia by Using Deep Learning with 2-D ECG Spectral Image Representation

Tasks

There are two tasks:

1. Dataset Collection
2. Image Preprocessing

Dataset Collection:

The dataset contains six classes:

1. Left Bundle Branch Block
2. Normal
3. Premature Atrial Contraction
4. Premature Ventricular Contractions
5. Right Bundle Branch Block
6. Ventricular Fibrillation

Image Preprocessing:

Image Pre-processing includes the following main tasks

1. Import Image Data Generator Library
2. Configure Image Data Generator Class
3. Apply Image Data Generator functionality to the train set and test set

Import Image Data Generator Library:

Image data augmentation is a technique that can be used to artificially expand the size of a training dataset by creating modified versions of images in the dataset. The Keras deep learning neural network library provides the capability to fit models using image data augmentation via the Image Data Generator class.

Import The Image data Generator

```
[ ] from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

Configure Image Data Generator Class:

There are five main types of data augmentation techniques for image data, specifically:

1. Image shifts via the width_ shift_ range and height_ shift_ range arguments.
2. Image flips via the horizontal _flip and vertical _flip arguments.
3. Image rotates via the rotation_ range argument.
4. Image brightness via the brightness_ range argument.
5. Image zooms via the zoom_ range argument.

Configure Image Data Generator Class

```
[ ] train_datagen = ImageDataGenerator(rescale = 1./255,shear_range = 0.2,zoom_range = 0.2,horizontal_flip = True)
    test_datagen = ImageDataGenerator(rescale = 1./255)
```

An instance of the Image Data Generator class can be constructed for train and test.

Apply Image Data Generator functionality to the train set and test set:

We will apply Image Data Generator functionality to Train set and Test set by usingthe following code.

This function will return batches of images from the subdirectories Left Bundle Branch Block, Normal, Premature Atrial Contraction, Premature Ventricular Contractions, Right Bundle Branch Block and Ventricular Fibrillation, together with labels 0 to 5

{'Left Bundle Branch Block': 0, 'Normal': 1, 'Premature Atrial Contraction': 2, 'Premature Ventricular Contractions': 3, 'Right Bundle Branch Block': 4, 'Ventricular Fibrillation': 5}

We can see that for training there are 15341 images belonging to 6 classes and for testing there are 6825 images belonging to 6 classes.

Apply Image Data Generator Functionality To Trainset and Testset