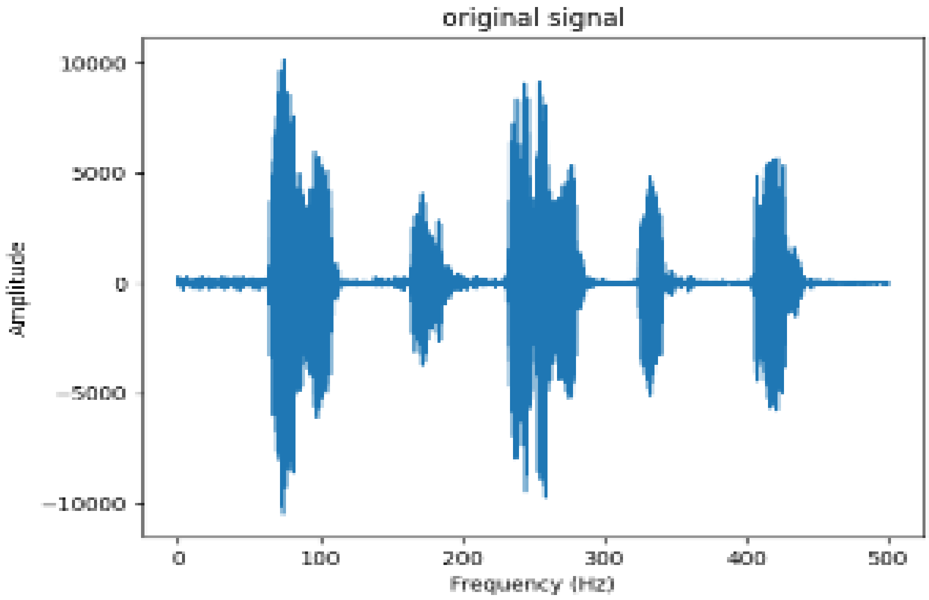
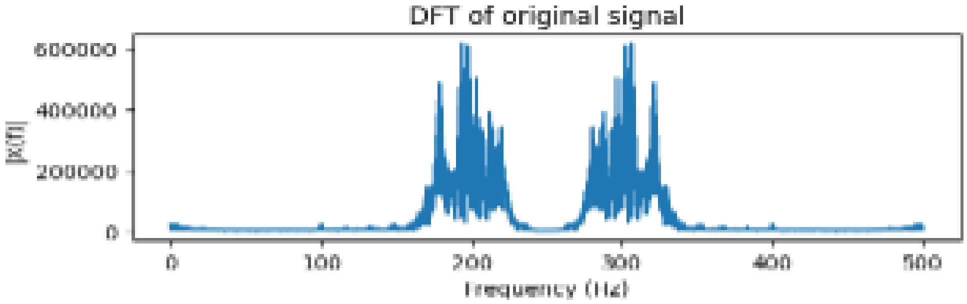
Screenshots of various graphs:

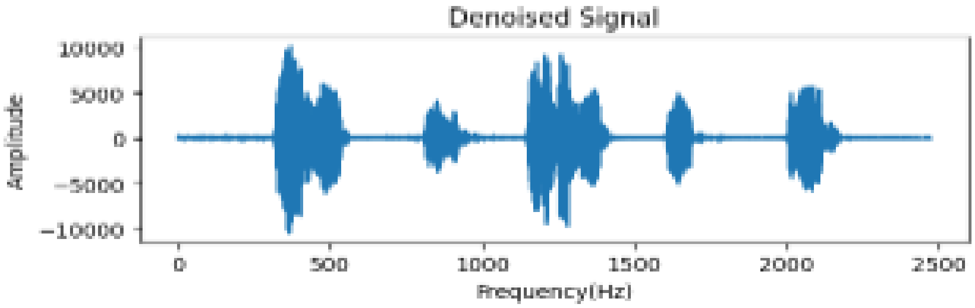
Name : Atul kumar singh

Sentence 1: “D F G H K “

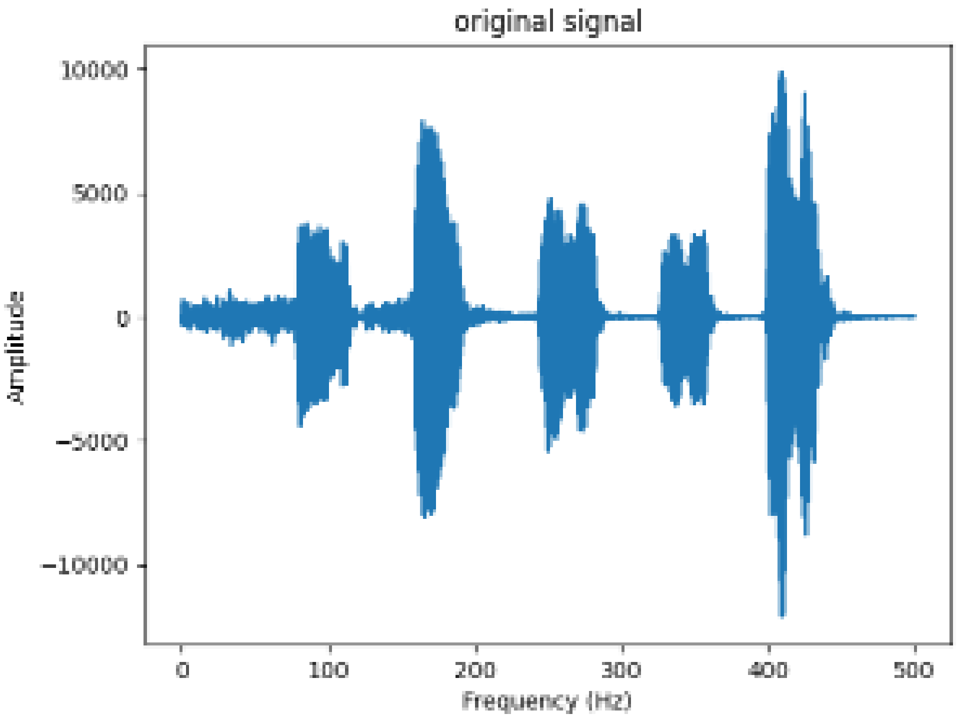
Frequency: 500Hz

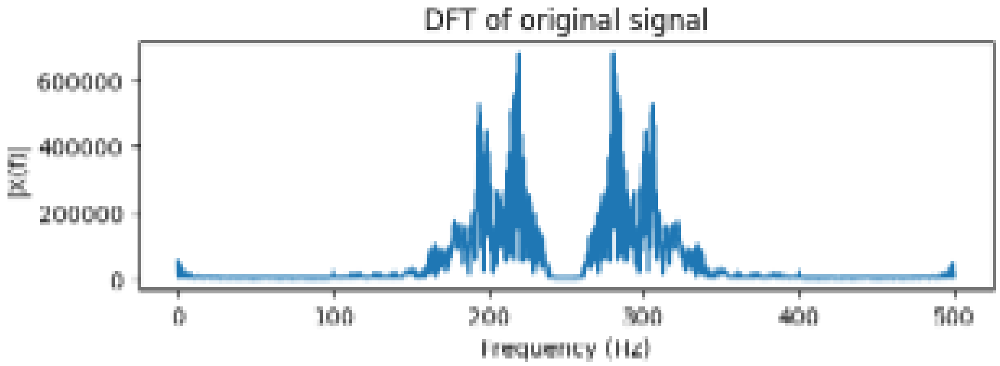


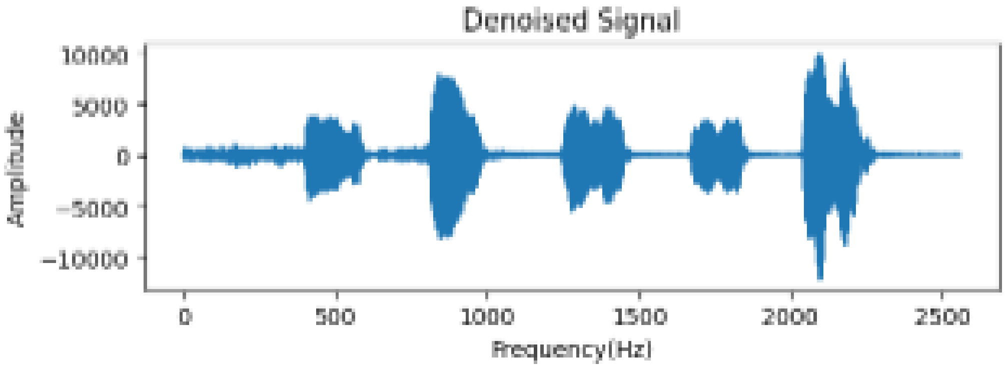




Sentence 2 : “A E I O U”
Frequency : 500 Hz

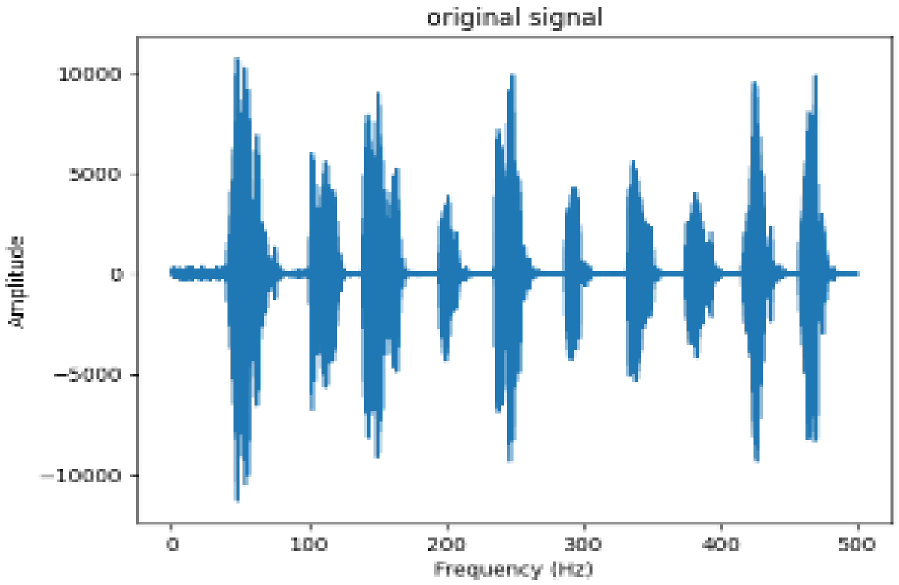


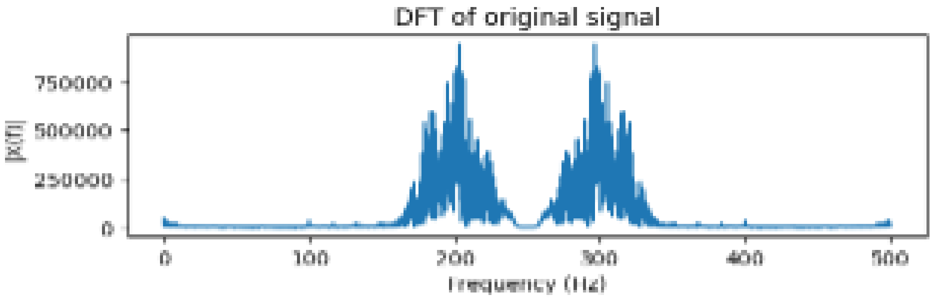


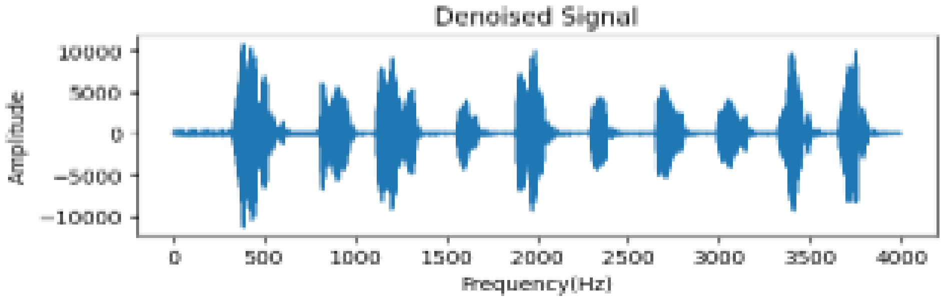


Sentence 3 : “B C D F G H K L M N”

