Emotion Detection in Speech

by

Milad Shirani

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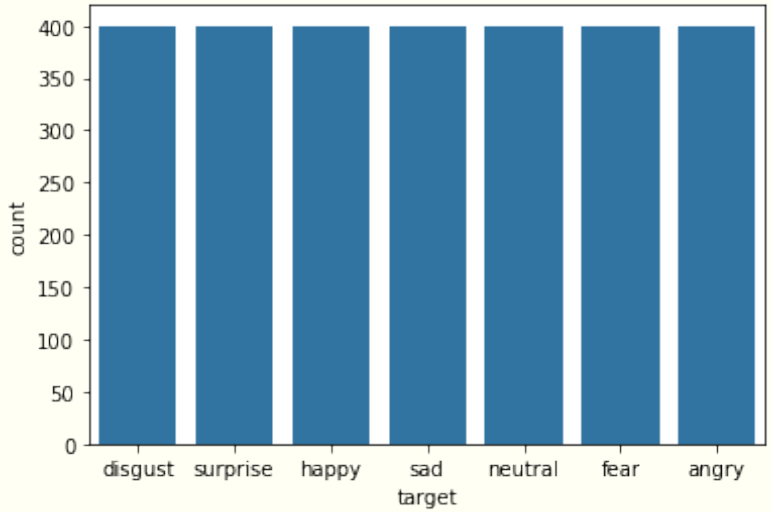
Project Overview

1. In order for a therapist to fully analyze a patience, both words and emotions conveyed by patient's speech is important.
2. In this work, we want to introduce a new model to detect the emotion of an audio file.
3. We used Convolutional Neural Network as well as Transfer Learnings such as EfficientNetB3 and EfficientNetB7

Data and Method

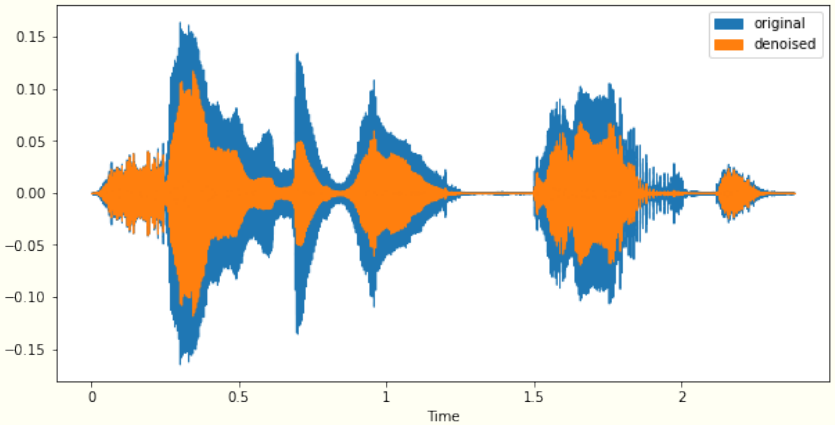
- 2800 audio files provided by University of Toronto



