Multimedia Computing & Application | Assignment 2
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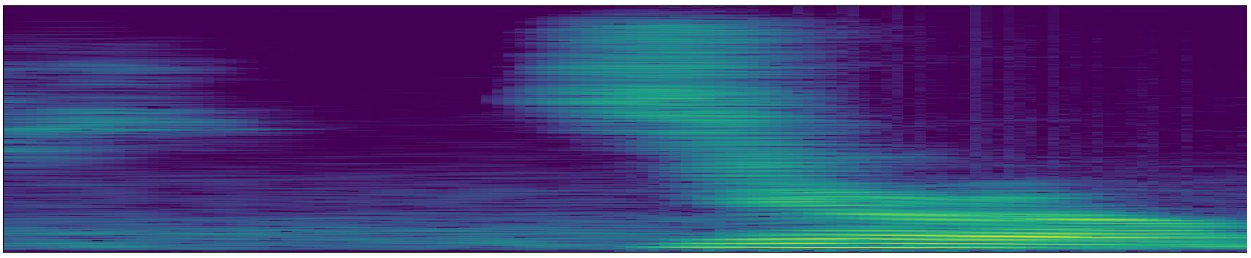
Ques 1.
An example of the computed spectrogram is shown below:



The Corresponding spectrogram for each folder i.e training and validation have been computed and saved at
https://drive.google.com/drive/u/0/folders/1R5M_ZNQJTwdH_2e59S6cz5Yi0D020946
With folder names for training as : test_1, test_2, test_3, test_4 and train_spect
Folder name for Testing as : test_spect

Ques 2.
Example of computed MFCC:

```
array([ 1.1438773 ,  0.90482513,  0.61136621,  0.45957664,  0.34938091,
        0.24925657,  0.18777056,  0.12052083,  0.06430649,  0.01814262,
       -0.02553732, -0.05863365, -0.08604695, -0.10691522, -0.12258051,
       -0.13941814, -0.14673613, -0.1503338 , -0.15322413, -0.15574519,
       -0.15971522, -0.161925  , -0.16125289, -0.15987693, -0.15674597,
       -0.15565189, -0.15378596, -0.15196315, -0.15044007, -0.14704253,
       -0.14227852, -0.13751472, -0.13223474, -0.1278819 , -0.12270475,
       -0.11857263, -0.11533169, -0.11306275, -0.1117791 , -0.1102086 ])
```

The corresponding MFCC for training and testing have been as csv saved at -
https://drive.google.com/drive/u/0/folders/1R5M_ZNQJTwdH_2e59S6cz5Yi0D020946
Named MFCC_TEST.csv and MFCC_TRAIN.csv

Ques 3.

a.) **SVM using Spectrogram**

Model :

```
SVC(C=10, break_ties=False, cache_size=200, class_weight=None, coef0=0.0,
    decision_function_shape='ovr', degree=3, gamma='scale', kernel='rbf',
    max_iter=-1, probability=False, random_state=None, shrinking=True, tol=0.01,
    verbose=False)
```

Classification Report

	precision	recall	f1-score	support
0	0.00	0.00	0.00	260
1	0.00	0.00	0.00	230
2	0.00	0.00	0.00	236
3	0.00	0.00	0.00	248
4	0.00	0.00	0.00	280
5	0.00	0.00	0.00	242
6	0.11	1.00	0.19	262
7	0.00	0.00	0.00	263
8	0.00	0.00	0.00	243
9	0.00	0.00	0.00	230
accuracy			0.11	2494
macro avg	0.01	0.10	0.02	2494
weighted avg	0.01	0.11	0.02	2494

b.) **SVM for MFCCs**

Model:

```
SVC(C=10, break_ties=False, cache_size=200, class_weight=None, coef0=0.0,
    decision_function_shape='ovr', degree=3, gamma='scale', kernel='rbf',
    max_iter=-1, probability=False, random_state=None, shrinking=True,
    tol=0.001, verbose=False)
```

Classification Report:

	precision	recall	f1-score	support
0	0.10	0.77	0.17	243
1	0.07	0.18	0.10	242
2	0.00	0.00	0.00	280
3	0.00	0.00	0.00	230
4	0.00	0.00	0.00	230
5	0.00	0.00	0.00	263
6	0.00	0.00	0.00	262
7	0.00	0.00	0.00	248
8	0.00	0.00	0.00	236
9	0.00	0.00	0.00	260
accuracy			0.09	2494
macro avg	0.02	0.10	0.03	2494
weighted avg	0.02	0.09	0.03	2494

In my models, spectrogram classification performed better than the MFCC coefficient which is clear from the accuracy report from the validation data.
For spectrogram -> Accuracy: 0.10505212510024058
For MFCC -> Accuracy: 0.09262229350441059