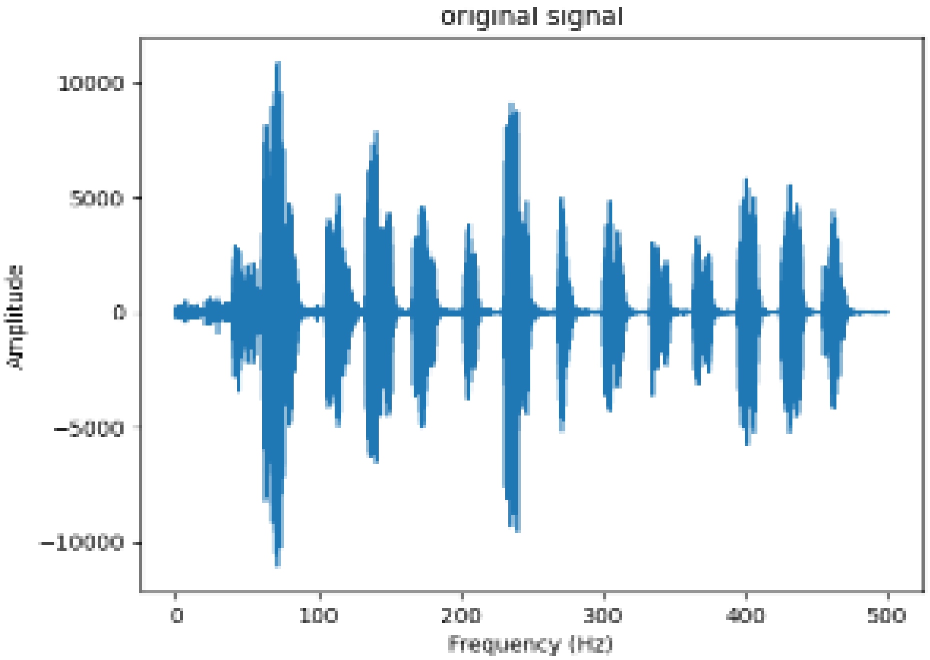
Frequency : 500 Hz

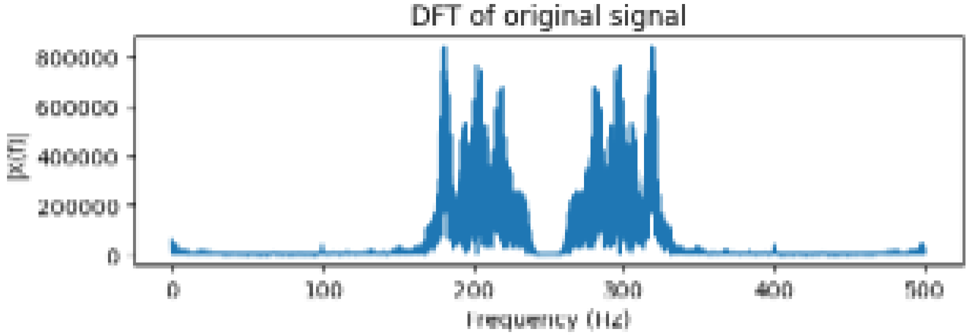


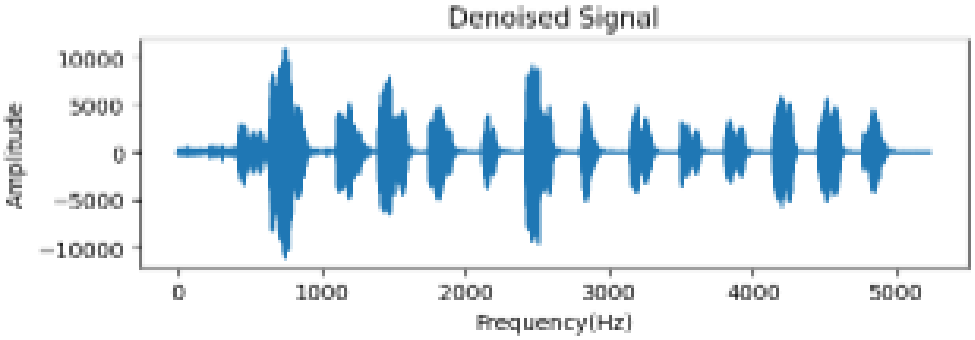




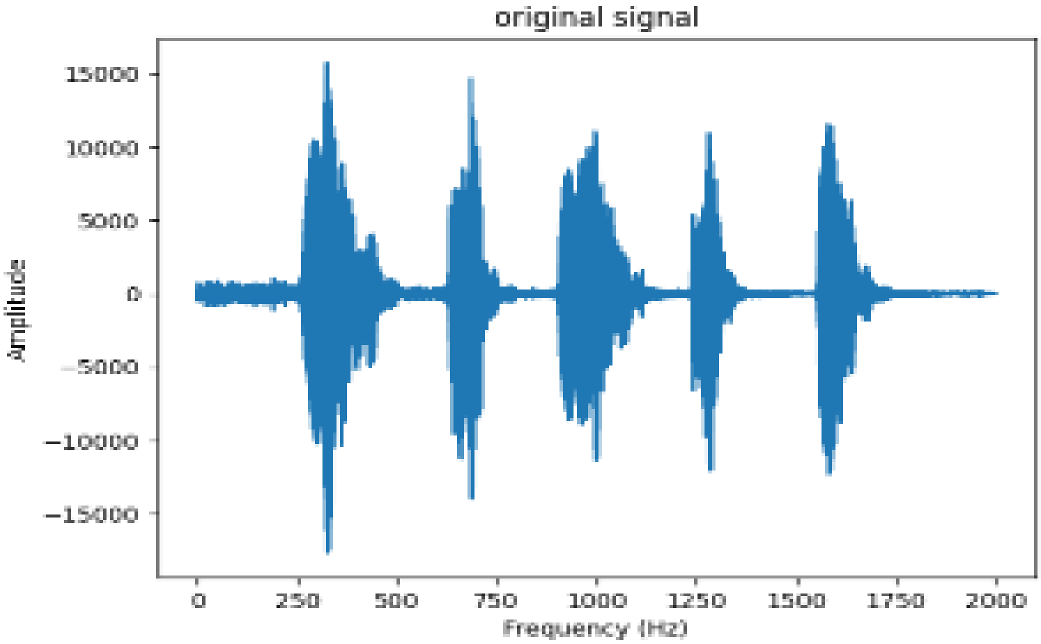
Sentence 4: “A B C D E F G H I K L M N O”
Frequency : 500 Hz

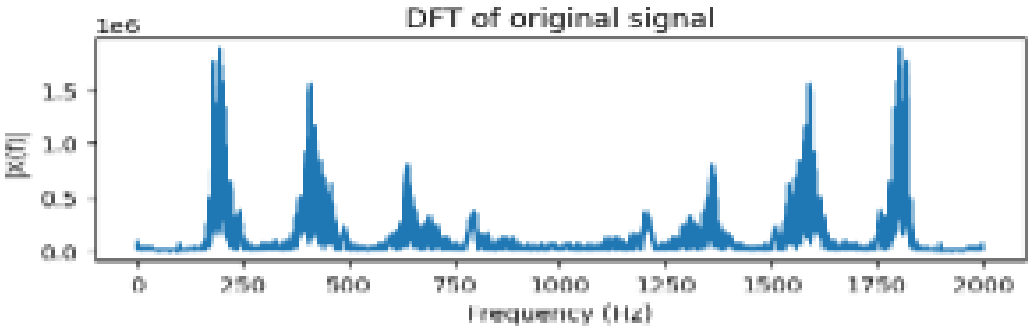

original signal

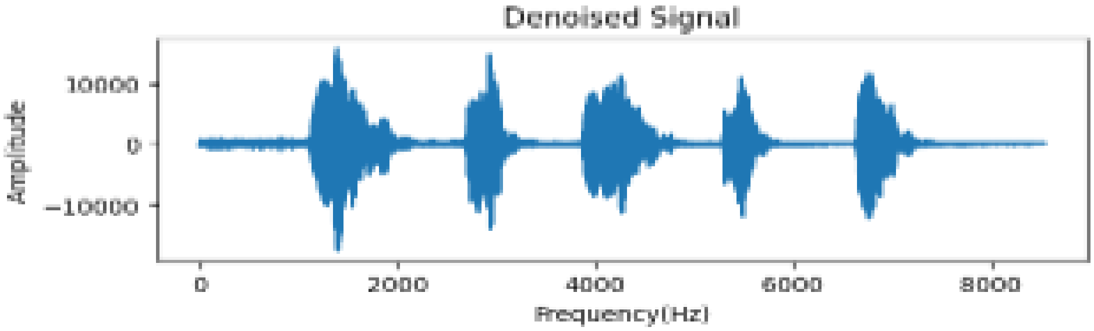

DFT of original signal


Denoised Signal

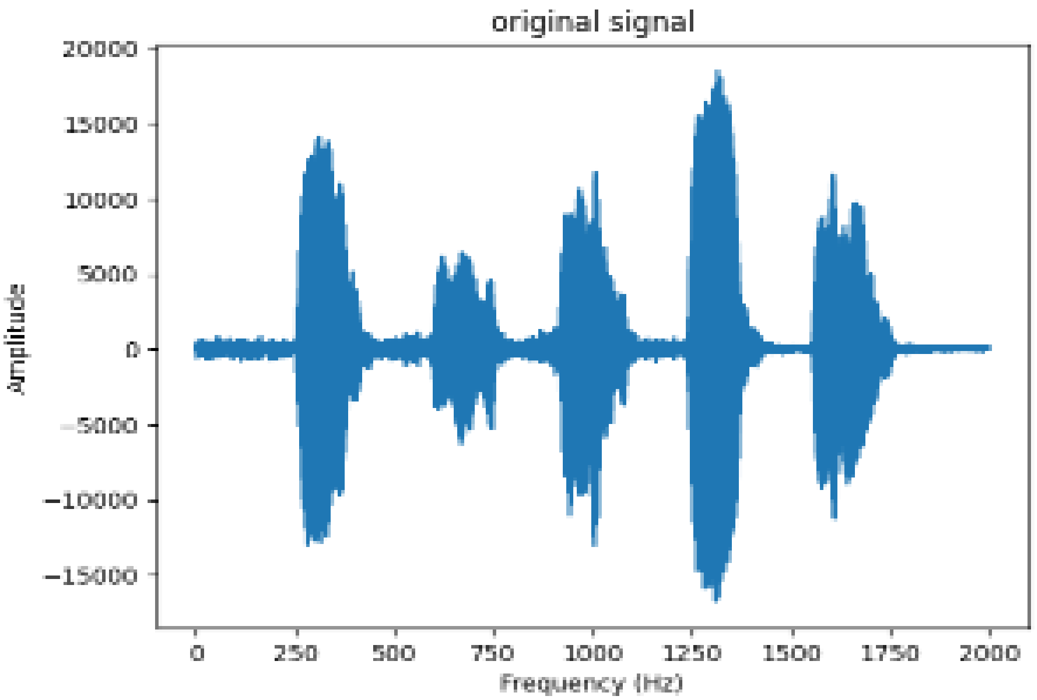
Sentence 1 : “D F G H K”
Frequency : 2000 Hz

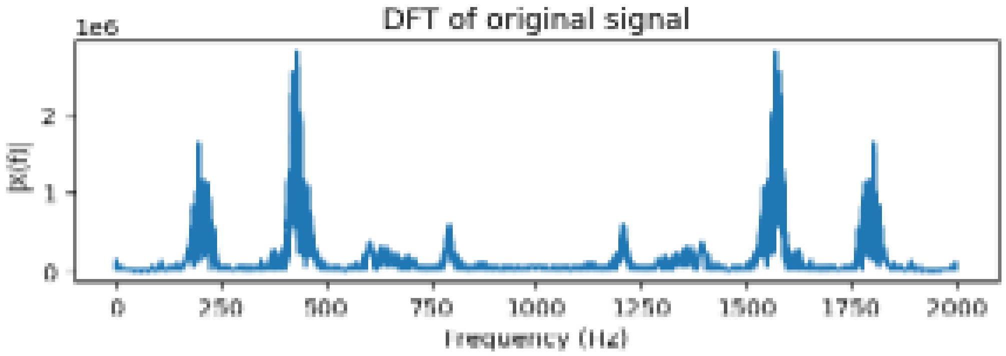

original signal

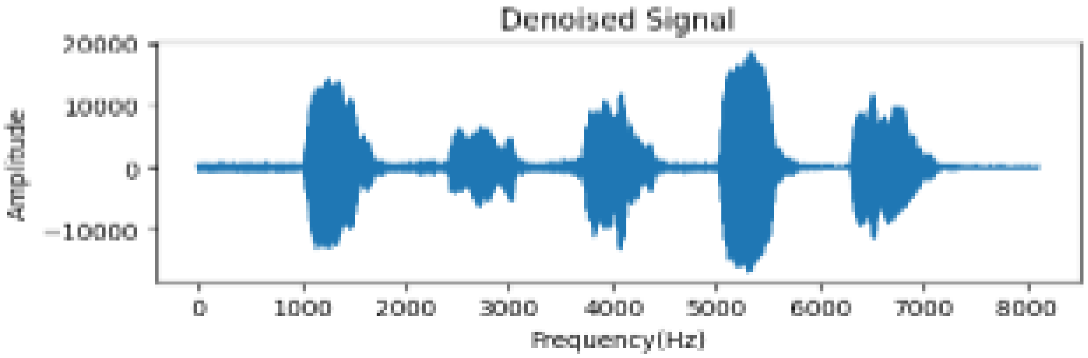

DFT of original signal


Denoised Signal

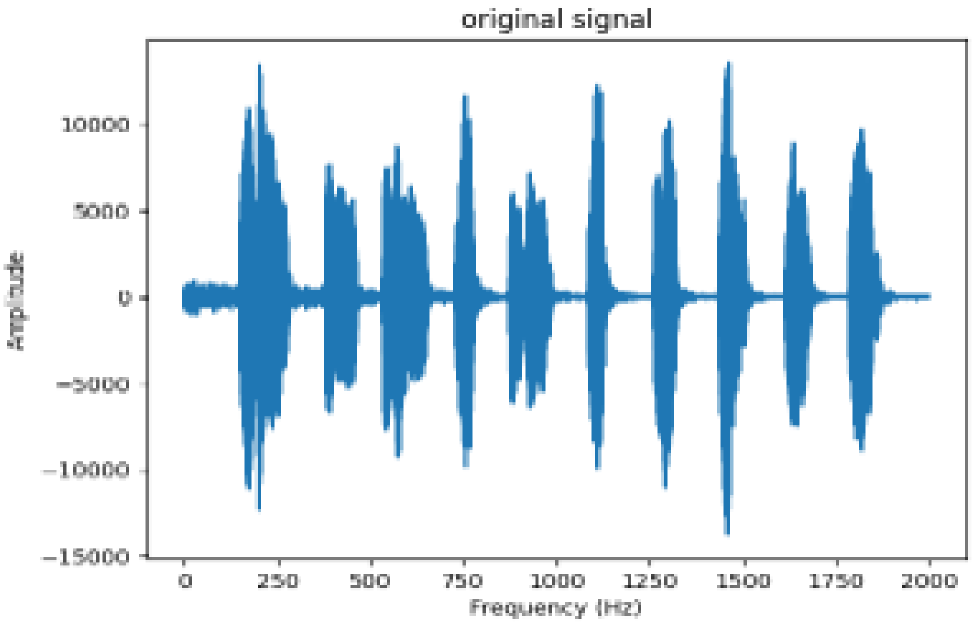
Sentence 2 : “A E I O U”
Frequency : 2000 Hz

