Name(s)

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Project Number

J0497

Project Title

Person Identification by Voice Spectral Analysis

Abstract

Objectives/Goals
The goal of this project is to determine if voice spectral analysis can characterize a human voice to identify a specific person.

Methods/Materials
The software used to chart the voice spectral analysis is Raven Pro: Interactive Sound Analysis Software from the Cornell Lab of Ornithology. To conduct this experiment, test subjects from the age groups: 6-12, 13-19, 20-50 of each gender. The phrase each test subject spoke was:"It is a beautiful day outside." Later, a separate phrase was recorded,"Science rocks", to compare different phrases the same people have spoken. After the voice analysis was completed, the spectrographs were compared in the changes in frequencies and the highest frequency for every sample.

Results
The data clearly showed that the spectral properties differed uniquely, in terms of frequency variations and waveform pattern, despite similarities in gender and age. Further analysis showed that changes in the phrase and volume, preserved waveform patterns and voice fluctuations. Evidently, every person has unique changes in frequencies and waveform patterns.

Conclusions/Discussion
Through this project I discovered that when any person speaks their waveform pattern is very different, despite similarities in age and gender. Also if a person were to say another phrase the waveform still remains relatively similar. The volume was specified to a certain extent but not accurately using instruments. At first volume appeared to have an effect upon the waveform; however research found that even with volume differences between the test subjects the waveform still followed the same pattern when they spoke at a different volume. With sophisticated algorithms to show the changes in frequencies and waveform pattern, voice spectral analysis could potentially be used to solve court cases. Possible extensions upon this experiment could be done to see whether voice spectral analysis could be used for early detection of learning disabilities like Dyslexia or Down syndrome; or whether voice spectral analysis can be used for detection of diseases like Parkinson's disease and Alzheimer's.

Summary Statement

This project is about characterizing a human voice by voice spectral analysis, to determine if it can identify a specific person.

Help Received

I discussed the idea with my father and teacher.