

Sprint-1

Dataset Collection & Image Preprocessing

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

Task:

There are two tasks:

1. Dataset Collection
2. Image Preprocessing

Dataset Collection:

The dataset contains six different 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 ImageDataGenerator Library
2. Configure ImageDataGenerator Class
3. Apply ImageDataGenerator functionality to the trainset and test set

Import ImageDataGenerator Library:

1. 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.
2. The Keras deep learning neural network library provides the capability to fit models using image data augmentation via the ImageDataGenerator class.

▾ Import The Image data Generator

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

Configure ImageDataGenerator 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 `ImageDataGenerator` class can be constructed for train and test.

Apply ImageDataGenerator functionality to the trainset and testset:

We will apply `ImageDataGenerator` functionality to Trainset and Testset by using the 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

▾ Apply Image Data Generator Functionality To Trainset and Testset

```
➤ x_train = train_datagen.flow_from_directory("/content/data/train", target_size = (64,64), batch_size = 32, class_mode = "categorical")
  x_test = test_datagen.flow_from_directory("/content/data/test", target_size = (64,64), batch_size = 32, class_mode = "categorical")

Found 15341 images belonging to 6 classes.
Found 6825 images belonging to 6 classes.
```