IBMz Datathon

Lummox Team-104

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Emotion Detection using Voice Sample

Detects the emotion of a person based on a recorded voice sample.

It works by measuring the distortions in the audio file.

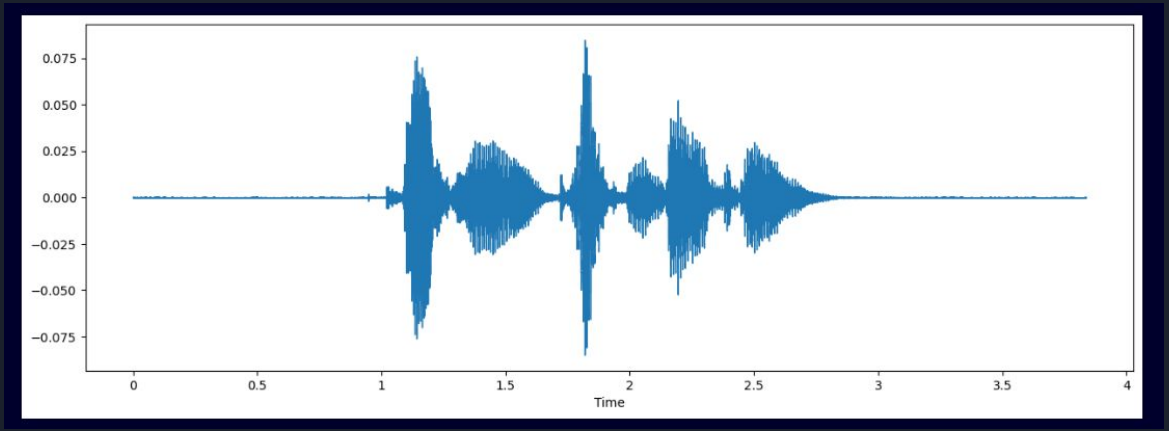
We have built the model using a convolution neural network, with a dataset consisting of Voice Actor sample data and have them classified depending on their Gender and Emotion

Datasets Used-

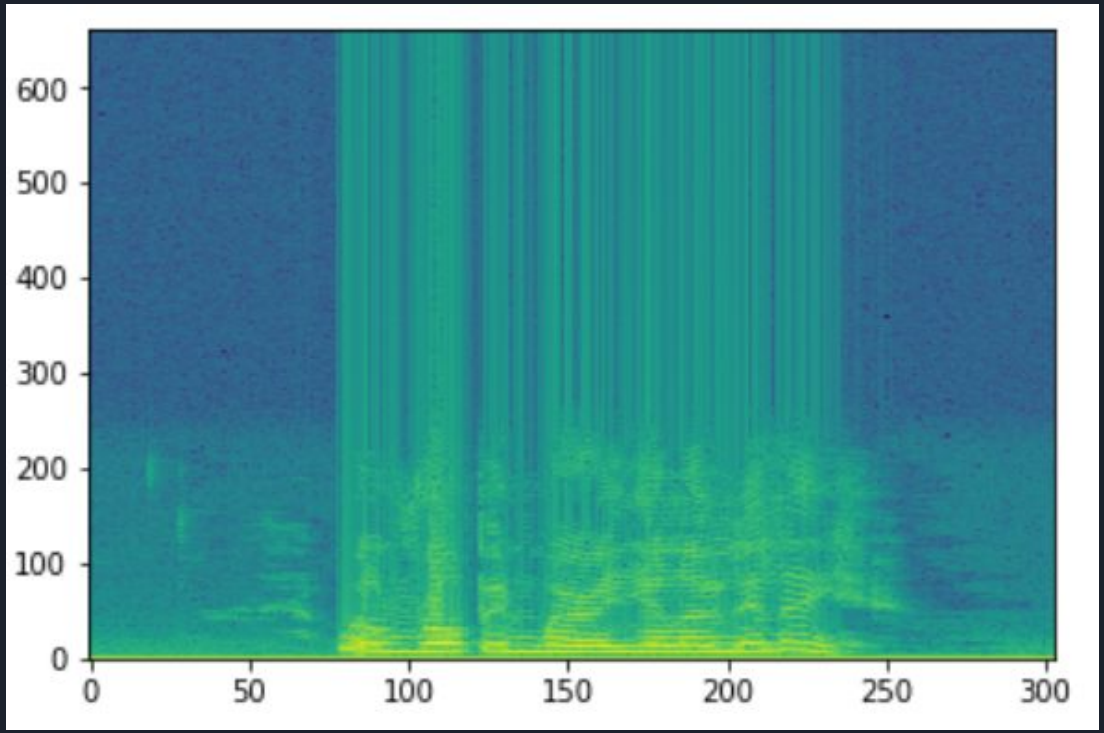
RAVDESS and SAVEE

Loading and Visualizing Audio

Loading and Displaying the WAV files in Python-



Spectrogram - Using scipy



Feature Extraction

Extracting the features of the audio using **Librosa**

```
In [60]: train[255:265]
```