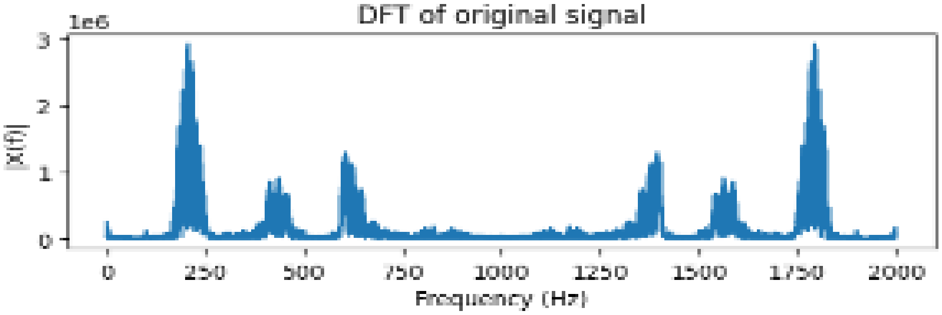

original signal

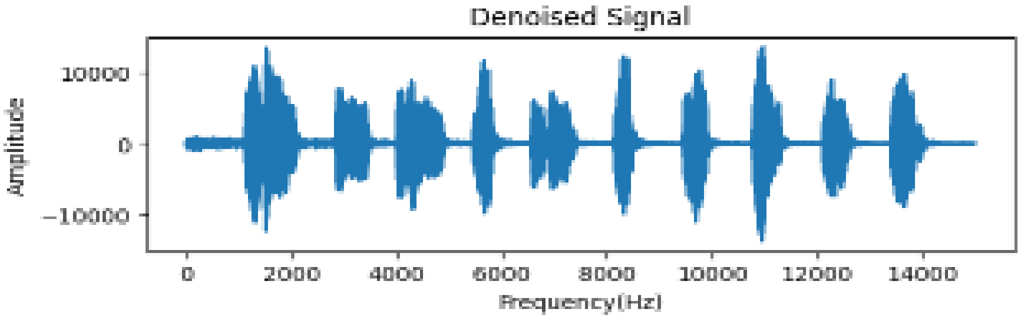

DFT of original signal


Denoised Signal

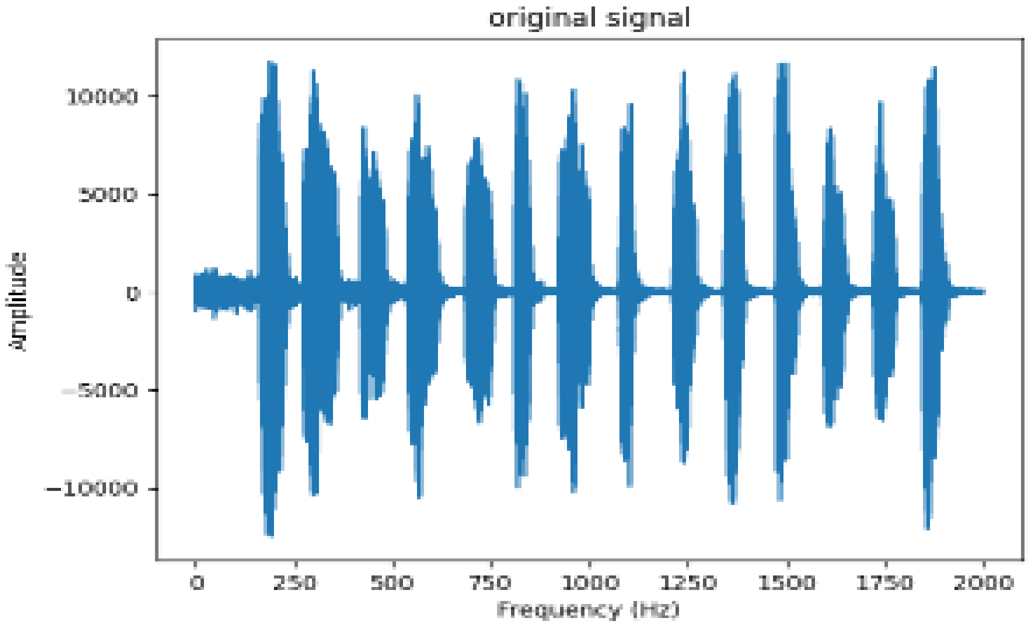
Sentence 3 : “B C D F G H K L M N”
Frequency : 2000 Hz

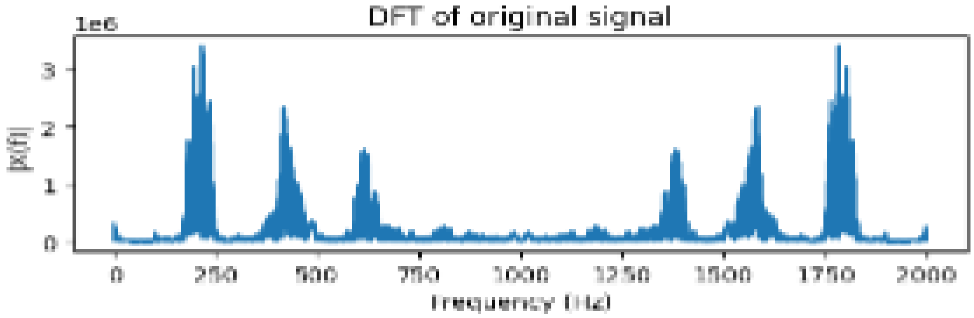


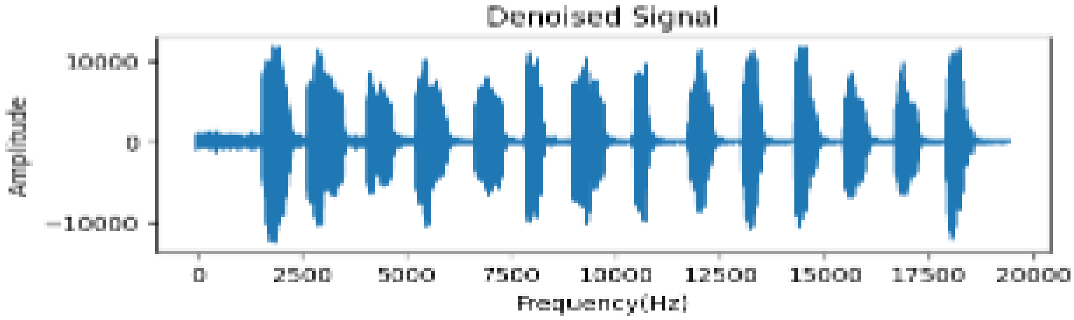




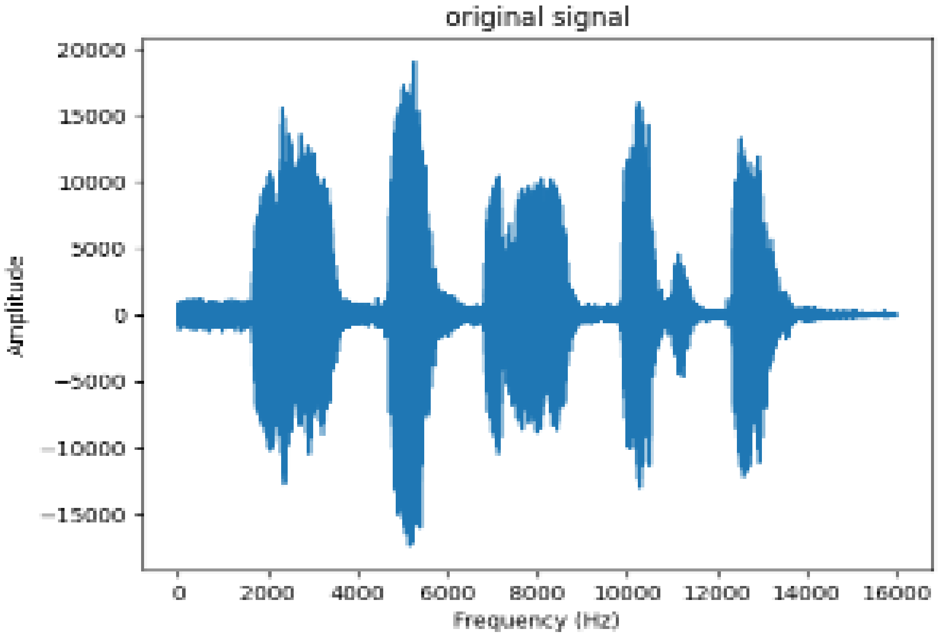
Sentence 4 : “A B C D E F G H I K L M N O”
Frequency : 2000 Hz

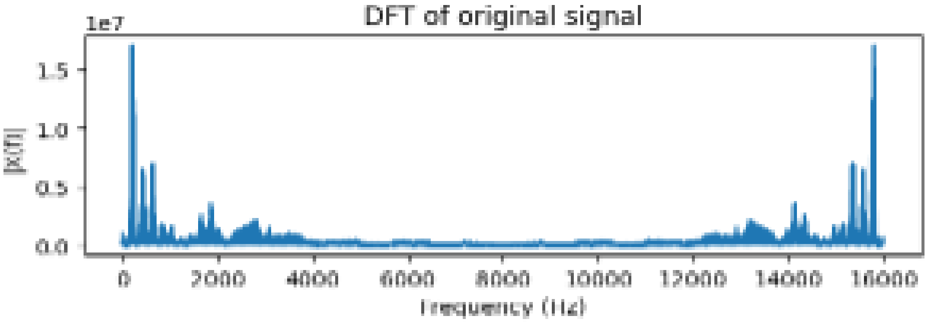


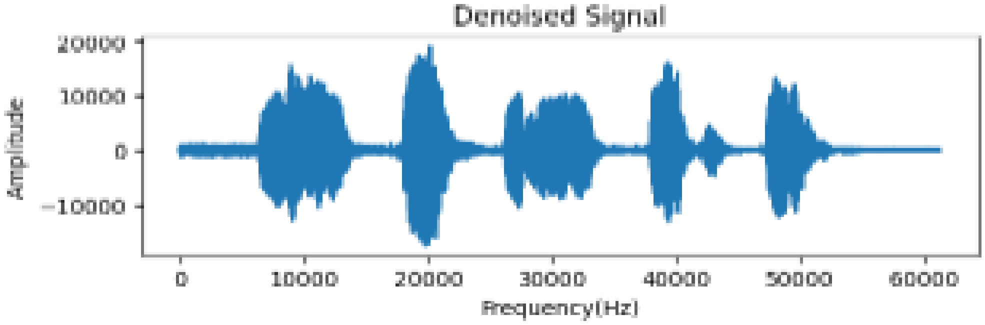




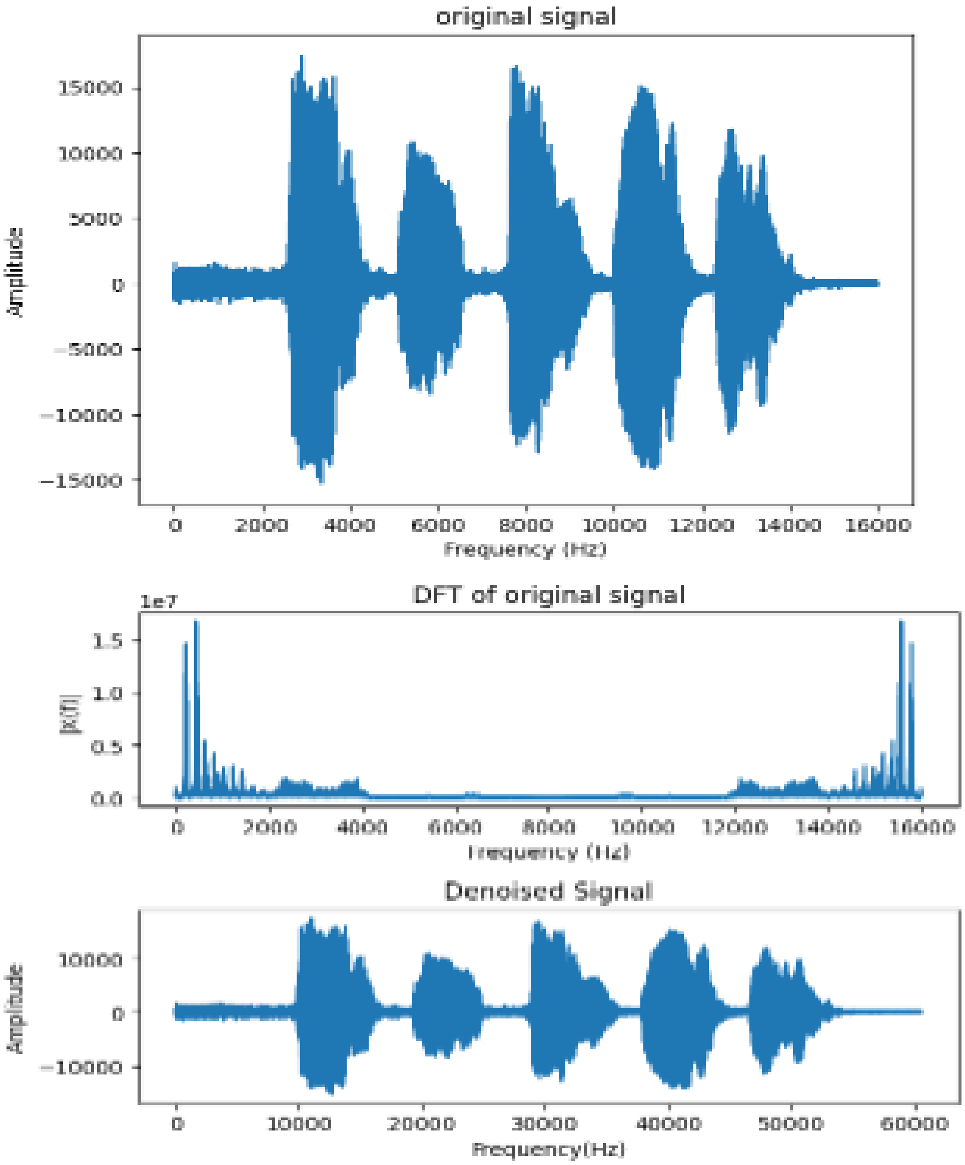
Sentence 1 : “D F G H K”
Frequency : 16000 Hz



