

CSCI 475 ENGL 469/569

Computational Linguistics

Programming Assignment #2

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Calculate pitch and formants and detect significant changes:

Figures 1-5 show the results of our program to calculate pitch and formants and detect significant changes. The left vertical axis displays frequency in Hertz and the right vertical axis displays a key for the differences seen throughout the sound file. An increase in frequency results in a red highlight, and a decrease in frequency results in a blue highlight. The darker the color, the more significant the change.

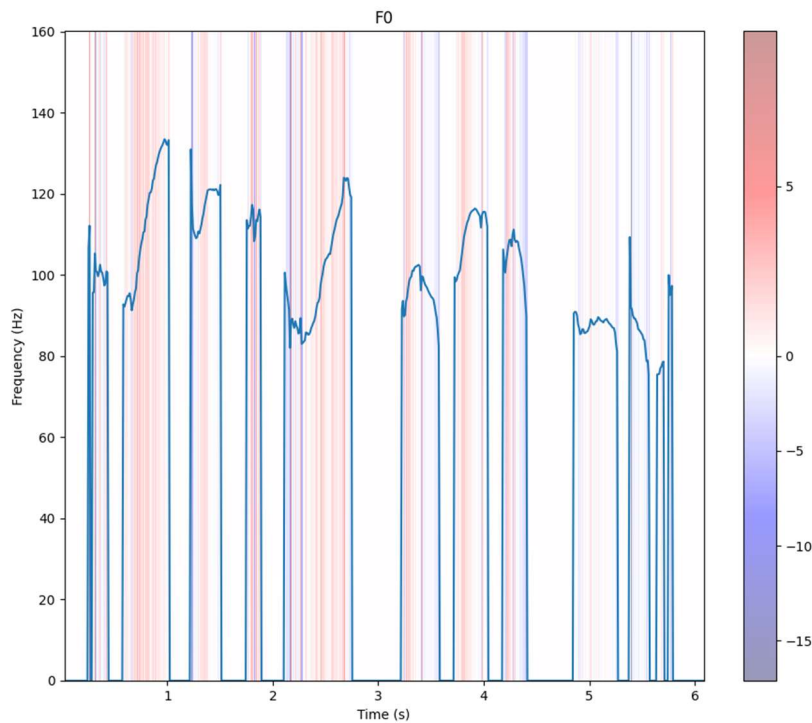


Figure 1: F0 throughout sound file

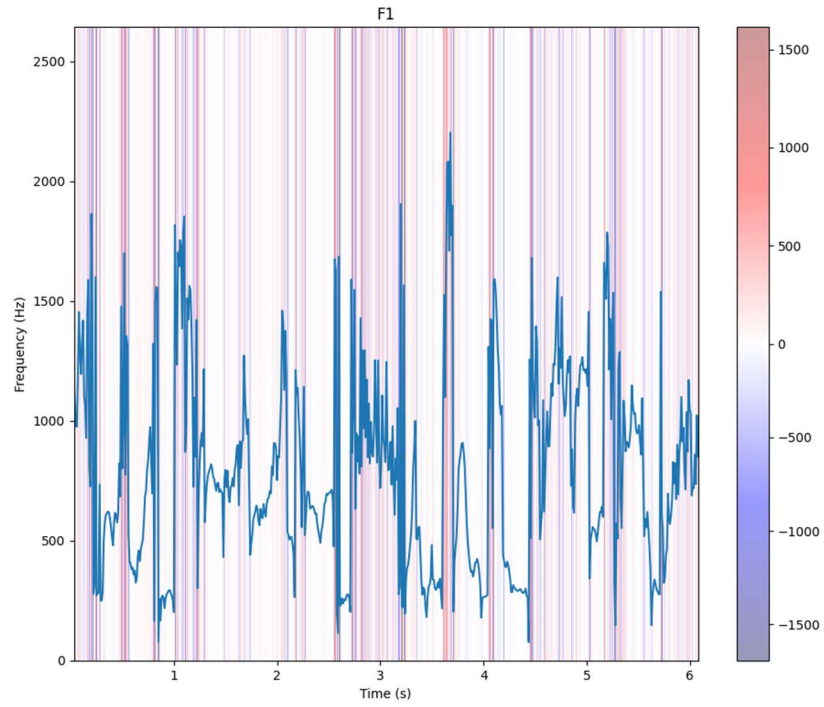


Figure 2: F1 throughout sound file

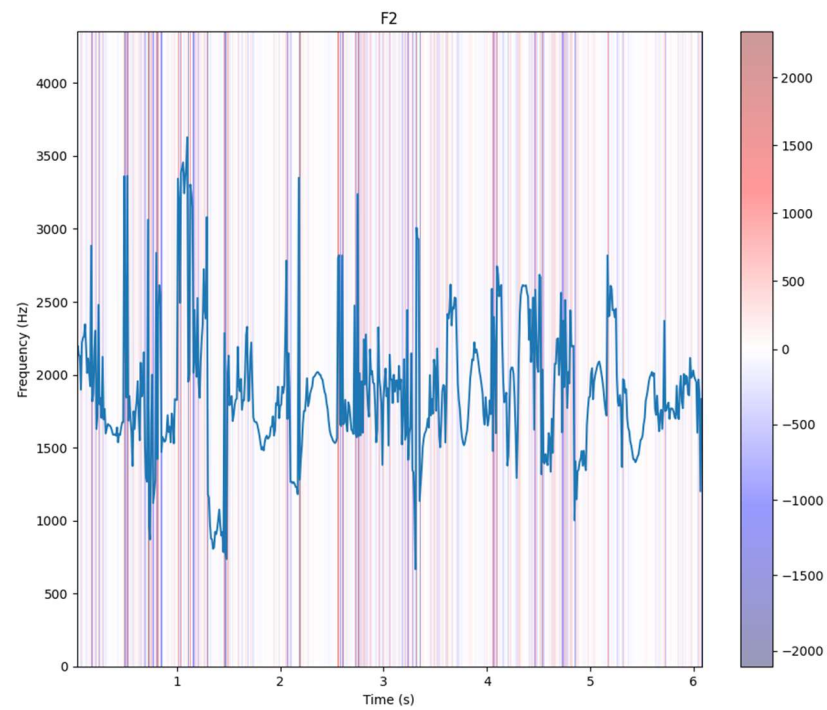


Figure 3: F2 throughout sound file

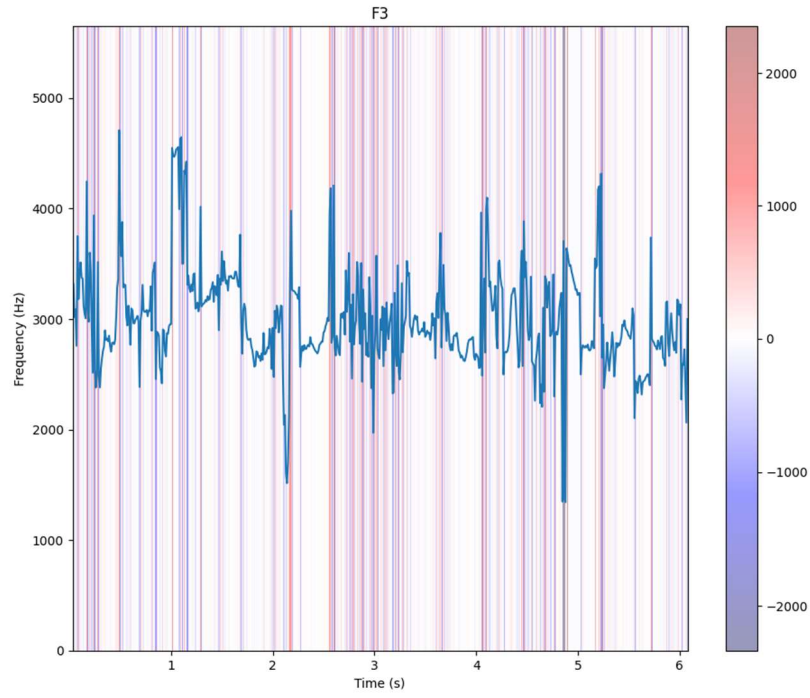


