# Speech Emotion Interpreter

*A tool for the hearing-impaired*

# 38,200,000

Approximately 14.3% of Americans report some degree of hearing loss

# RAVDESS Audio Identifiers

### Emotion

- Angry
- Disgust
- Fear
- Happy
- Neutral
- Sad
- Surprise

### Actor

- Male
- Female

### Statement

- "Kids are talking by the door"
- "Dogs are sitting by the door"

## Using Librosa

### Sampling Rate

Number of samples per unit (second) from a continuous signal to make a discrete or digital signal.
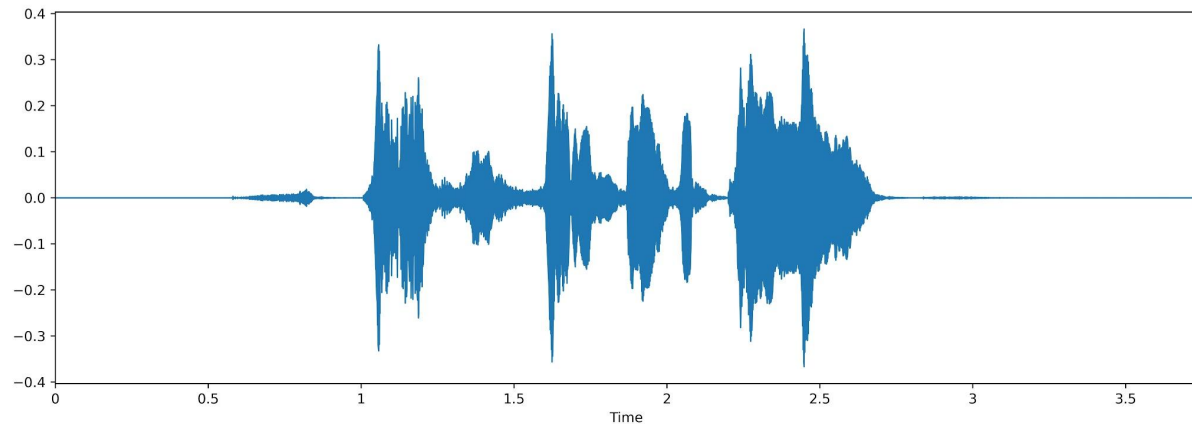
### Mel-frequency Cepstral Coefficient (MFCC)

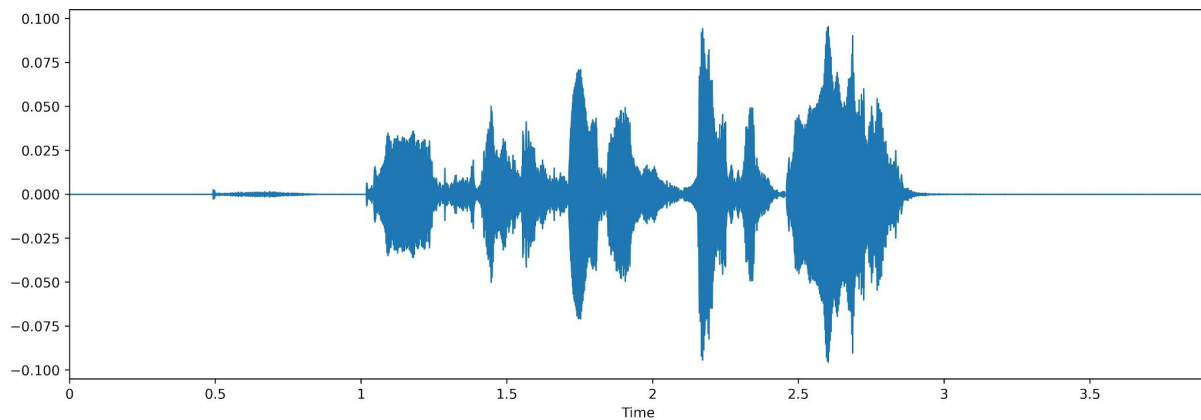Coefficient that represent the short-term power spectrum of a sound.