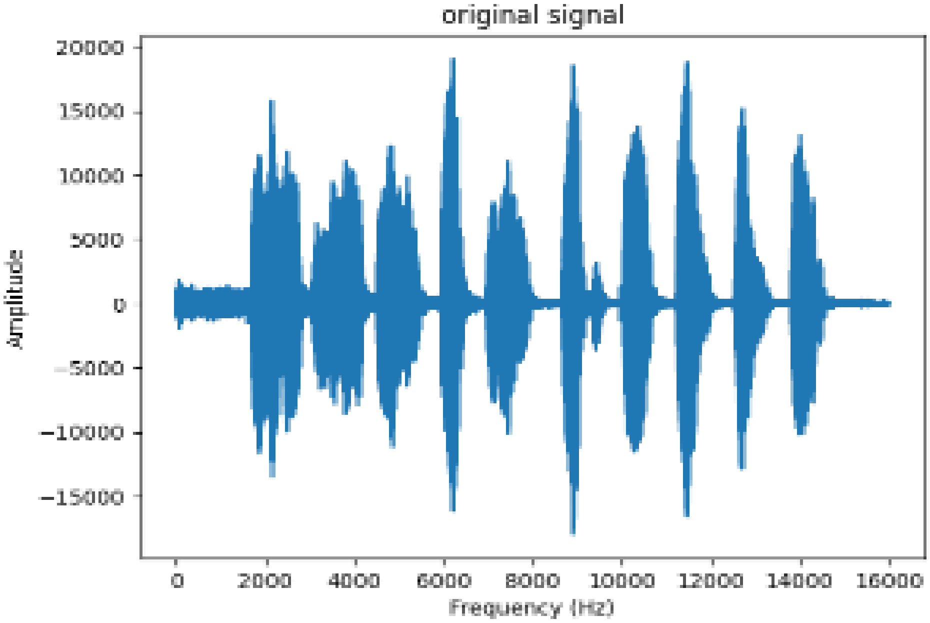


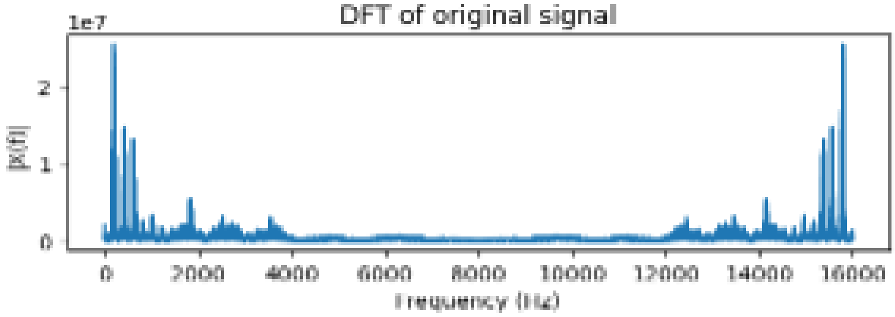


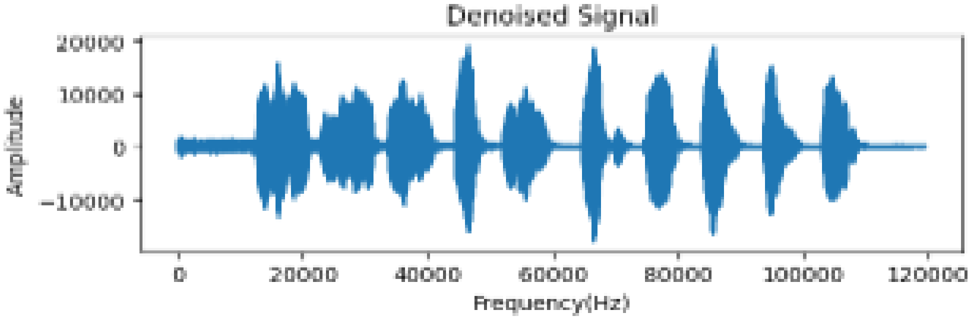
Sentence 2 : “A E I O U”
Frequency : 16000 Hz



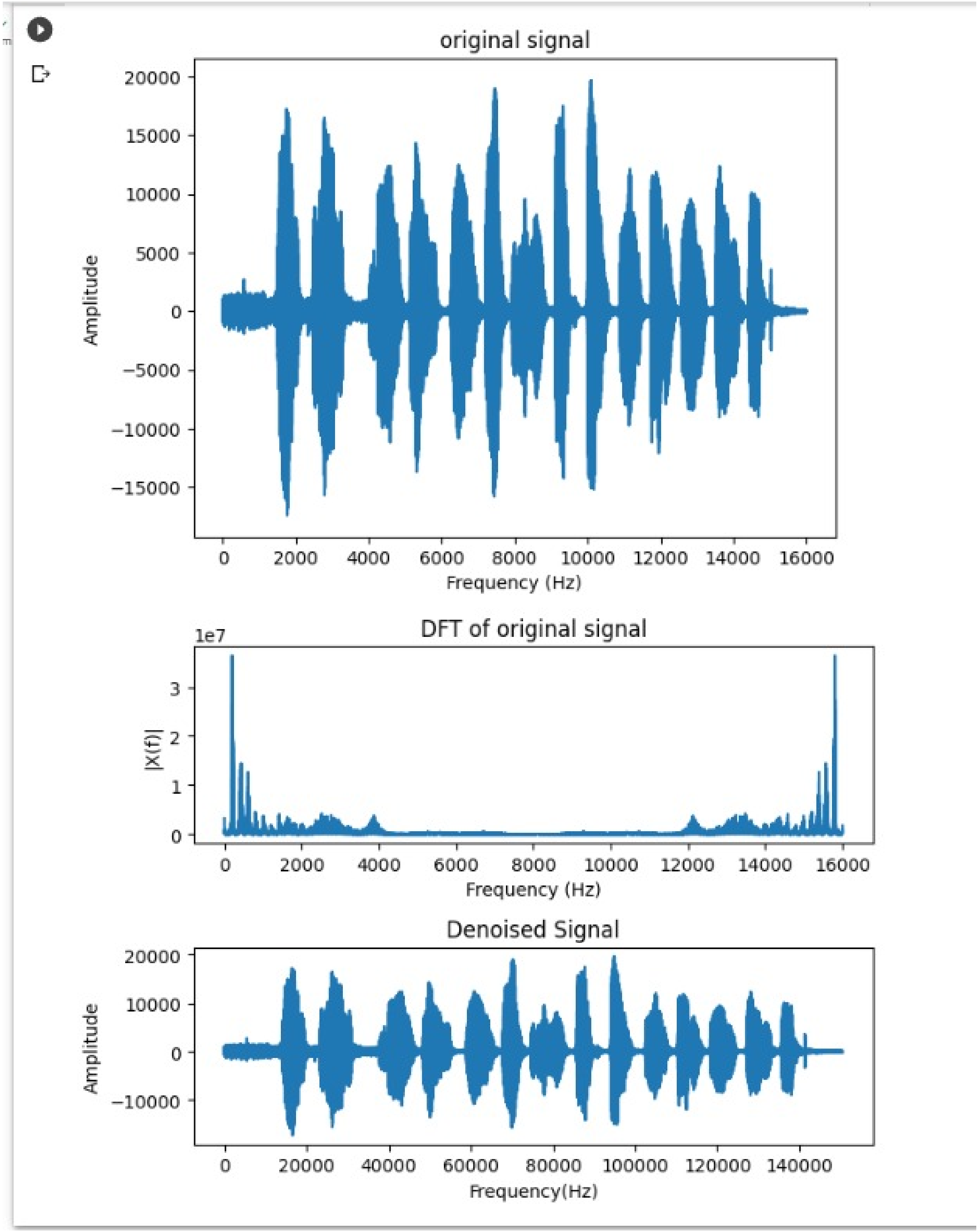
Sentence 3 : “B C D F G H K L M N”
Frequency : 16000 Hz



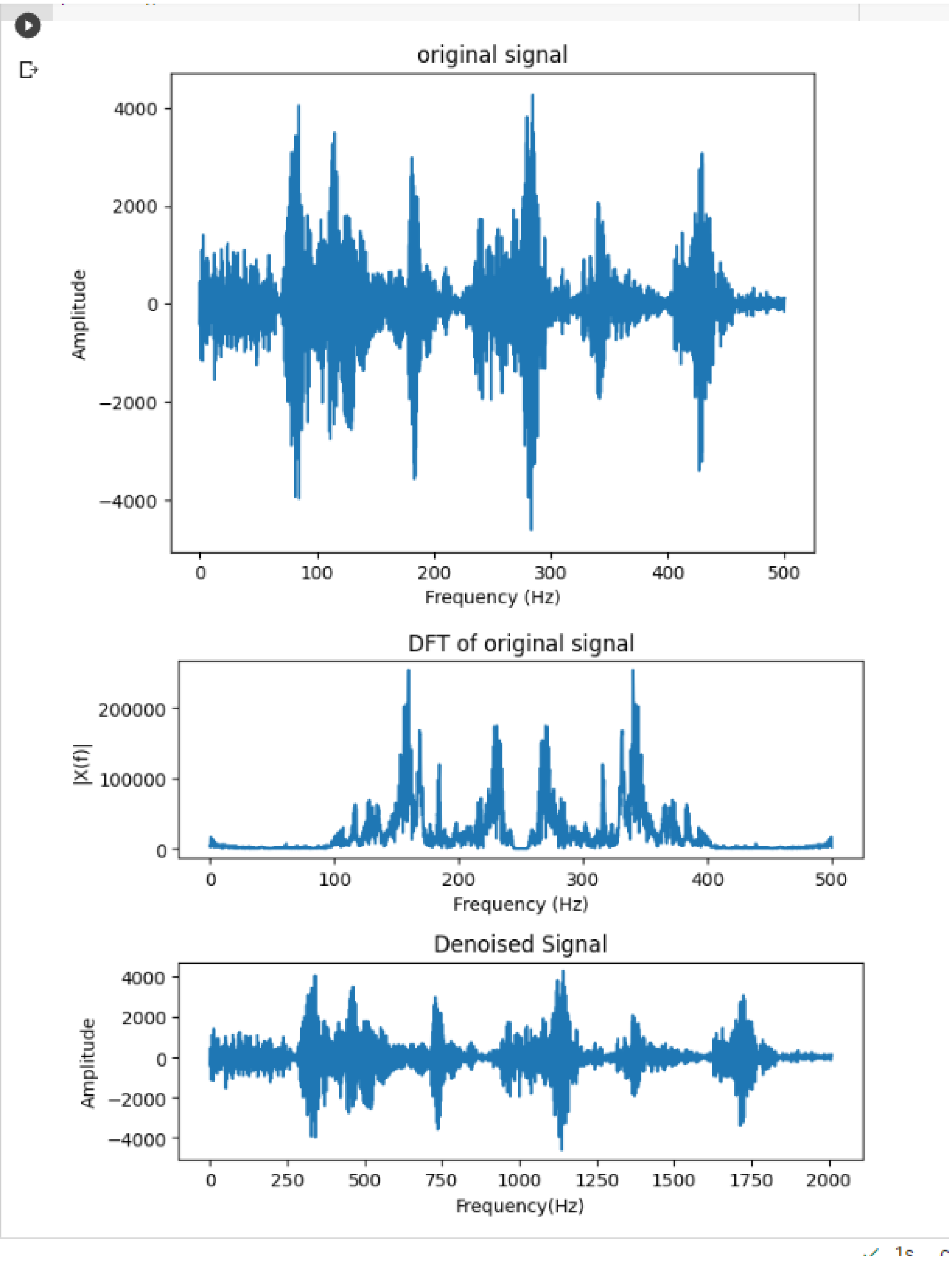




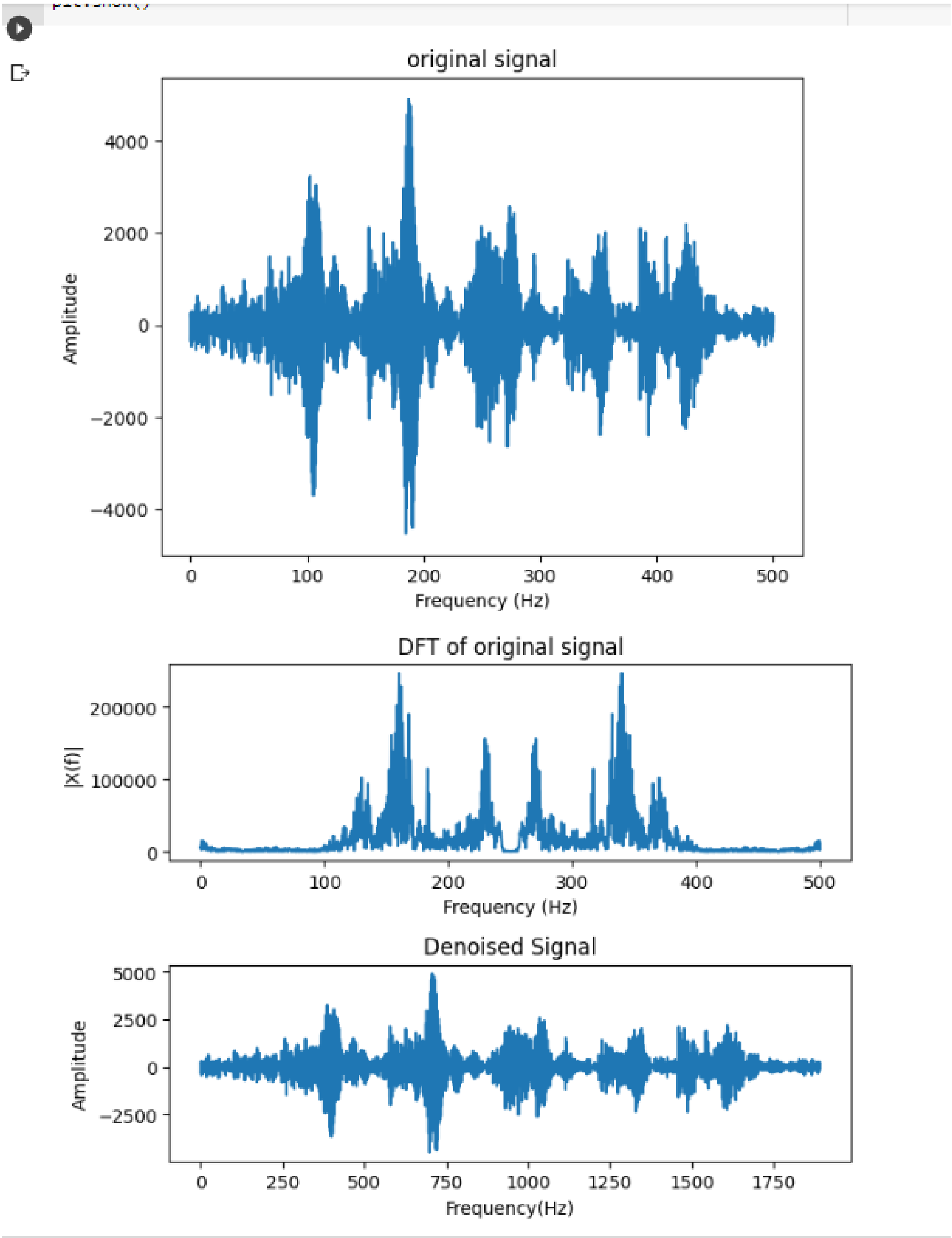
Sentence 4 : “A B C D E F G H I K L M N O”
Frequency : 16000 Hz