Out[60]:

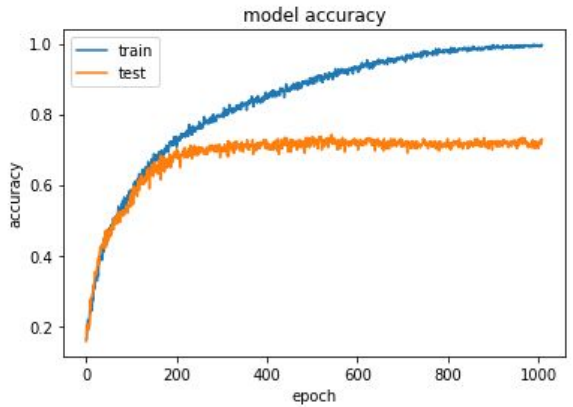
4	5	6	7	8	9	...	121	122	123	124	125	126	127	128	129	0
582	0.243815	0.234133	0.220812	0.222221	0.232087	...	0.248799	0.253912	0.260256	0.257698	0.258209	0.256242	0.255648	0.255648	0.255701	angry
521	0.285065	0.291352	0.303514	0.308232	0.328804	...	0.234485	0.228035	0.216631	0.214859	0.212437	0.213037	0.218348	0.223208	0.224450	fearful
765	0.108862	0.103840	0.101478	0.107730	0.103912	...	0.066940	0.036635	0.027208	0.036532	0.053178	0.065569	0.057186	0.039764	0.021314	angry
141	0.074467	0.089486	0.088280	0.092139	0.093846	...	0.054423	0.053604	0.055540	0.058426	0.060729	0.068808	0.088886	0.098216	0.090357	sad
724	0.281591	0.296421	0.285957	0.260214	0.257237	...	0.299710	0.291853	0.291916	0.299710	0.299710	0.299710	0.287766	0.252755	0.243608	happy
779	0.330779	0.330779	0.330779	0.330779	0.330779	...	0.288739	0.287423	0.283312	0.291878	0.305482	0.321055	0.327999	0.301280	0.300456	calm
433	0.169379	0.171645	0.179289	0.190308	0.182795	...	0.149075	0.147707	0.159900	0.184663	0.187635	0.168762	0.149145	0.130382	0.120786	neutral
036	0.238554	0.242728	0.229463	0.228398	0.243454	...	0.223064	0.207814	0.210600	0.210909	0.202713	0.192792	0.192630	0.195298	0.187149	happy
079	0.326079	0.305091	0.284397	0.274060	0.266039	...	0.156601	0.185422	0.202734	0.204833	0.213753	0.221158	0.222267	0.185138	0.151496	sad
975	0.172604	0.173216	0.167372	0.168891	0.178888	...	0.205757	0.200951	0.197044	0.193599	0.208915	0.228052	0.219472	0.205900	0.201549	surprised

Extracted Feature Set

Building the Model

Convolution Neural Network

In [110]:
```
#sigmoid
plt.plot(cnnhistory.history['acc'])
plt.plot(cnnhistory.history['val_acc'])
plt.title('model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'test'], loc='upper left')
plt.show()
```