Audio Examples:

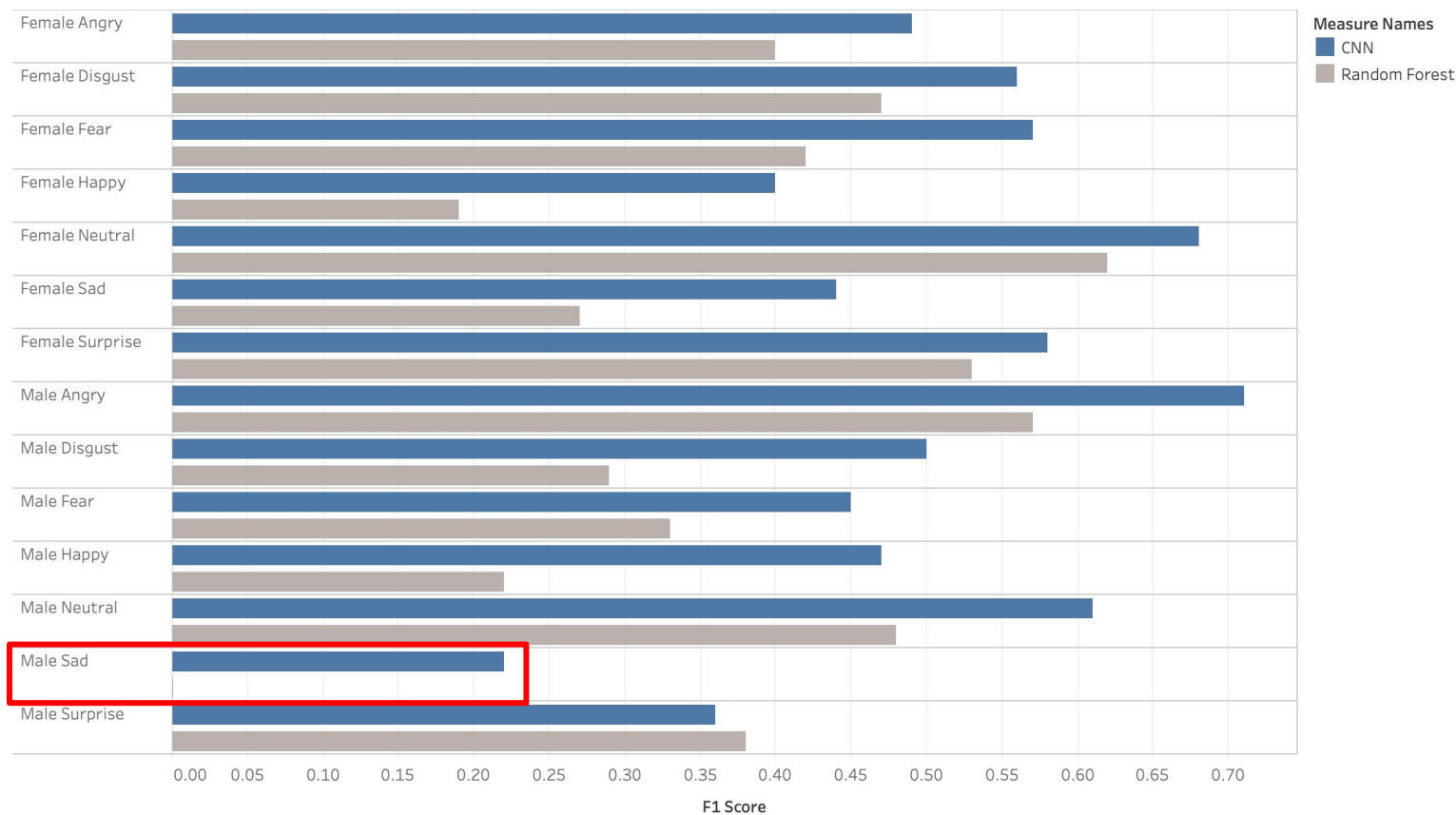*"Dogs are sitting