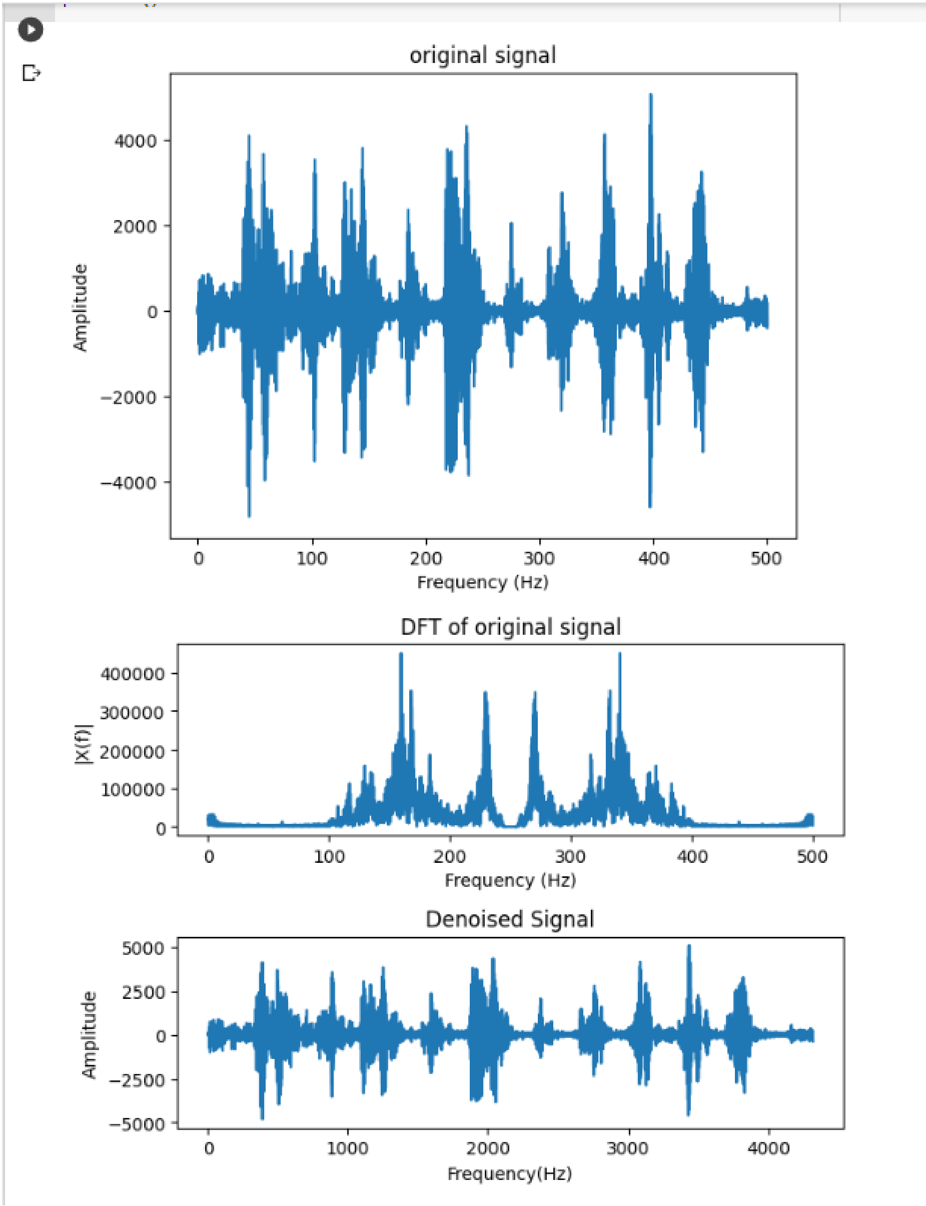
UTKARSH GUPTA
Sentence 1: “D F G H K”
FREQUENCY 500 Hz


original signal
4000
2000
0
−2000
−4000
Amplitude
0
100
200
300
400
500
Frequency (Hz)
DFT of original signal
200000
100000
0
|X(f)|
0
100
200
300
400
500
Frequency (Hz)
Denoised Signal
4000
2000
0
−2000
−4000
Amplitude
0
250
500
750
1000
1250
1500
1750
2000
Frequency(Hz)

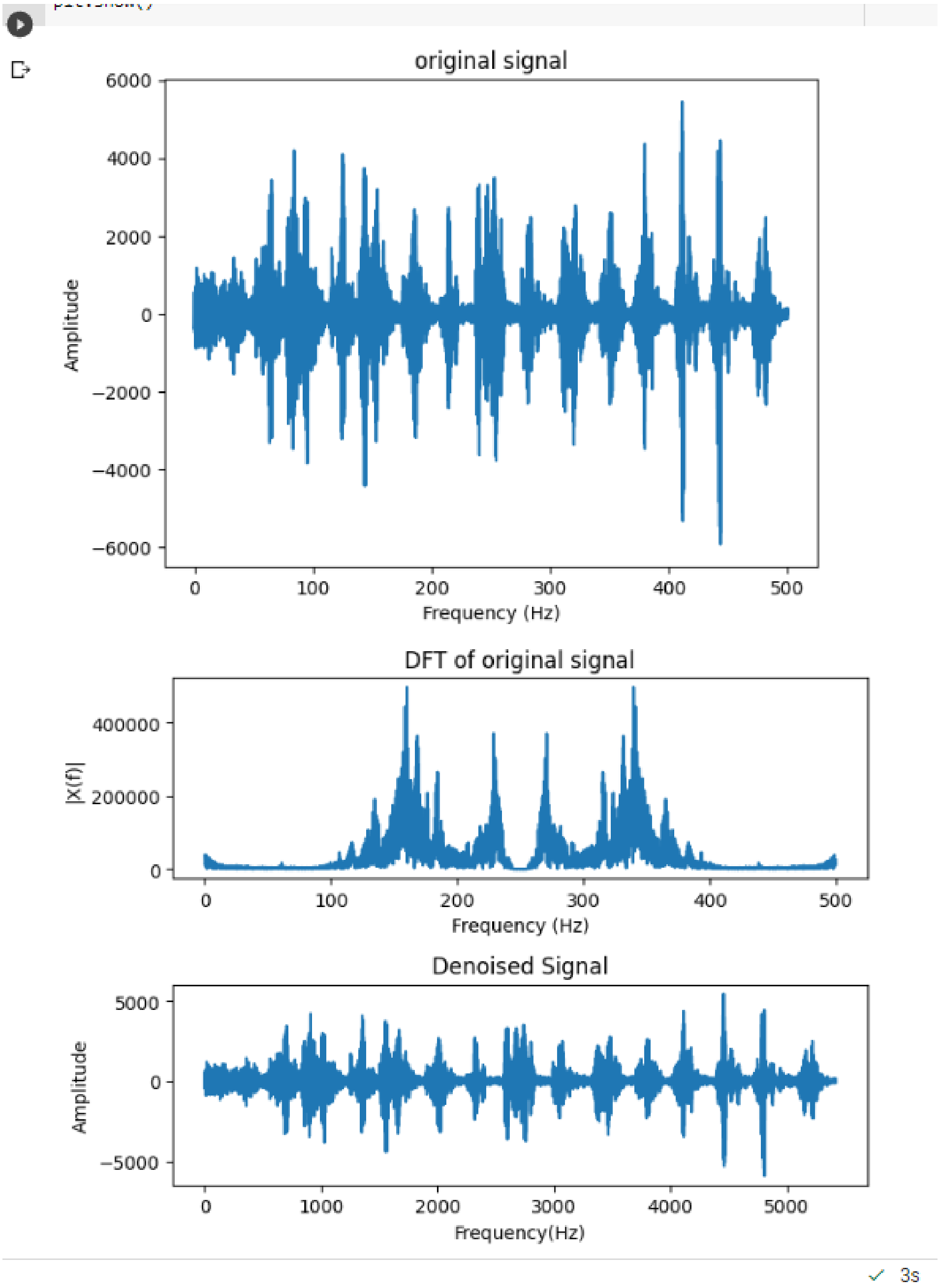
Sentence 2: “A E I O U”
FREQUENCY 500 Hz



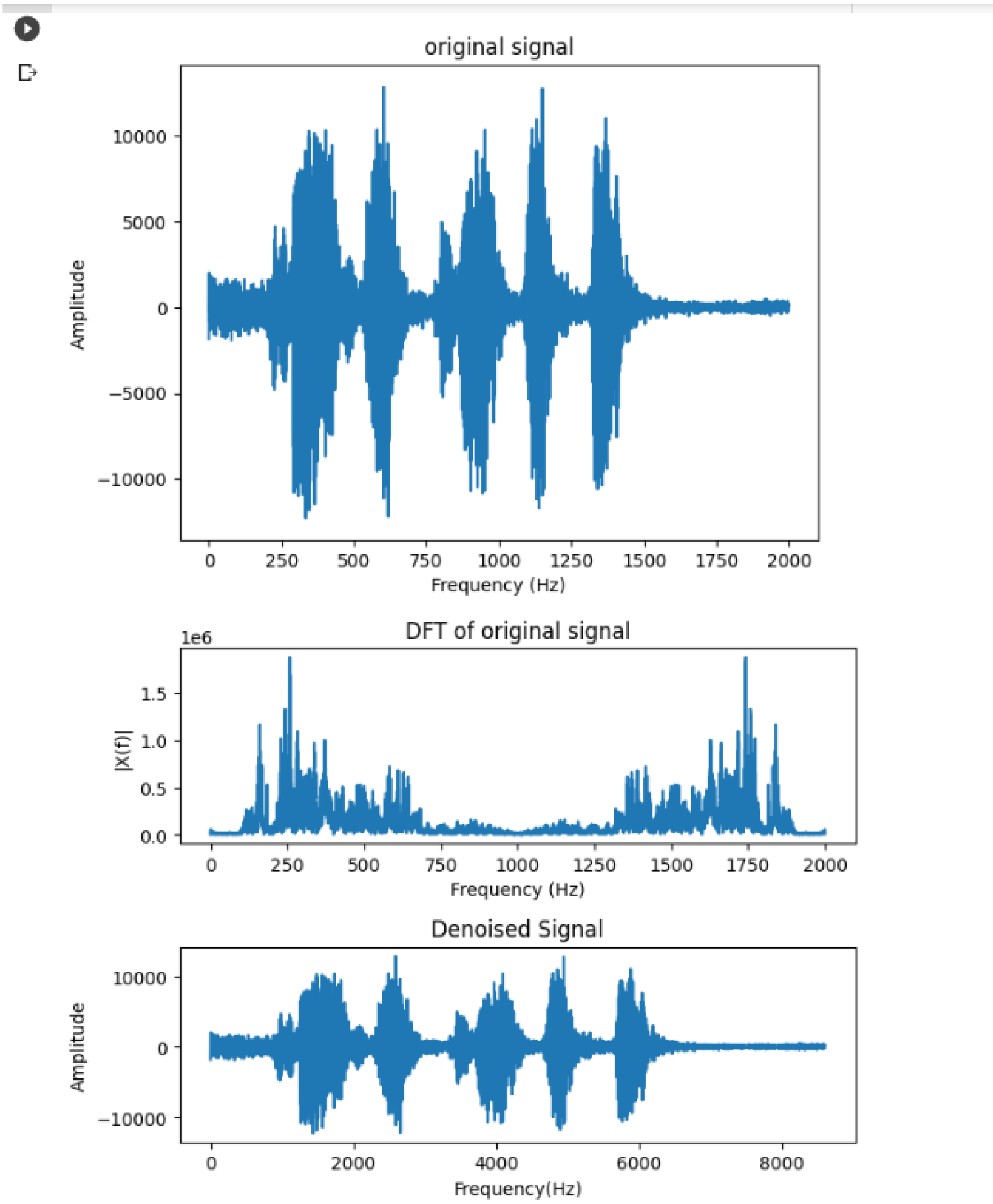
Sentence 3: “B C D F G H K L M N”
FREQUENCY : 500 Hz


original signal
Amplitude
4000
2000
0
−2000
−4000
0
100
200
300
400
500
Frequency (Hz)
DFT of original signal
|X(f)|
400000
300000
200000
100000
0
0
100
200
300
400
500
Frequency (Hz)
Denoised Signal
Amplitude
5000
2500
0
−2500
−5000
0
1000
2000
3000
4000
Frequency(Hz)

