

Instruments Identification

Group 10



Data Collection

 Guitar-0.csv

 Harmonica-2.csv

 NoSound-4.csv

 Piano-1.csv

 Saxophone-3.csv

jupyter Guitar-0.csv Last Saturday at 4:40 PM

Logout

File Edit View Language current mode

```
1 1.638653819043000000e+12,-1.6000000000000000e+01,-3.0000000000000000e+00,-1.2000000000000000e+01,-3.0000000000000000e+00,-5.0000000000000000e+00,-1.4000000000000000e+01,3.0000000000000000e+00,-6.0000000000000000e+00,-7.0000000000000000e+00,-1.4000000000000000e+01,-1.3000000000000000e+01,-1.4000000000000000e+01,-2.6000000000000000e+01,-2.3000000000000000e+01,-3.1000000000000000e+01,-3.1000000000000000e+01,-1.2000000000000000e+00,-5.0000000000000000e+00,-5.0000000000000000e+00,-1.2000000000000000e+01,2.2000000000000000e+01
```

jupyter Piano-1.csv Last Saturday at 5:13 PM

Logout

File Edit View Language current mode

```
1 1.638655829080000000e+12,6.4000000000000000e+01,4.6000000000000000e+01,5.7000000000000000e+01,2.6000000000000000e+01,3.2000000000000000e+01,4.6000000000000000e+01,3.4000000000000000e+01,6.2000000000000000e+01,4.2000000000000000e+01,5.2000000000000000e+01,4.4000000000000000e+01,3.7000000000000000e+01,3.6000000000000000e+01,3.7000000000000000e+01,3.5000000000000000e+01,2.1000000000000000e+01,1.0000000000000000e+00,8.0000000000000000e+00,8.0000000000000000e+00,-2.0000000000000000e+00,7.0000000000000000e+00,-1.0000000000000000e+01,-1.1000000000000000e+01,0000000000000000e+01
```

jupyter Harmonica-2.csv Last Saturday at 6:12 PM

Logout

File Edit View Language current mode

```
1 1.638659368651000000e+12,-2.3000000000000000e+01,-1.3000000000000000e+01,-5.1000000000000000e+01,-1.7000000000000000e+01,-6.0000000000000000e+00,-1.1000000000000000e+01,-7.6000000000000000e+01,-1.2100000000000000e+02,-8.1000000000000000e+01,-4.7000000000000000e+01,-9.5000000000000000e+01,-1.1600000000000000e+02,-9.4000000000000000e+01,-1.1900000000000000e+02,-7.0000000000000000e+01,-6.1000000000000000e+01,-1.7000000000000000e+01,-5.4000000000000000e+01,-8.2000000000000000e+01,-9.6000000000000000e+01,-1.8000000000000000e+01,-9.0000000000000000e+01,-1.3300000000000000e+02,-1.8500000000000000e+02,-1.6500000000000000e+02,-8.0000000000000000e+01,-7.2000000000000000e+01,-7.7000000000000000e+01,-1.0900000000000000e+02,-2.6000000000000000e+01,-1.0500000000000000e+02,-1.3400000000000000e+02,-1.3000000000000000e+02,-1.2000000000000000e+02,-1.5800000000000000e+02,-1.3300000000000000e+02,-1.1000000000000000e+02,-1.8100000000000000e+02,-1.3100000000000000e+02,-1.0000000000000000e+02,-1.1500000000000000e+02,-8.8000000000000000e+01,-1.1500000000000000e+02,-6.3000000000000000e+01,-1.1700000000000000e+02,-5.6000000000000000e+01,2.5000000000000000e+01,-6.1000000000000000e+01
```

Each sample was recorded for 3 minutes

Features used to identify different instruments

- Frequencies using FFT
- Mel scale MFCC
- Distribution of frequencies over formants

Confusion Matrix

	G	P	H	S	No Sound
Guitar	141.	16.	6.	3.	31.
Piano	39.	97.	13.	16.	6.
Harmonica	11.	19.	94.	30.	2.
Saxophone	7.	26.	38.	71.	3.
No sound	27.	2.	1.	0.	161.

Results

The average accuracy is 0.6558139534883722

The average precision is [0.70723066 0.58434564 0.61578338 0.50084363 0.84795131]

The average recall is [0.62147305 0.61418528 0.62760504 0.59541639 0.80421013]

Guitar → Piano → Harmonica → Saxophone → No Sound