Shazam for Singing: Building a Music Recognition App That Can Process Humming

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Having a song stuck in your head is a common problem, and while music identification apps can be helpful sometimes, they have a limitation: they cannot process user humming, only prerecorded songs. This is the problem that I want to solve, and my hypothesis is that software can recognize a song that is hummed if the frequency pattern is extracted and compared to an existing song's frequency levels. I coded an app that can identify a user humming either Mary Had a Little Lamb or Twinkle Twinkl Little Star, and I built it using the Python and HTML languages. I gathered 20 audio samples of people humming each song (40 samples total), and created logarithmic spectrograms for each sample to extract the frequency levels. Once calculating the average frequency per second for each song, I used that information to create parameters for my app. If the user's hum frequency is within a certain range, then it belongs to one song or the other. This project disproved my hypothesis; I found that the frequency alone is not always sufficient to accurately identify songs. In the future, I would like to continue experimenting with different ways to extract multiple features from audio samples, such as pitch, tempo, and key. While the technique that I chose (manually calculating only the frequencies of samples) may not have been the most accurate or efficient option, it was a starting point for future research.

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