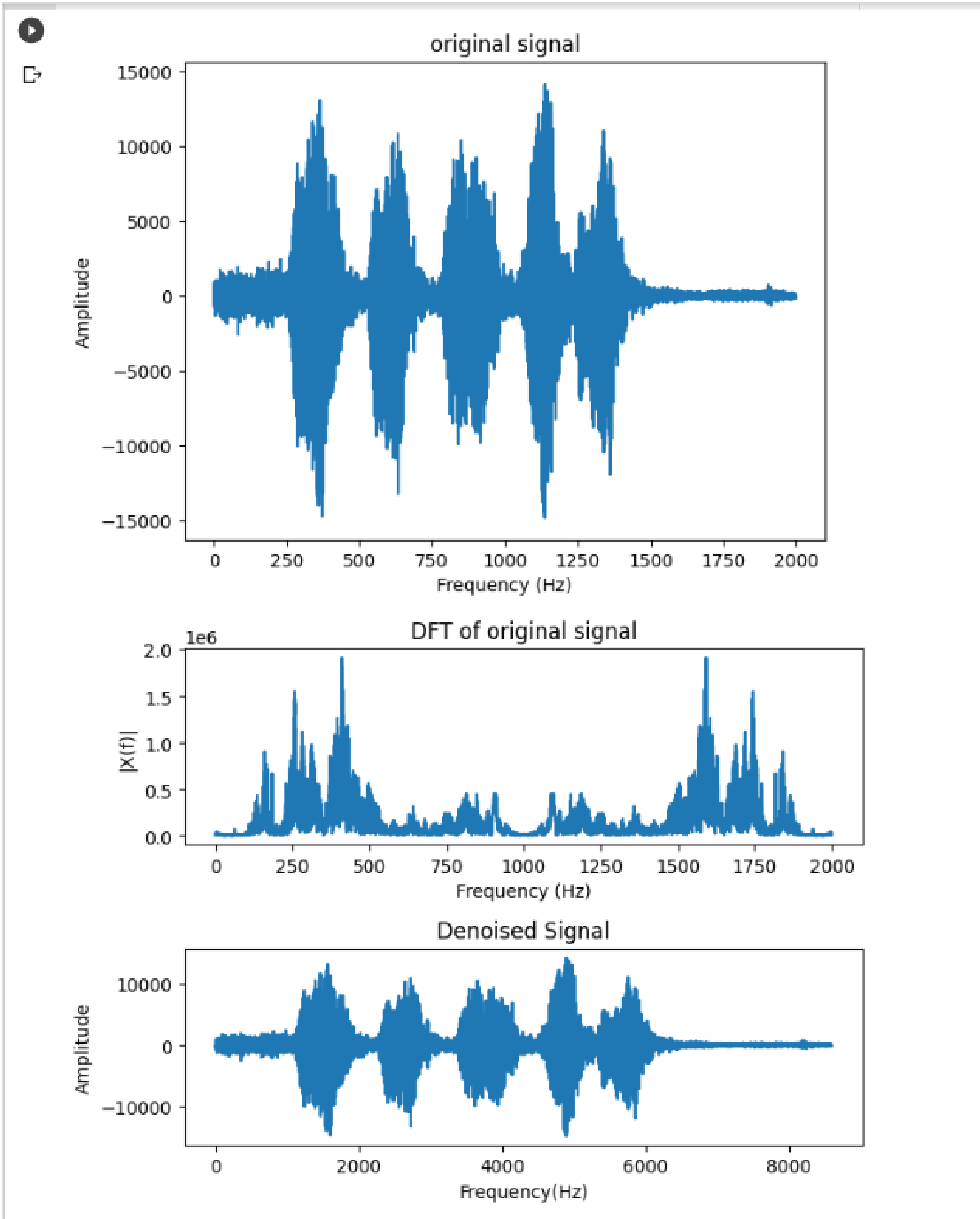
Sentence 4: “A B C D E F G H I K L M N O”
FREQUENCY : 500 Hz


original signal
6000
4000
2000
0
−2000
−4000
−6000
Amplitude
0
100
200
300
400
500
Frequency (Hz)
DFT of original signal
400000
200000
0
|X(f)|
0
100
200
300
400
500
Frequency (Hz)
Denoised Signal
5000
0
−5000
Amplitude
0
1000
2000
3000
4000
5000
Frequency(Hz)
✓ 3s

Sentence 1: “D F G H K”
FREQUENCY: 2000 Hz

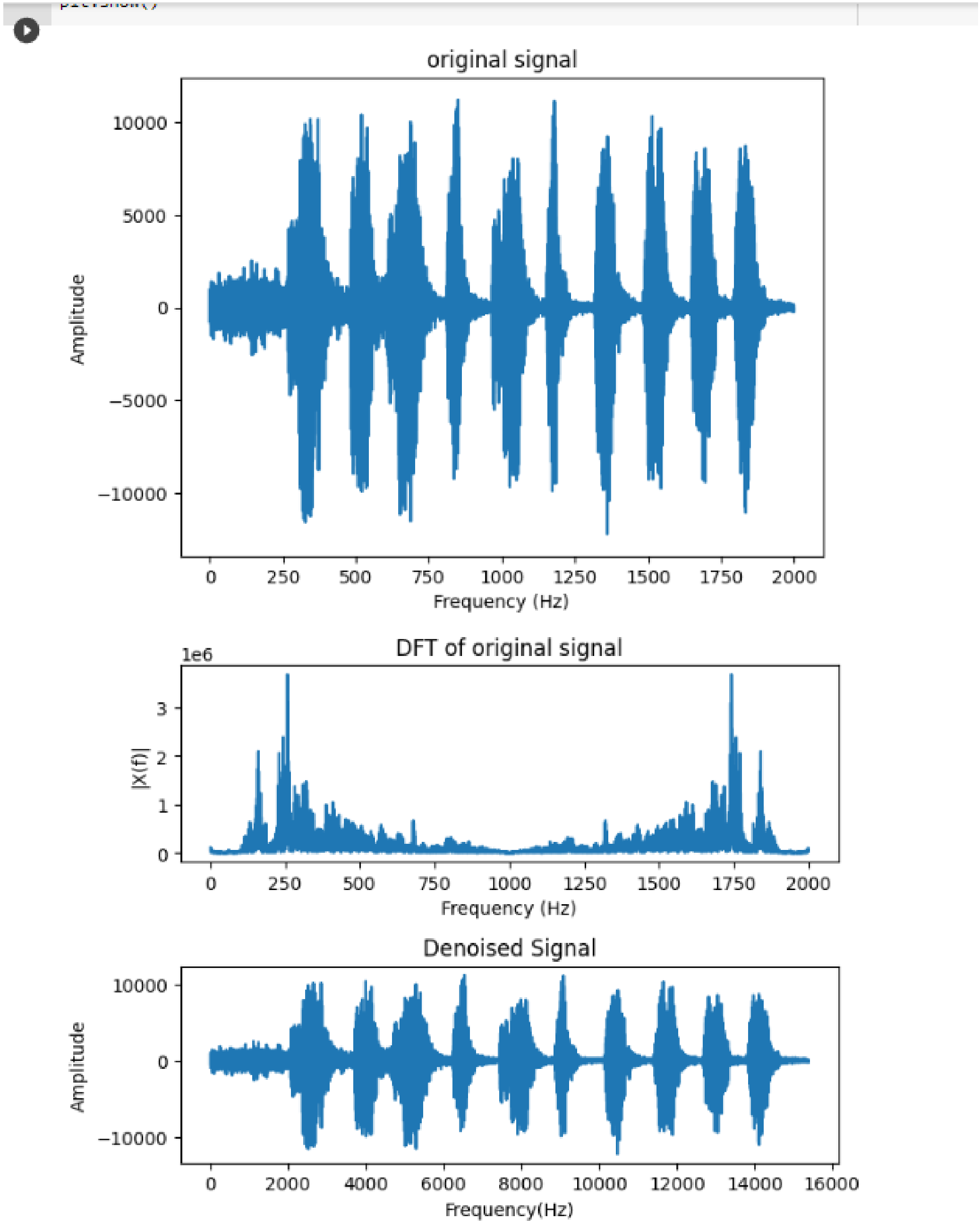


Sentence 2: “A E I O U”
FREQUENCY: 2000 Hz

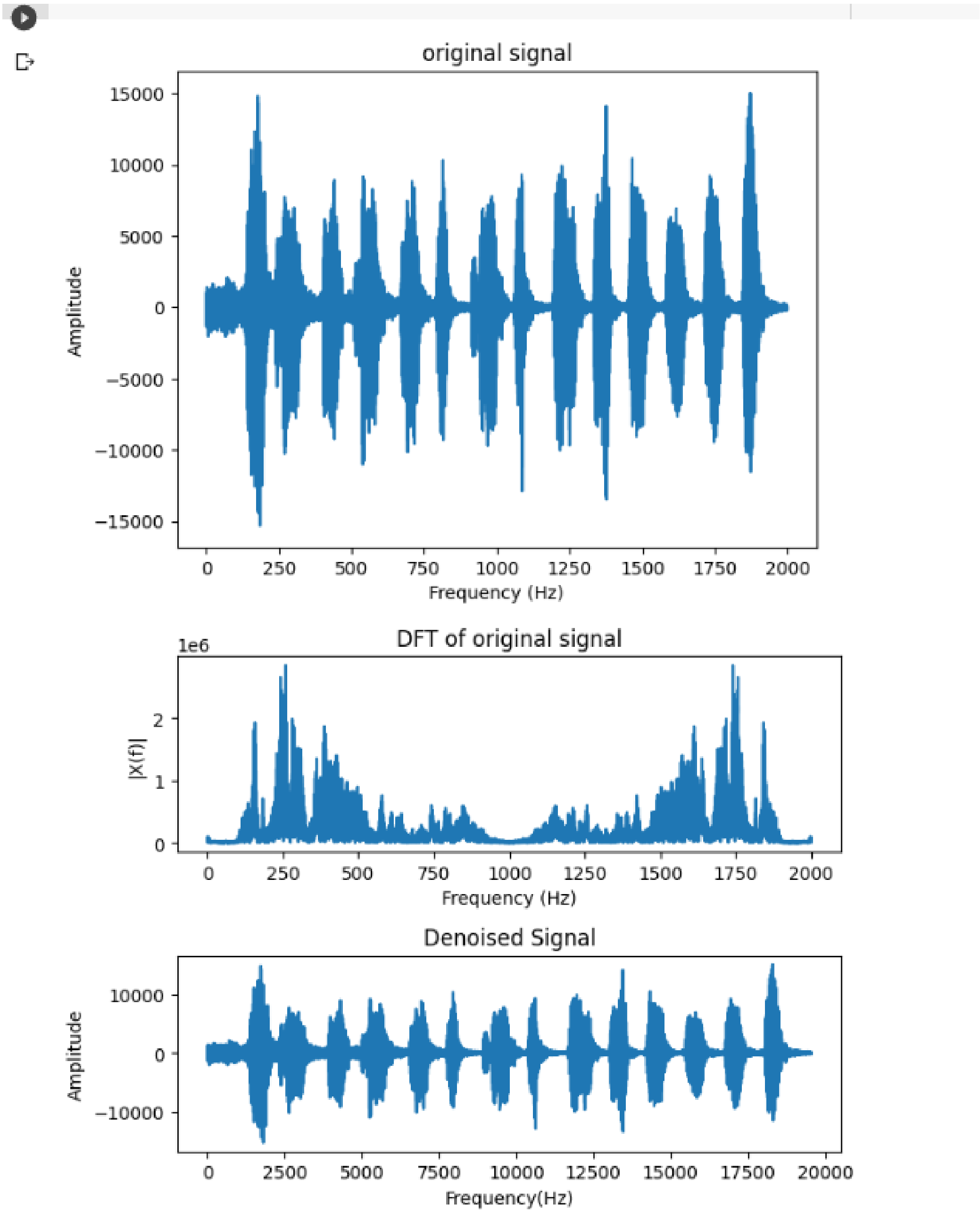


Sentence 3: “B C D F G H K L M N”

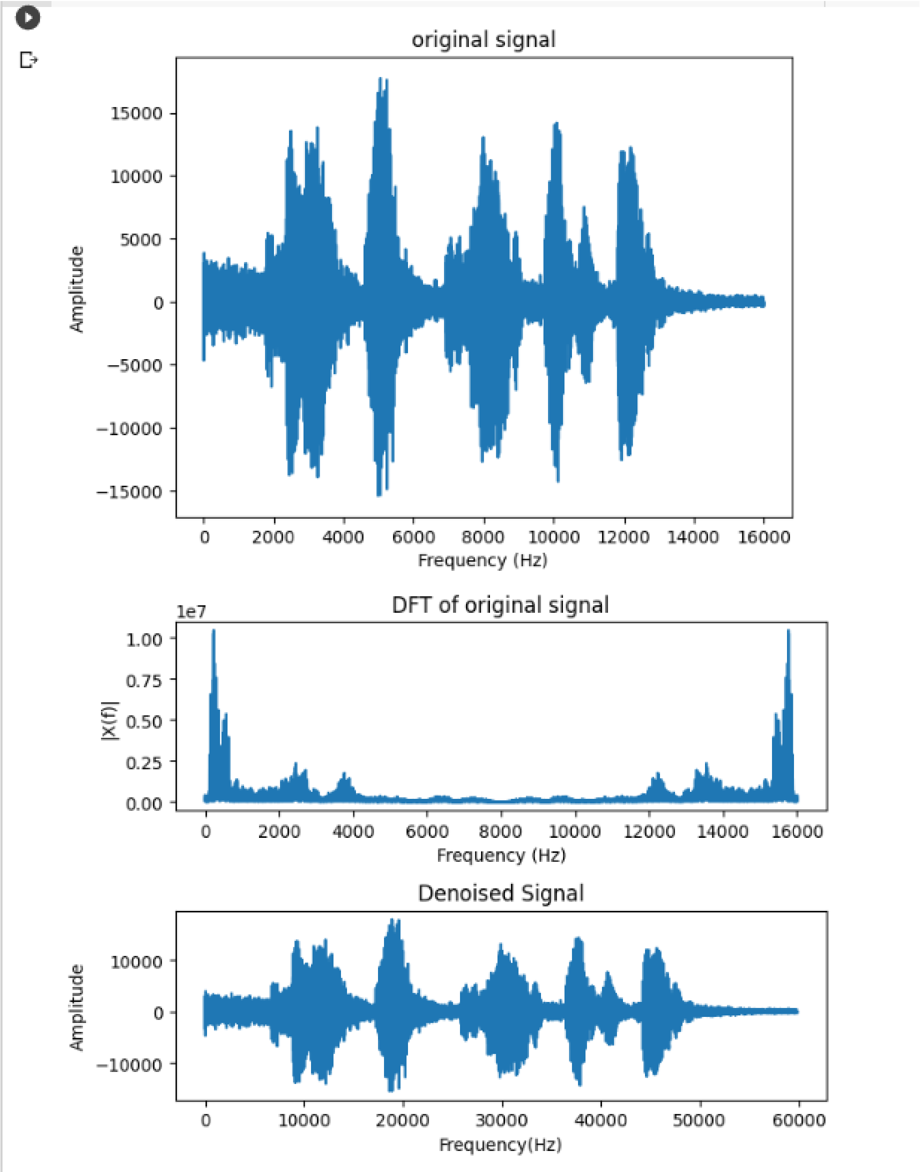
FREQUENCY: 2000 Hz



Sentence 4: “A B C D E F G H I K L M N O”
FREQUENCY : 2000 Hz



Sentence 1: “D F G H K”
FREQUENCY: 16000 Hz


original signal

Amplitude
15000
10000
5000
0
−5000
−10000
−15000
0
2000
4000
6000
8000
10000
12000
14000
16000
Frequency (Hz)