Figure 4: F3 throughout sound file

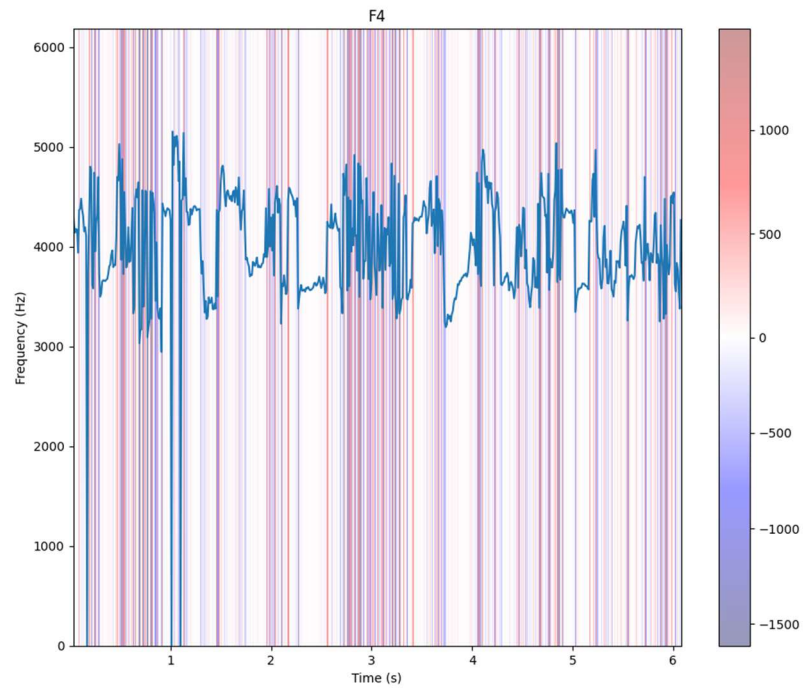


Figure 5: F4 throughout sound file

Calculate the average of the pitch and formants for 1 IPA sound:

We calculated the average of the pitch and formants for the IPA sound [a:i] in the word \giant\. Table 1 shows these values as well as whether the pitch and formants rise, fall, or remain flat. We used the Just Noticeable Differences (JNDs) to determine the rising and falling. If the frequency rose or fell more than the JND for that formant throughout an interval, we labeled it as rising or falling, respectively. A rising or falling less than the JND was labeled as flat.

Formant	Average (Hz)	Rising/Falling/Flat	Net Change (Hz)	JND
F0	103.0	Rising	12.0	5
F1	796.0	Rising	266.0	60
F2	1600.0	Flat	-69.0	200
F3	2814.0	Flat	-45.0	400
F4	3288.0	Flat	252.0	650*

*Estimation based on other JNDs