DIGITAL SIGNAL PROCESSING
EC204

Project

EQUILIZER

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EQUILIZER

INTRODUCTION

An **equalizer** is a device that is used to balance the frequency response of an audio system or music player. In this project, we will be designing an equalizer using MATLAB software.

Types Of Audio Equalizers

- Graphic Equalizer: A graphic equalizer consists of multiple sliders or knobs that control the amplitude of specific

- frequency bands. It provides a visual representation of the frequency response and allows for precise adjustments.

- Parametric Equalizer: A parametric equalizer provides more control over the audio signal by allowing adjustments to the frequency, amplitude, and bandwidth (Q) of each equalization band.

- Shelving Equalizer: A shelving equalizer boosts or cuts frequencies above or below a specific frequency, creating a shelf-like response.

Objective

The main objective of this project is to design an equalizer that can balance the frequency response of an audio system and enhance the quality of the audio output.

How Do Audio Equalizer Works ??

- Audio equalizers work by manipulating the amplitude of specific frequency bands in an audio signal.
- The frequency bands are determined by the type of equalizer used (graphic, parametric, shelving, or peaking).
- The user adjusts the sliders, knobs, or parameters of the equalizer to boost or cut specific frequency bands to shape the overall sound.
- The equalized audio signal is then sent to an amplifier or other audio processing devices for further processing or playback.

Methodology:

To design an equalizer using MATLAB, we will be following the following steps:

Load the audio file into MATLAB: We will start by loading an audio file into MATLAB software. This can be done using the "audioread" function in MATLAB.

Plot the frequency response of the audio file: After loading the audio file, we will plot the frequency response of the file using the "fft" function in MATLAB. This will help us to identify the frequency bands that need to be equalized.

Design the equalizer: Once we have identified the frequency bands that need to be equalized, we will design the equalizer using the "fir1" function in MATLAB. This function is used to design finite impulse response (FIR) filters.

Apply the equalizer to the audio file: After designing the equalizer, we will apply it to the audio file using the "filter" function in MATLAB. This will balance the frequency response of the audio file.

Plot the frequency response of the equalized audio file: Finally, we will plot the frequency response of the equalized audio file using the "fft" function in MATLAB. This will help us to verify that the frequency response has been balanced.

Front end of Project Devolped by HTML , CSS , Javascript
And Linked with Matlab Project .

