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University of Ljubljana
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SEMINAR 2
Derive STFT of women and man sound record

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Table of Contents

1. Introduction

Derive Short Term Fourier Transform (STFT) of woman's and man's sound record

The two vocal properties are intensity (loudness) and frequency (pitch). Pitch of a man's voice fall under low frequency, where as woman's voice is of the high pitch type. Pitch and intensity are proportional to each other

2. Methods

Task1: Calculate and show the STFT of each record.

First I used audioread Matlab function to read each .wav file. [y,Fs] = audioread('filename') reads data from the file named filename – which is in our case .wav file, and returns sampled data, y, and a sample rate for that data, Fs.

```matlab
[y1,Fs1] = audioread('Man_scream.wav');
[y2,Fs2] = audioread('Female_scream.wav');
[y3,Fs3] = audioread('danced_with_devil.wav');
[y4,Fs4] = audioread('born_yesterday.wav');
```

I tried and played them all with function sound(y, Fs).

```matlab
%sound(y1, Fs1);
```

After that, we need to calculate and show STFT of each .wav file.

```matlab
stft(y1,Fs1,'Window',kaiser(256,5),'OverlapLength',220,'FFTLength',512);
%stft(y2,Fs2,'Window',kaiser(256,5),'OverlapLength',220,'FFTLength',512);
%stft(y3,Fs3,'Window',kaiser(256,5),'OverlapLength',220,'FFTLength',512);
%stft(y4,Fs4,'Window',kaiser(256,5),'OverlapLength',220,'FFTLength',512);
```
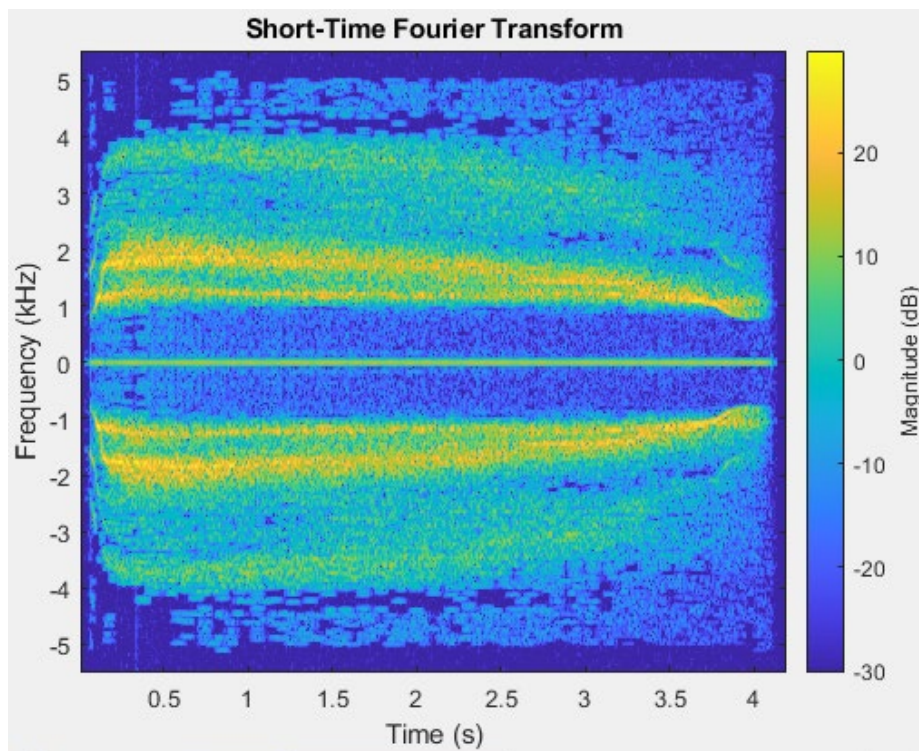
I set Kaiser window to length 256 and add shape parameter β=5. I specified the length of overlap as 220 samples and DFT length as 512 points.
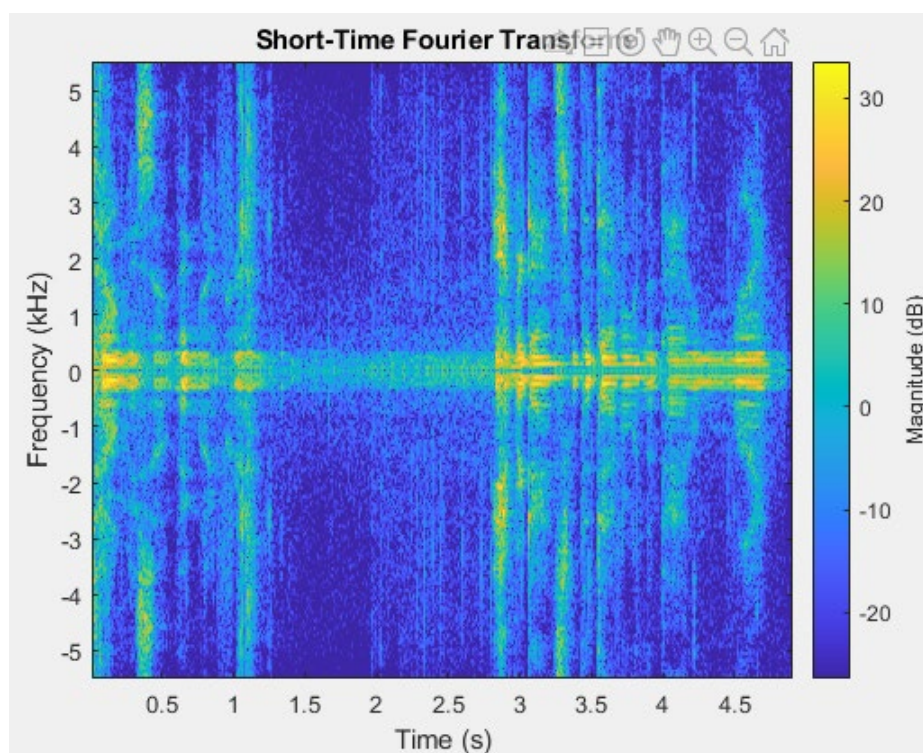
3. Result