by the door"*
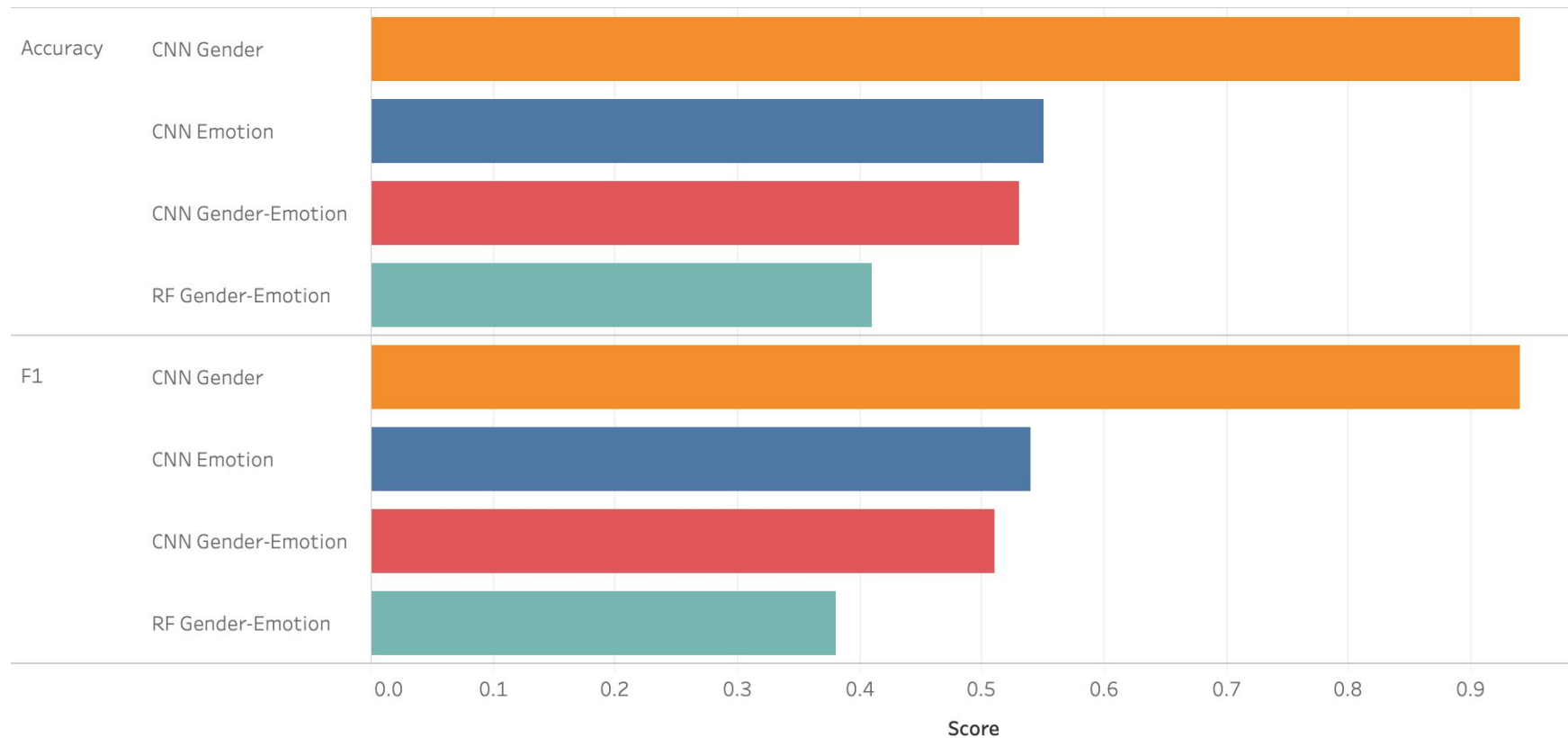
**Female Happy**