Use of filters
FIR1:
Low Pass Filter (0-250Hz)
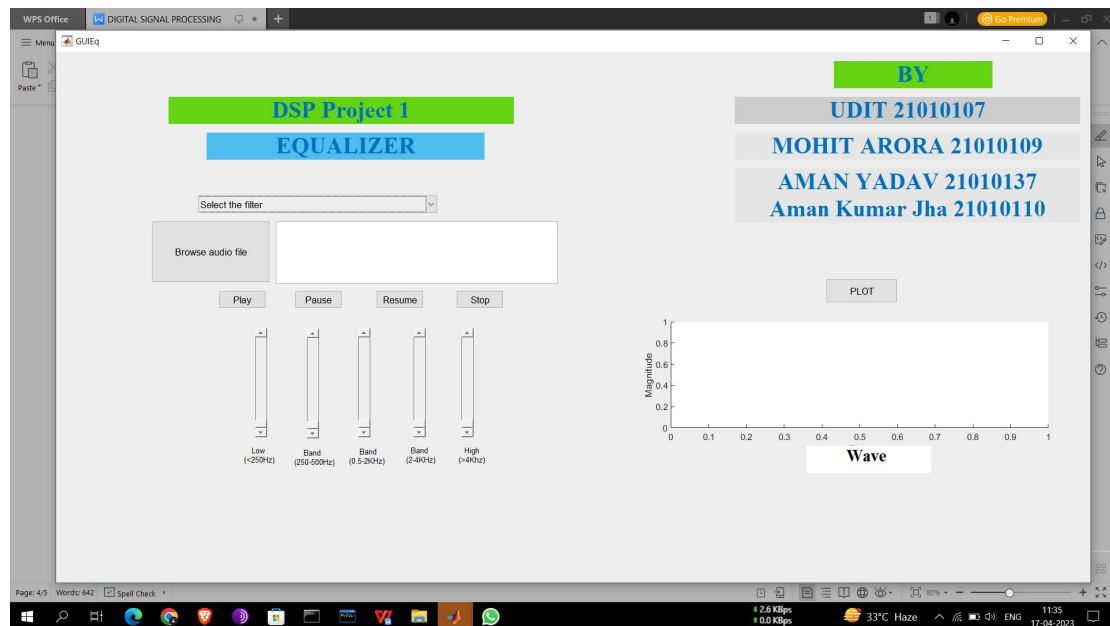Band Pass Filter (250-500Hz)
Band Pass Filter (500-2000Hz)
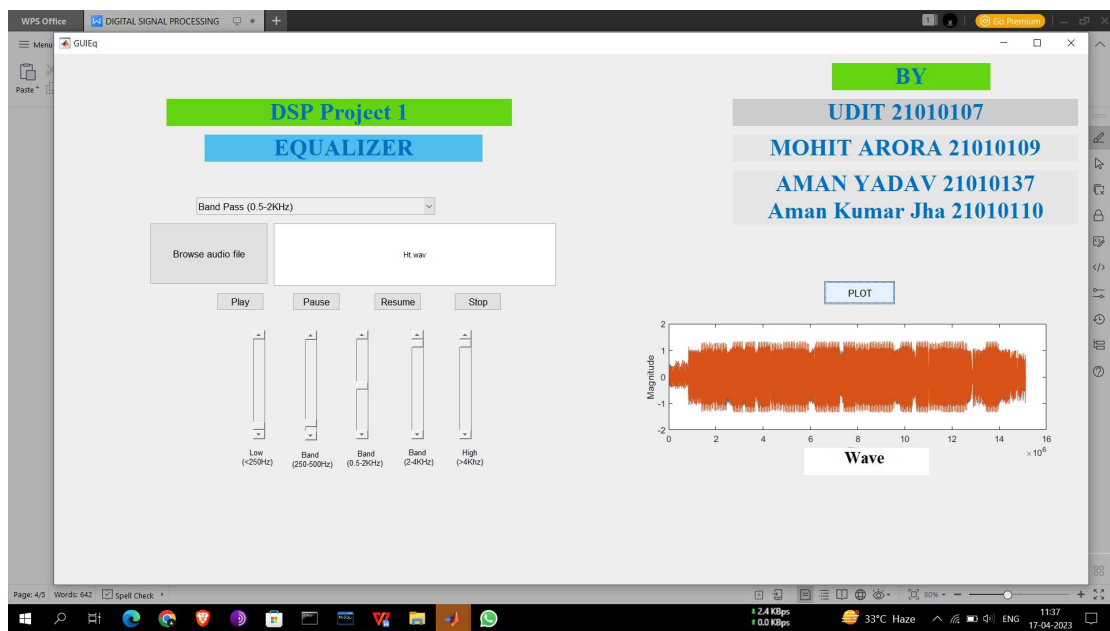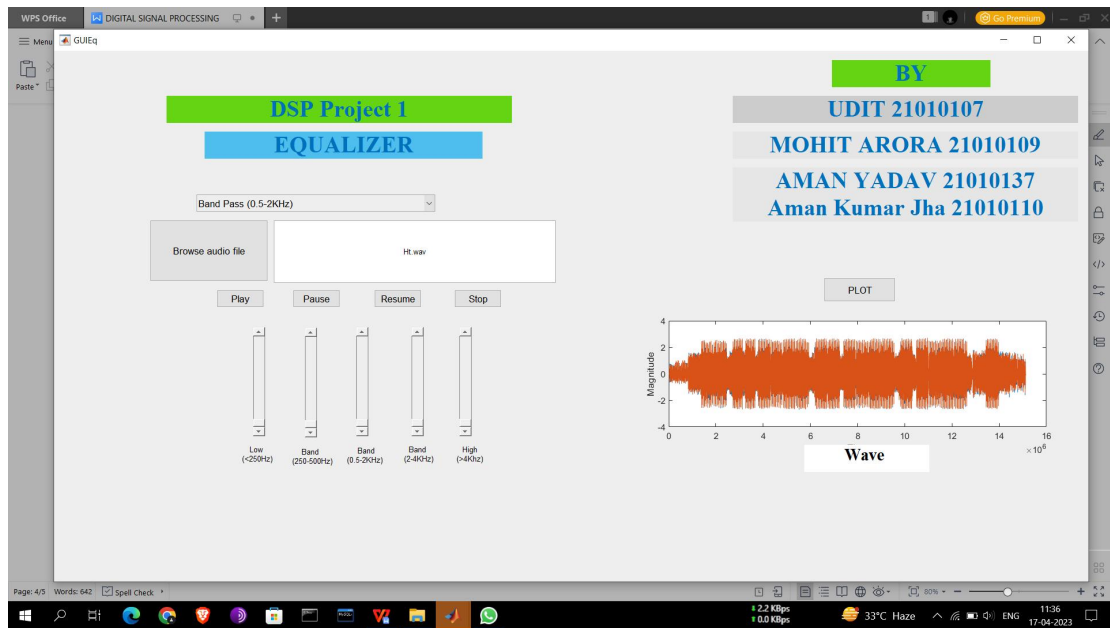Band Pass Filter (2000-4000Hz)
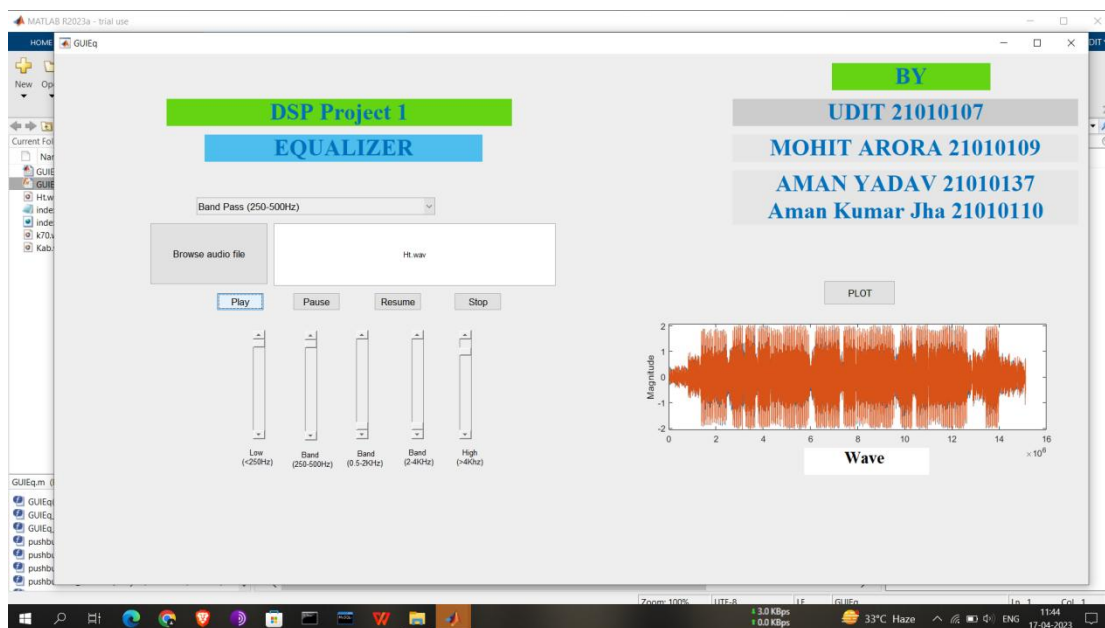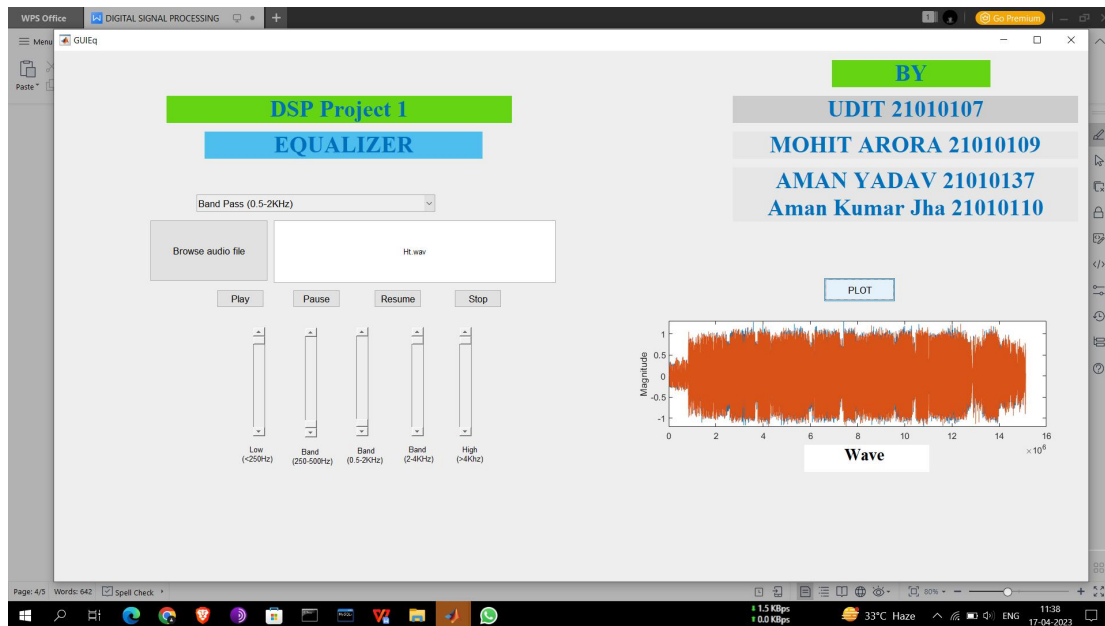High Pass Filter (>4000Hz)

Output-

Default GUI

Audio input in Equilizer in .wav

Conclusion

An audio equalizer is an effective way to manipulate and improve the quality of an input signal. There are many methods that can be used in order to improve the quality of a signal in MATLAB. For this research.The result of

filtering an input signal is an uninterrupted signal that improves upon the sound quality of the input.

Signals that are subject to noise, phase shifts, and frequency interference will often manipulate the signal in such a way that it is difficult to process or hear. Graphical methods are useful in providing a visual way to observe the characteristics of a signal.

Equalizers are an essential component of communications and sound systems because of the ability to improve sound quality and drain out miscellaneous noise. MATLAB have proved to be extremely useful tools for digital signal processing.

References

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