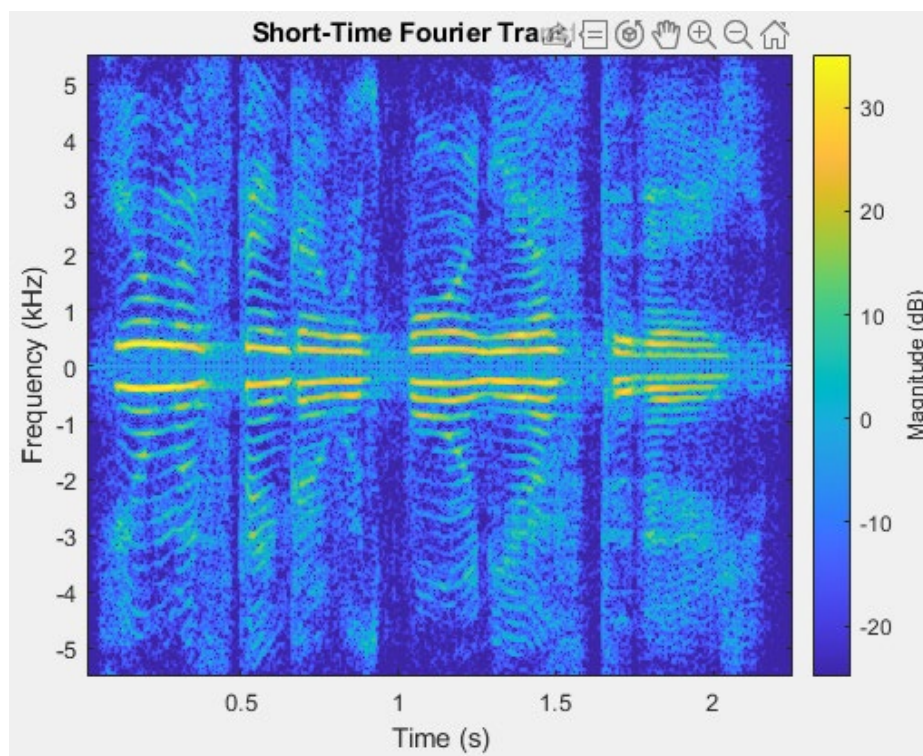Result of the Man_scream.wav file:
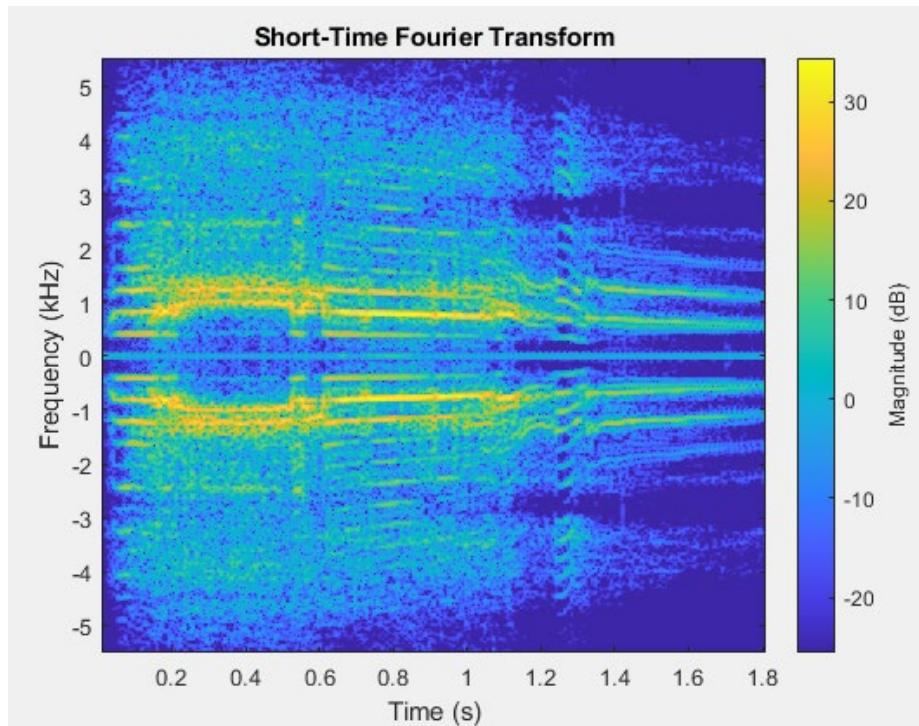
Result of the Woman_scream.wav file:
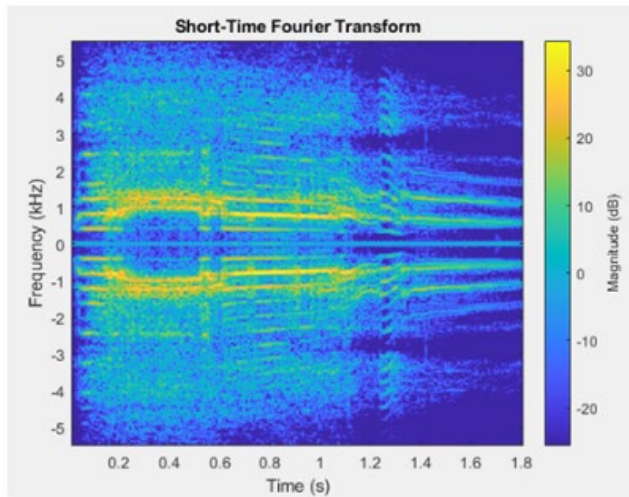
Result of the danced_with_devil.wav:
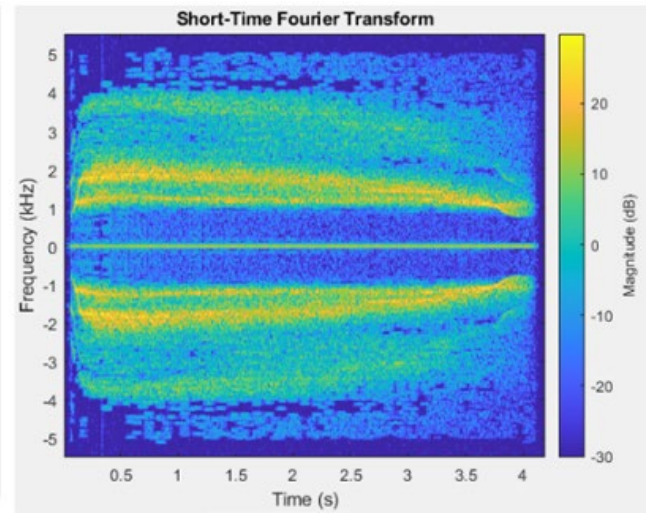

Result of the born_yesterday.wav:

4. Discussion

Women have higher pitch than men, but the frequency is approximately the same.

Comparison between those two voices is on the picture below.

Man voice

Woman voice