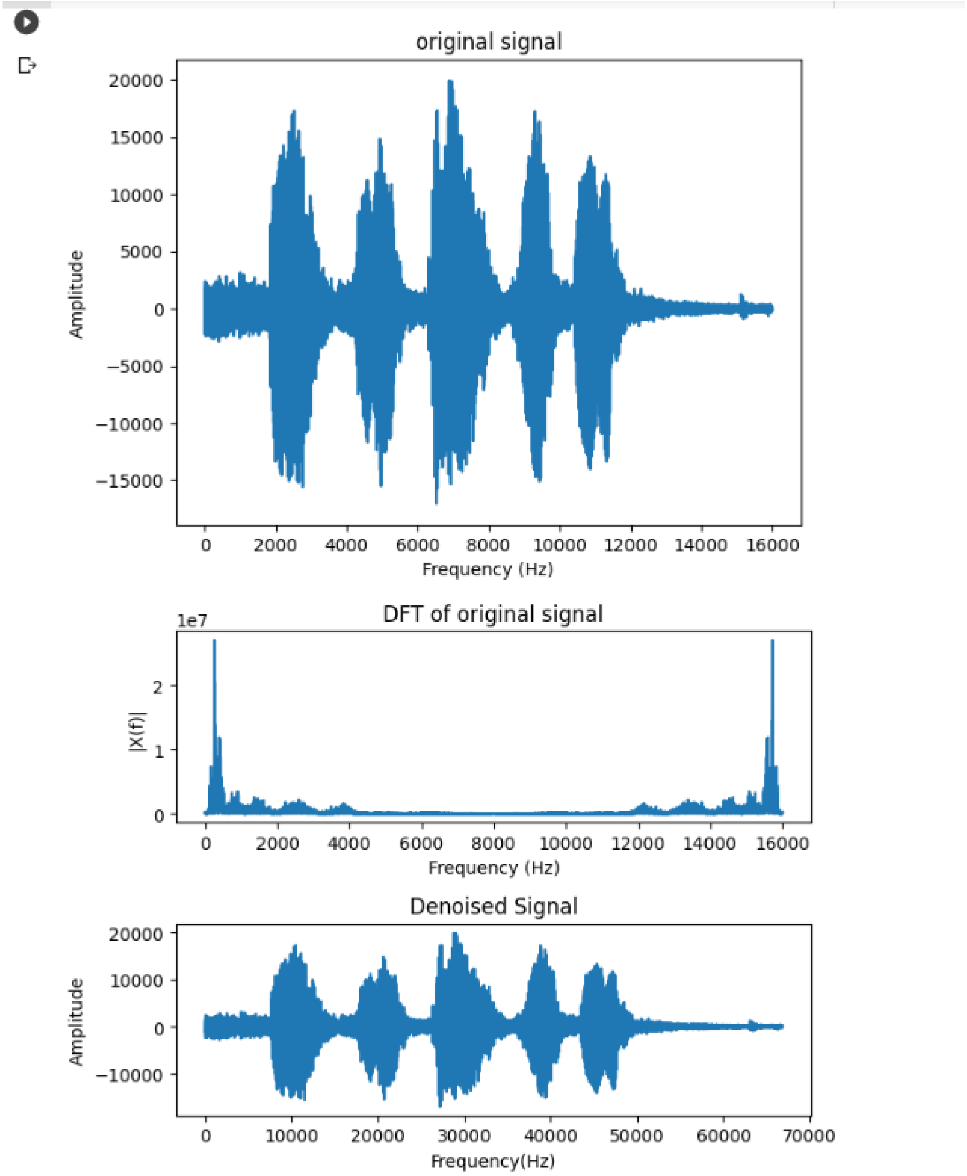
DFT of original signal

1e7
|X(f)|
1.00
0.75
0.50
0.25
0.00
0
2000
4000
6000
8000
10000
12000
14000
16000
Frequency (Hz)

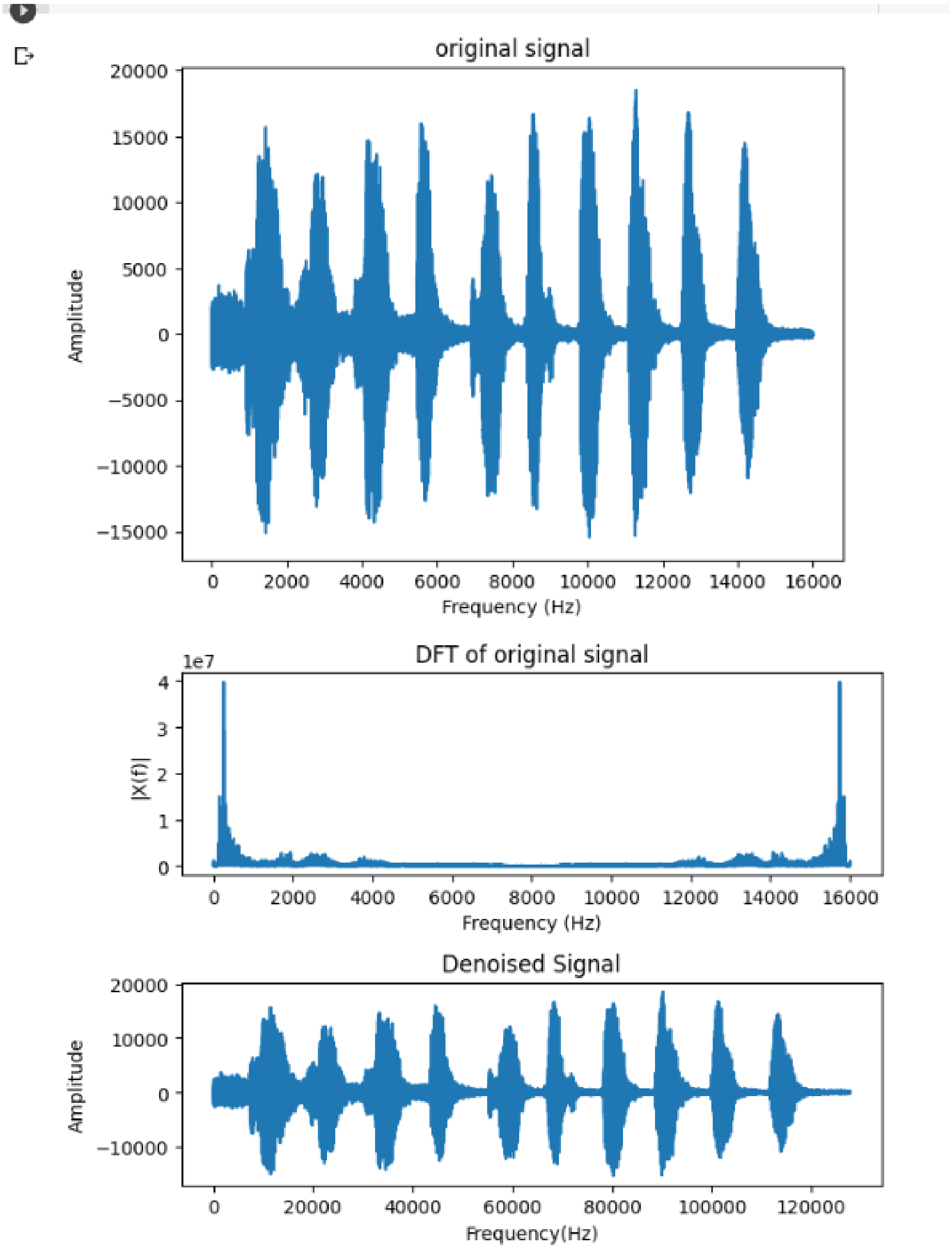
Denoised Signal

Amplitude
10000
0
−10000
0
10000
20000
30000
40000
50000
60000
Frequency(Hz)

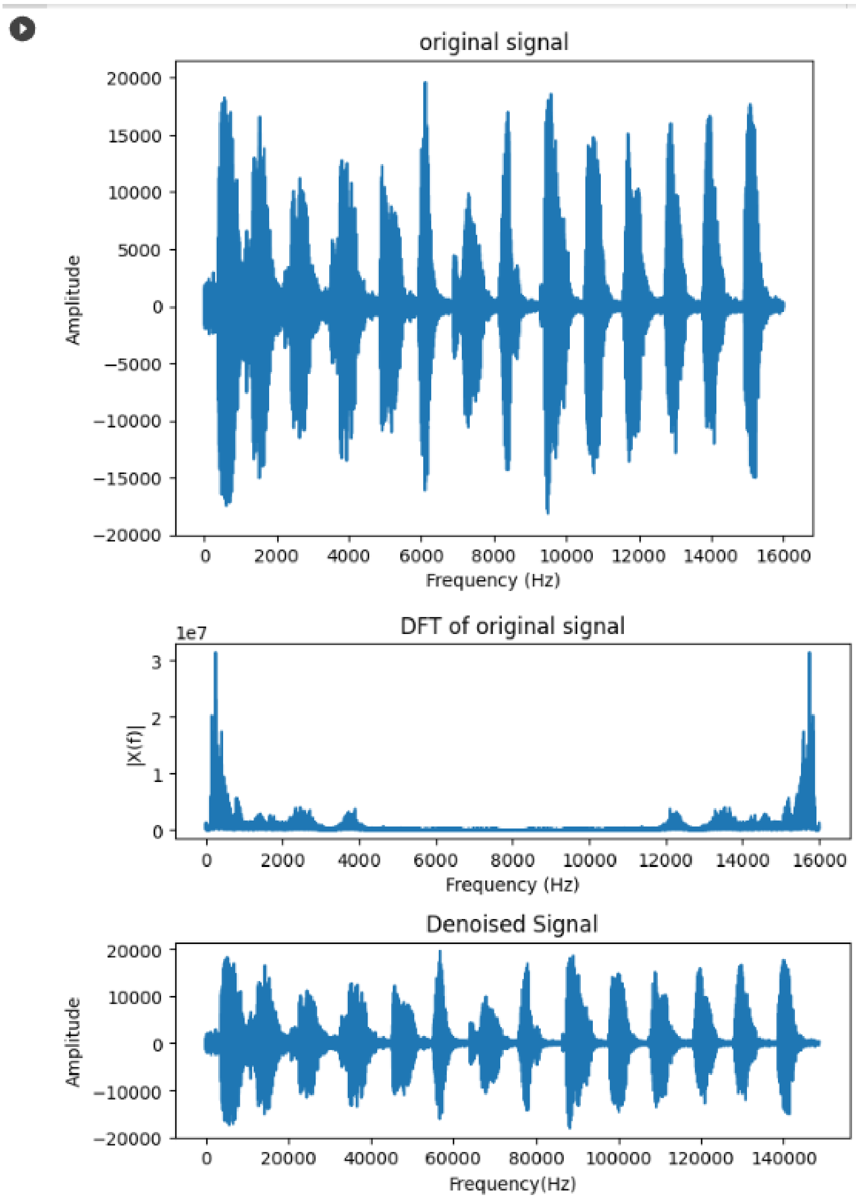
Sentence 2: “A E I O U”
FREQUENCY :16000 Hz