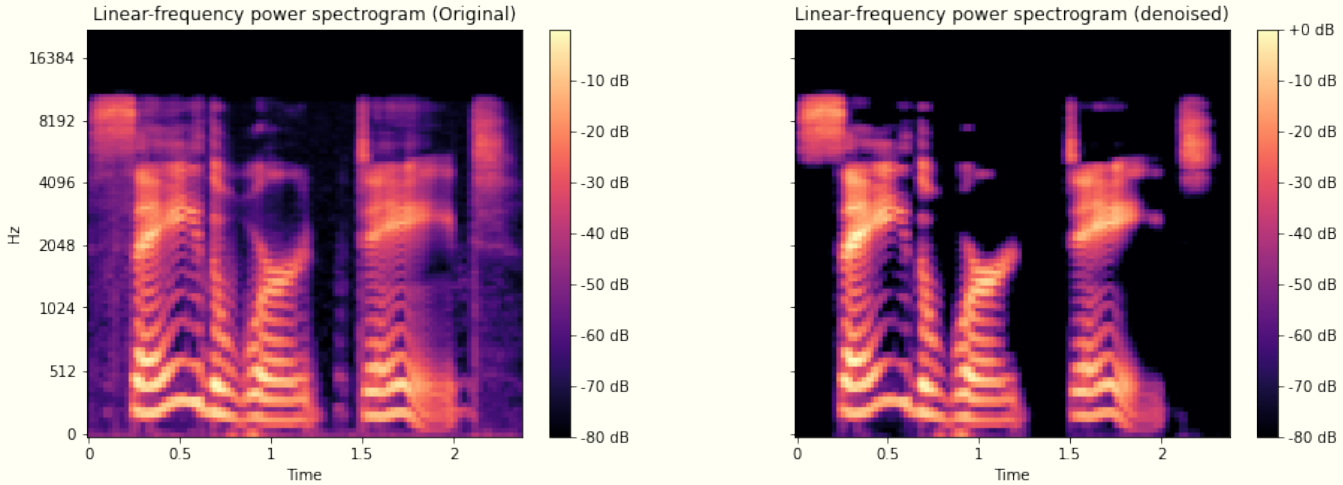
Distribution of Categories

- Converting audio files to mel-spectrograms

Effects of Denoising

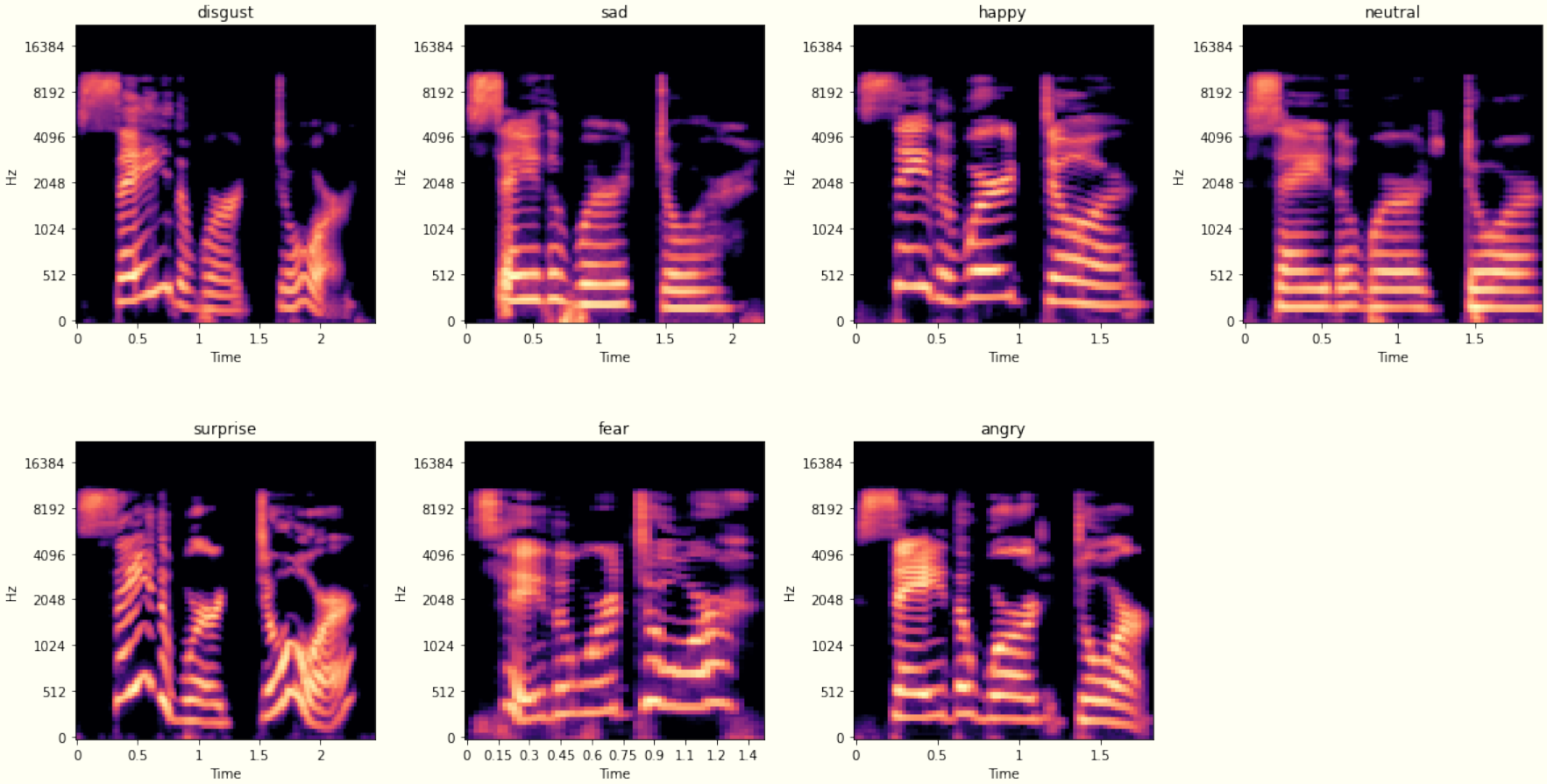


The Original and Denoised values of an Audio File



Mel-Spectrograms of Original and Denoised of an Audio File

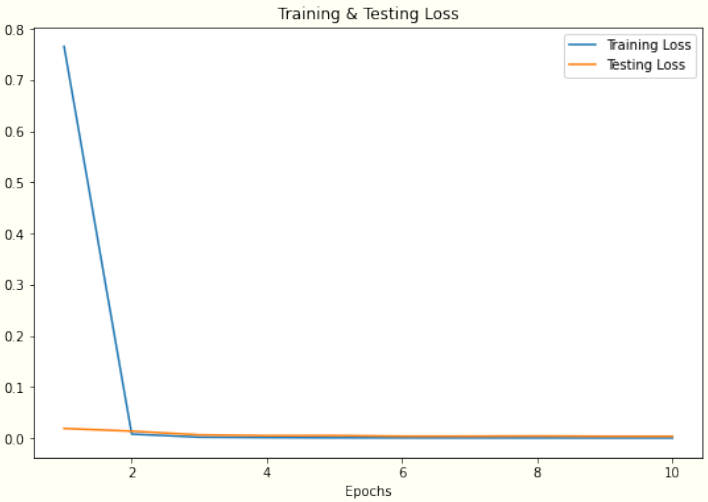
Effects of emotion

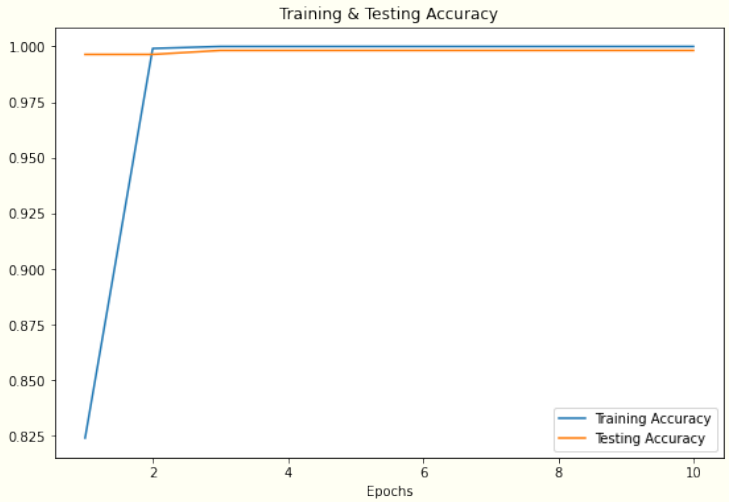


Effects of emotion in saying the word "door"

Modeling and Results

1. Most of the deep learning models performed well with test accuracy of 99%
2. We would recommend the first CNN model (link to the model) because it has the simplest structure





Conclusion

1. The information in speech is conveyed through words and emotion.
2. In order for a therapist to fully analyze a patient, it is important to understand both words and the emotion of the speech delivered by the patient.
3. The final model we introduce has the simplest structure. (link to the model)
4. This model can be implemented by virtual assistant such as Amazon Alexa or Siri as well in addition to the therapists.

Next Steps

1. Gathering more data points for training.
2. Deploying neural networks by using LSTM or Conv1d layers and train them on numerical values obtained from audio files.
3. Trying using MFCCs (Mel Frequency Cepstral Coefficients) to train machine learning models.

Q and A