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| Week | Task worked on last week | Status |
| 1 | Introductory research on MusicNet about models | Completed |
| 2 | Code for generating Spectrograms for 30s window and generated  Spectrograms for CQT, STFT, FFT | Completed |
| 3 | Code for pre-processing the data, test and validation split, trial of a basic custom cnn. | Completed |
| 4 | VGG19 models with multiple spectra and tuning, different window sizes. | Completed |

VGG19 tuning

Initially same architecture was tried on all three CQT, FFT and STFT spectra of 30s windows. However, out of all the models FFT spectra performed best, which was further tuned and tried with different window sizes.

Table

Description automatically generated

VGG19 Base model

Train and Validation accuracy on Initial Model

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| --- | --- | --- |
| **Spectrum** | **Train Accuracy** | **Validation Accuracy** |
| CQT | 0.9585 | 0.8014 |
| FFT | 0.9634 | 0.8149 |
| STFT | 0.8965 | 0.6343 |

VGG19 on CQT spectra

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| --- | --- | --- |
| **Step** | **Model architecture or hyperparameter which is being tuned** | **Optimal architecture at the end of this step** |
| 1 | Starting model which is the  initial architecture (as defined above) which is based on the VGG19 network. | The **initial model architecture** that was described above.  Train accuracy: 0.9585  Validation accuracy: 0.80  A picture containing text, map  Description automatically generated  Calendar  Description automatically generated |
|  | Base model  Flatten  Dropout (0.1)  Dense (256)  Dense (10) | A picture containing icon  Description automatically generated |

VGG19 on FFT Spectra

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| **Step** | **Model architecture or hyperparameter which is being tuned** | **Optimal architecture at the end of this step** |
| **1** | Starting model which is the  initial architecture (as defined above) which is based on the VGG19 network. | The **initial model architecture** that was described above. There are lot of fluctuations in the validation set which may be due to imbalanced classes.  Train accuracy: 0.9634  Validation accuracy: 0.8149  Calendar  Description automatically generated |
| 2 | Hyperparameters:  VGG19 Base model  Flatten  Dropout (0.1)  Dense (256)  Dense (10) | Train accuracy: 0.9585  Validation accuracy: 0.8691  A picture containing polygon  Description automatically generated  Calendar  Description automatically generated |
| 2 | Base Model  Flatten  Dropout 9 (0.1)  Dense 512  Dropout (0.1)  Dense 256  Dense 10 | Train accuracy: 0.9880  Validation accuracy: 0.8939  Chart, line chart  Description automatically generatedCalendar  Description automatically generated |
| 3 | Base Model  Flatten  Dropout 9 (0.1)  Dense 512  Dropout (0.2)  Dense 256  Dense 10 | Train accuracy: 0.9921  Validation accuracy: 0.8623  A picture containing text  Description automatically generatedCalendar  Description automatically generated |
|  | Base Model  Flatten  Dropout 9 (0.1)  Dense 256  Dropout (0.1)  Dense 128  Dense 10 | Train accuracy: 0.99  Validation accuracy: 0.86  Calendar  Description automatically generated |

Out of the current 30s window models, the architecture for model 2 were chosen further to try out different windows 15s and 40s, which are shown in presentation.

However, the 2 model for 30 second showed the best performance despite of windows, and different hyperparameters.

Note: When I tried to reproduce the model, it showed 0.86-0.88 validation accuracy in multiple runs which is why I did not consider for final submission, in comparison with other models.