**Female Sad**

# Convoluted neural network outperforms random forest at gender-emotion classification

# For speech, gender is easier to classify than emotion

*So can this interpreter be trusted?*

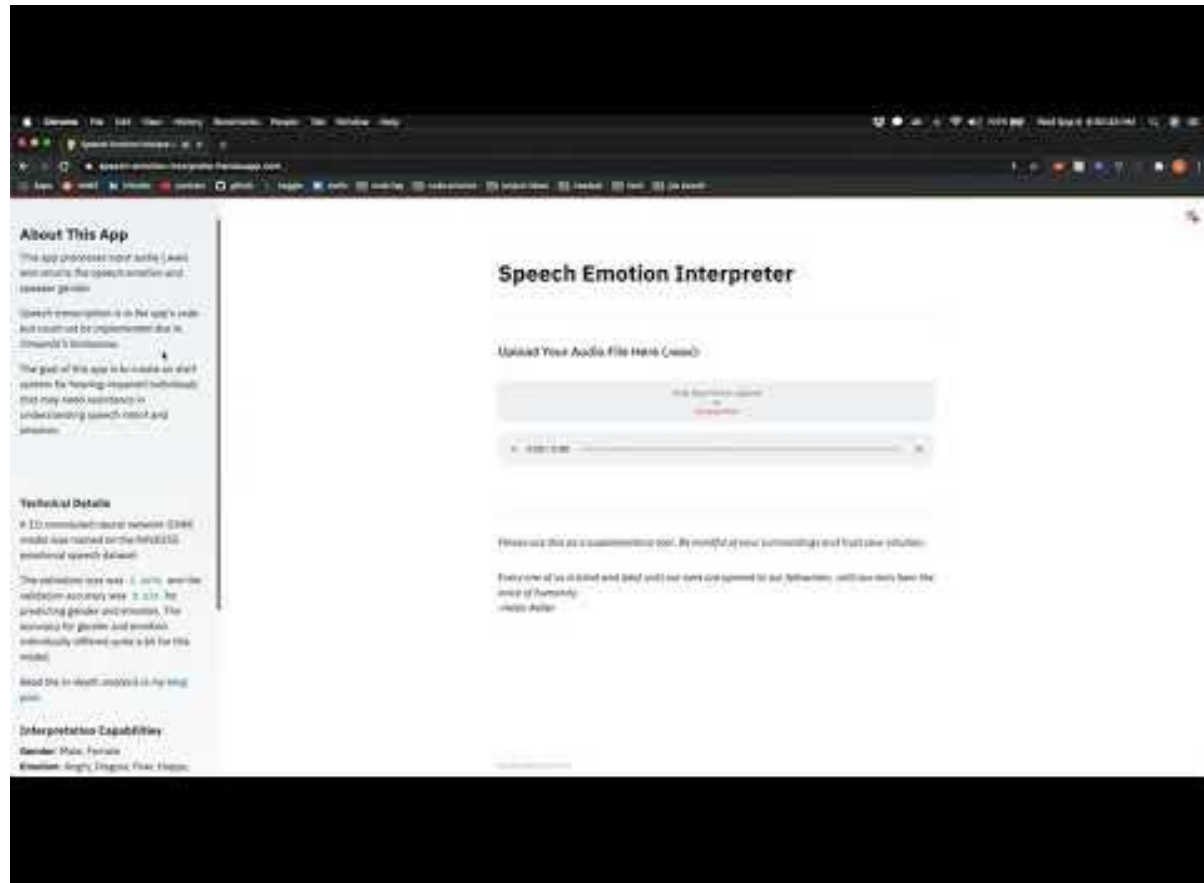## 52.5% accuracy
For predicting gender **and** emotion

## 7.1% chance
At guessing the correct gender and emotion

This is meant to be used as a supplementary tool!

# *Speech Emotion Interpreter Demo*

https://speech-emotion-interpreter.herokuapp.com

## Key Takeaways

◈ Extracting human intent is difficult, but possible

◈ Machine learning tools can be used to create more personalized assistive devices

◈ Can help reduce the financial impact of hearing loss

# Future Considerations

## 5.4 Speech to Text

```python
import speech_recognition as sr

r = sr.Recognizer()
```
executed in 5ms, finished 17:59:24 2020-09-03

```python
#male_audio_test speech to text
david = sr.AudioFile('test_audio/david_audio.wav')
with david as source:
    audio = r.record(source)

type(audio)
```
executed in 9ms, finished 17:59:25 2020-09-03

```
speech_recognition.AudioData
```

```python
r.recognize_google(audio)
```
executed in 1.13s, finished 17:59:27 2020-09-03

```
'David I need to talk to you right now'
```

- Implement speech transcription
- Separate models for gender and emotion
- Incorporate additional audio datasets for improved training
- Integrate the model into haptic feedback

Thanks!

# Any questions?

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