Predictions

Predictions on our Test Dataset

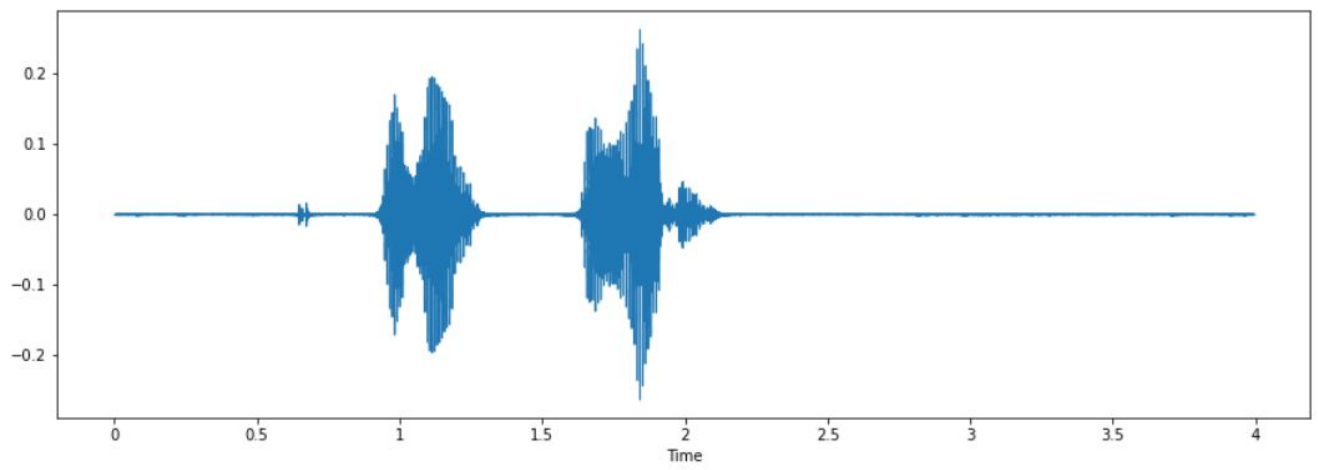
```
In [75]: finaldf[58:68]
```

Out[75]:

	actualvalues	predictedvalues
58	male_fearful	male_happy
59	male_fearful	male_fearful
60	male_fearful	male_fearful
61	male_fearful	male_fearful
62	male_sad	male_sad
63	male_fearful	male_fearful
64	male_happy	male_happy
65	female_angry	female_angry
66	female_angry	female_fearful
67	male_angry	male_angry

Testing on User Audio

Model predicting on audio file where user says “Good Morning” in a happy mood



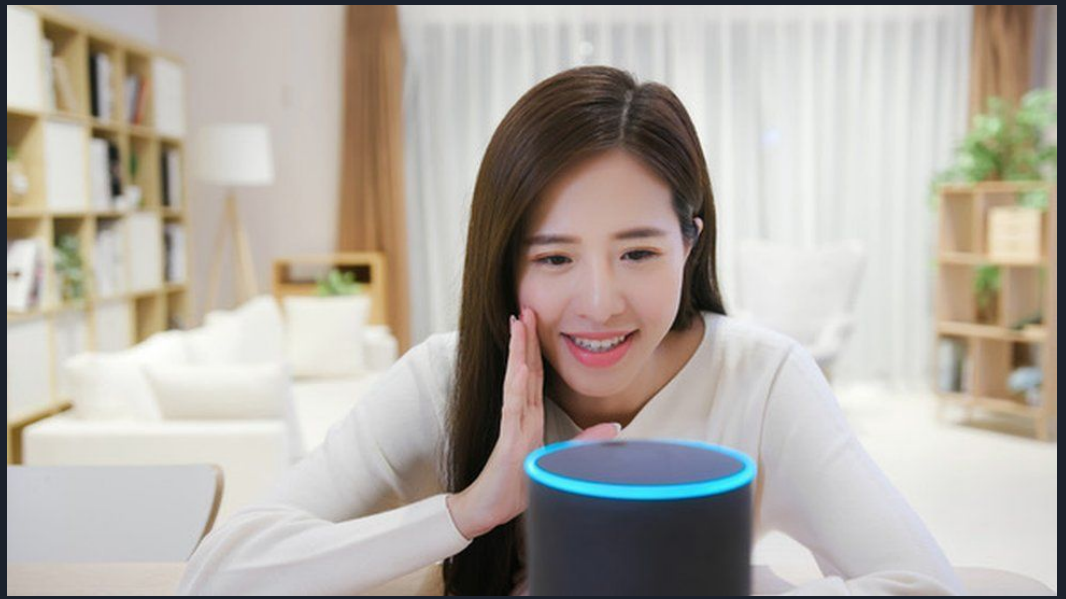

```
livepredictions = (lb.inverse_transform((liveabc)))

print("The predicted gender is '{}' and the emotion is '{}'.".format(*livepredictions[0].split("_")))
```

[73] ✓ 0.3s

```
The predicted gender is 'male' and the emotion is 'happy'.
```

Use Cases

1) Voice Assistant - Predict the emotions of the user and recommend information based on their mood. This would allow for a more personalized experience with such voice assistants. Ex- Plays a song based on the users mood



Use Cases

2) Police interrogation - Monitor criminal's emotions to extract confession from them

Use Cases

3) Therapy- Helps therapist gain an additional source of confirmation on their analysis

Conclusion

Building the model was a challenging task as it involved lot of trial and error methods, tuning etc. The model is very well trained to distinguish between male and female voices and it distinguishes with 91% accuracy.

The use of IBMz's LinuxOne was monumental to achieving the desired output, the speed and responsiveness of the platform is unmatched.

This project has a lot of real life use cases and we hope to implement such products

Thank You