Sentence 3: “B C D F G H K L M N”
FREQUENCY: 16000 Hz

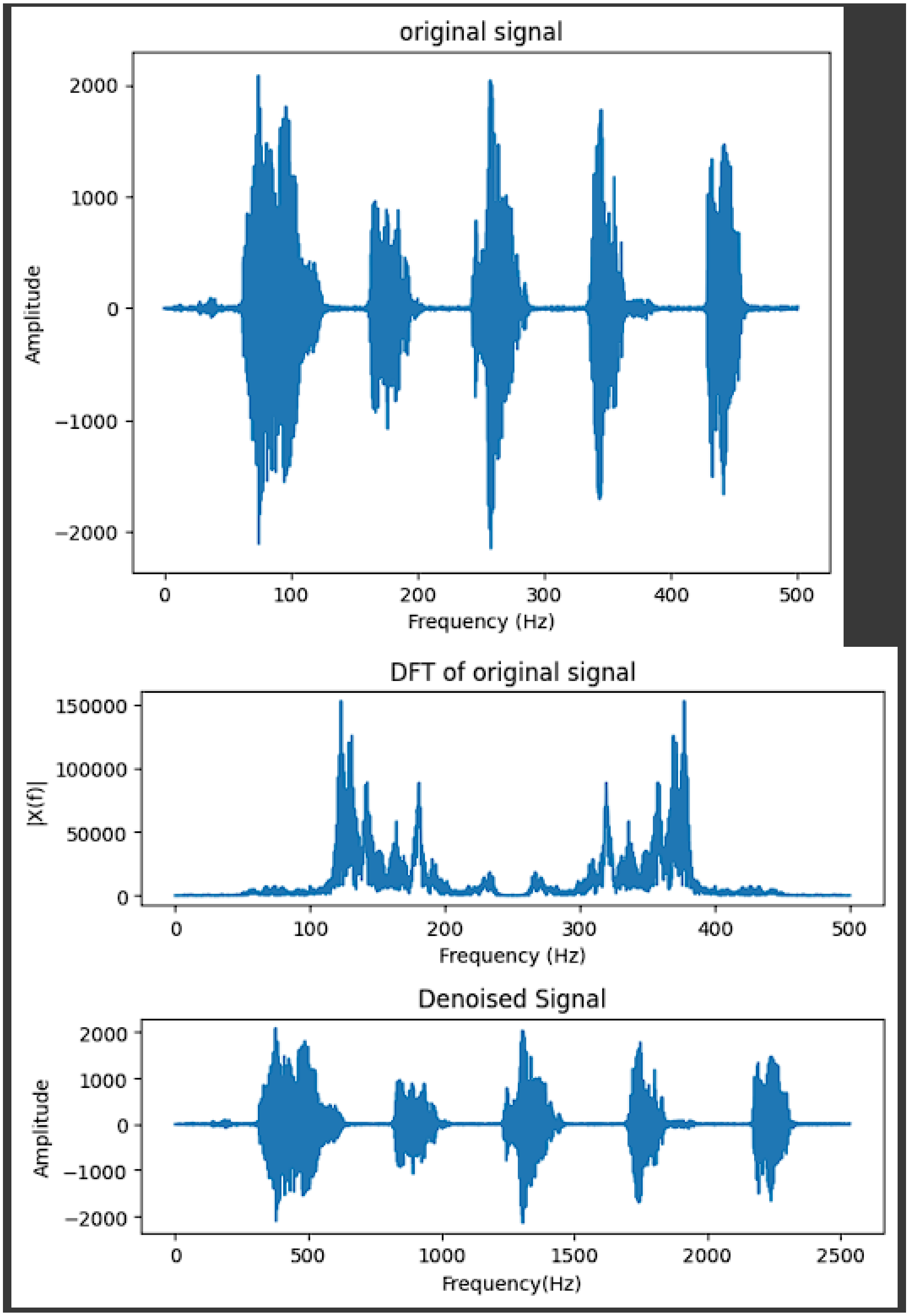


Sentence 4: “A B C D E F G H I K L M N O”
FREQUENCY: 16000 Hz



NAME:- UJJAWAL UPADHYAY (B21MT038)

Frequency:- 500Hz
Sentence:- “D F G H K”
Graph:-

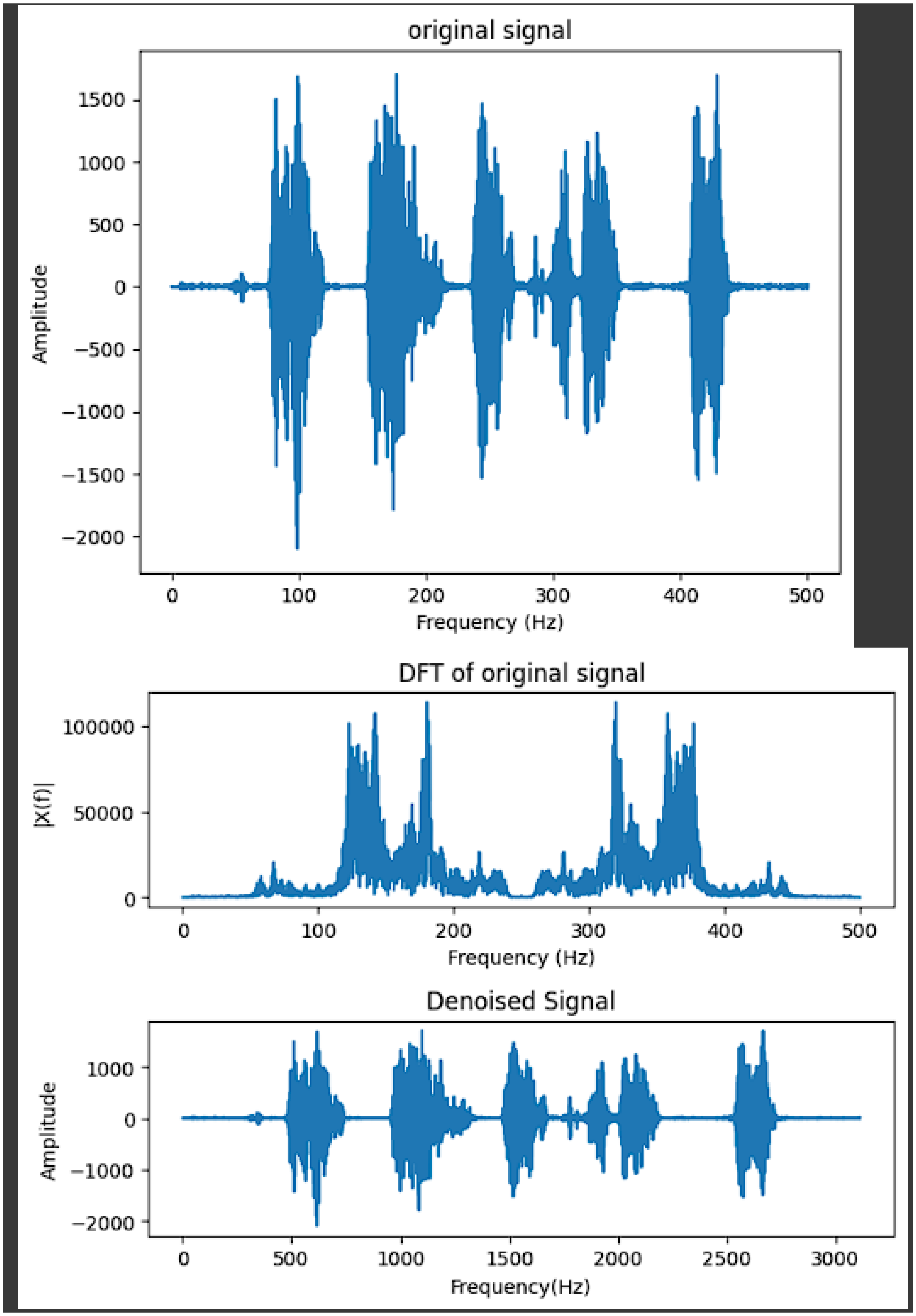


original signal

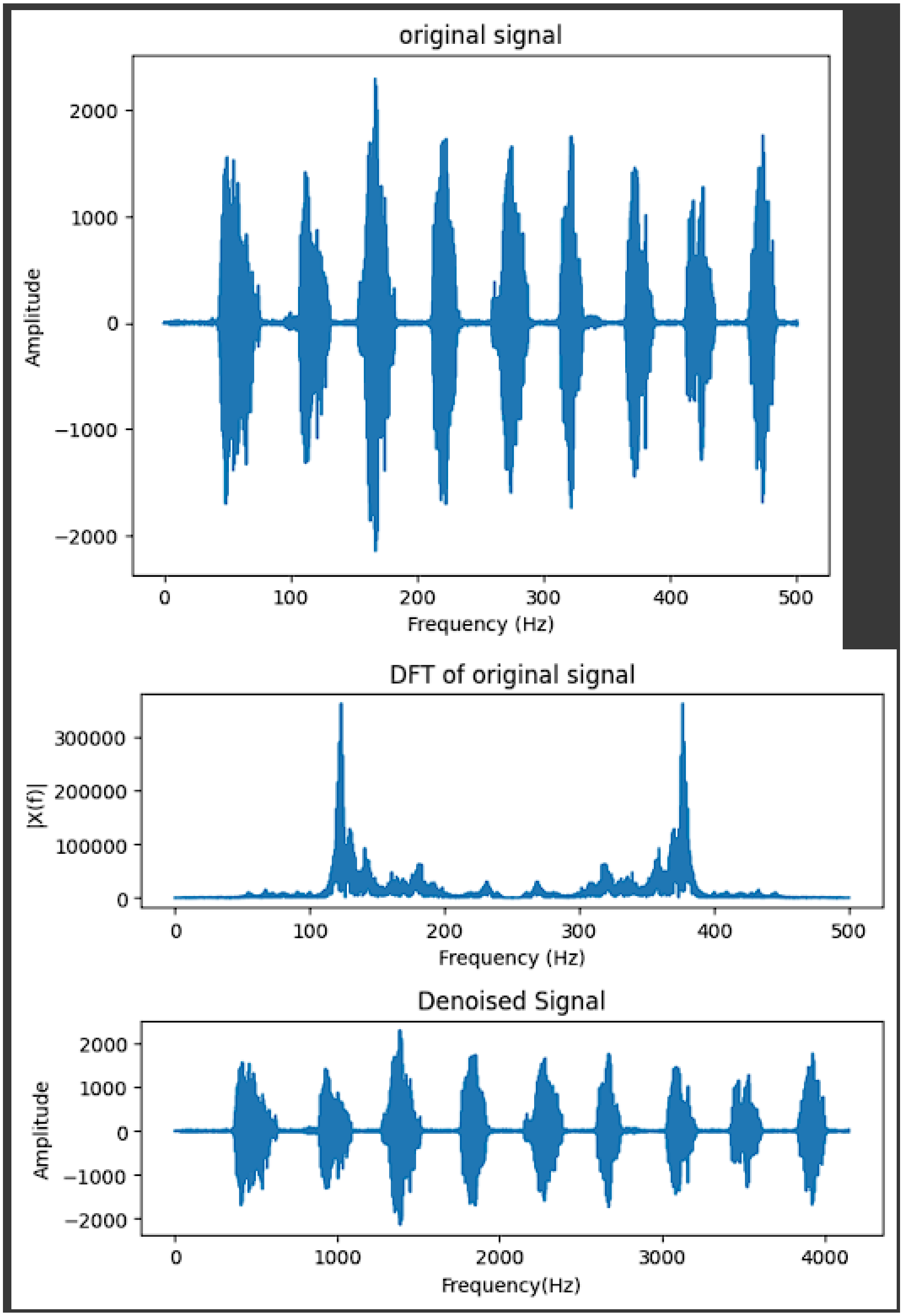
DFT of original signal

Denoised Signal

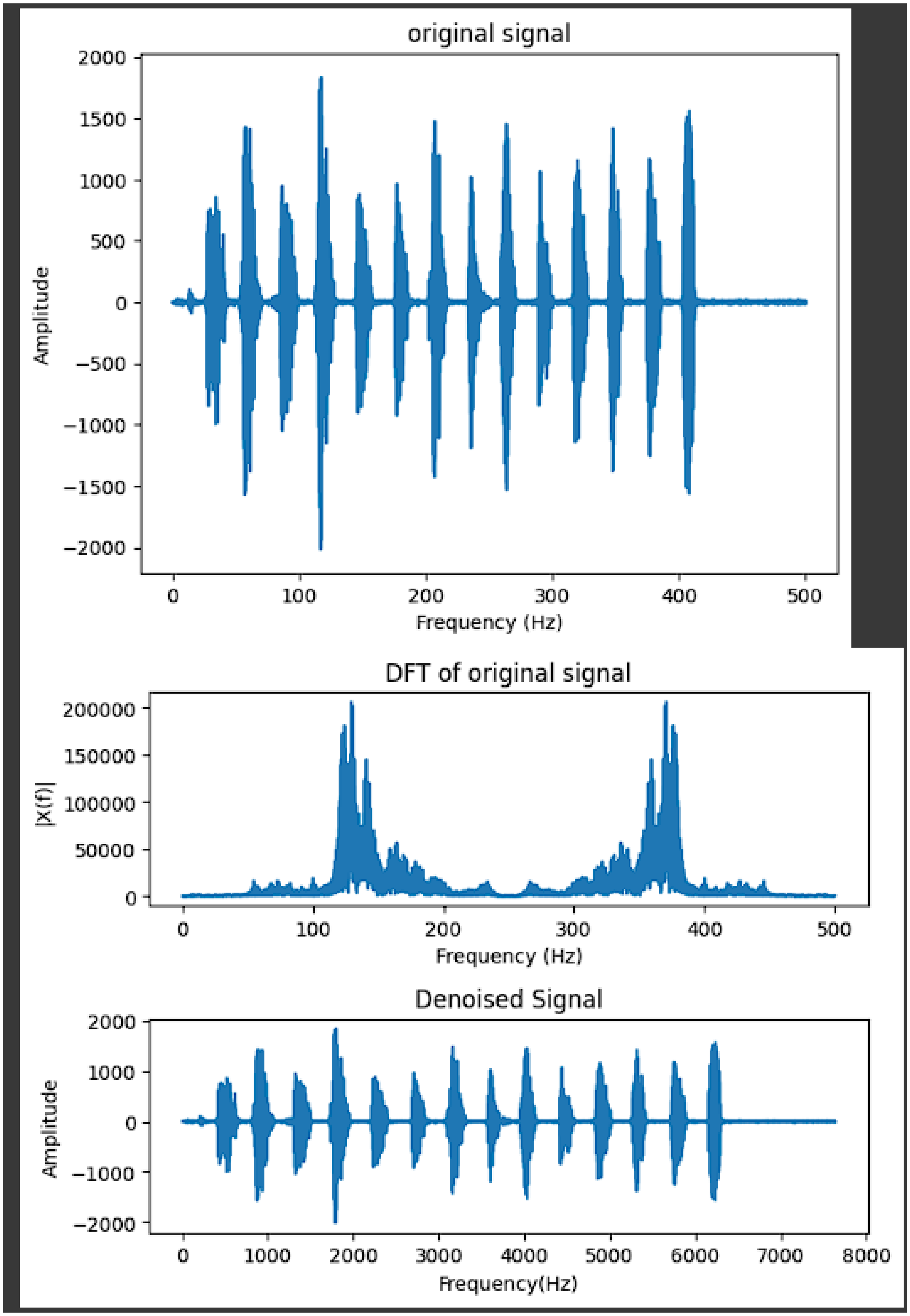
Frequency:- 500Hz
Sentence:- “A E I O U”
Graph:-



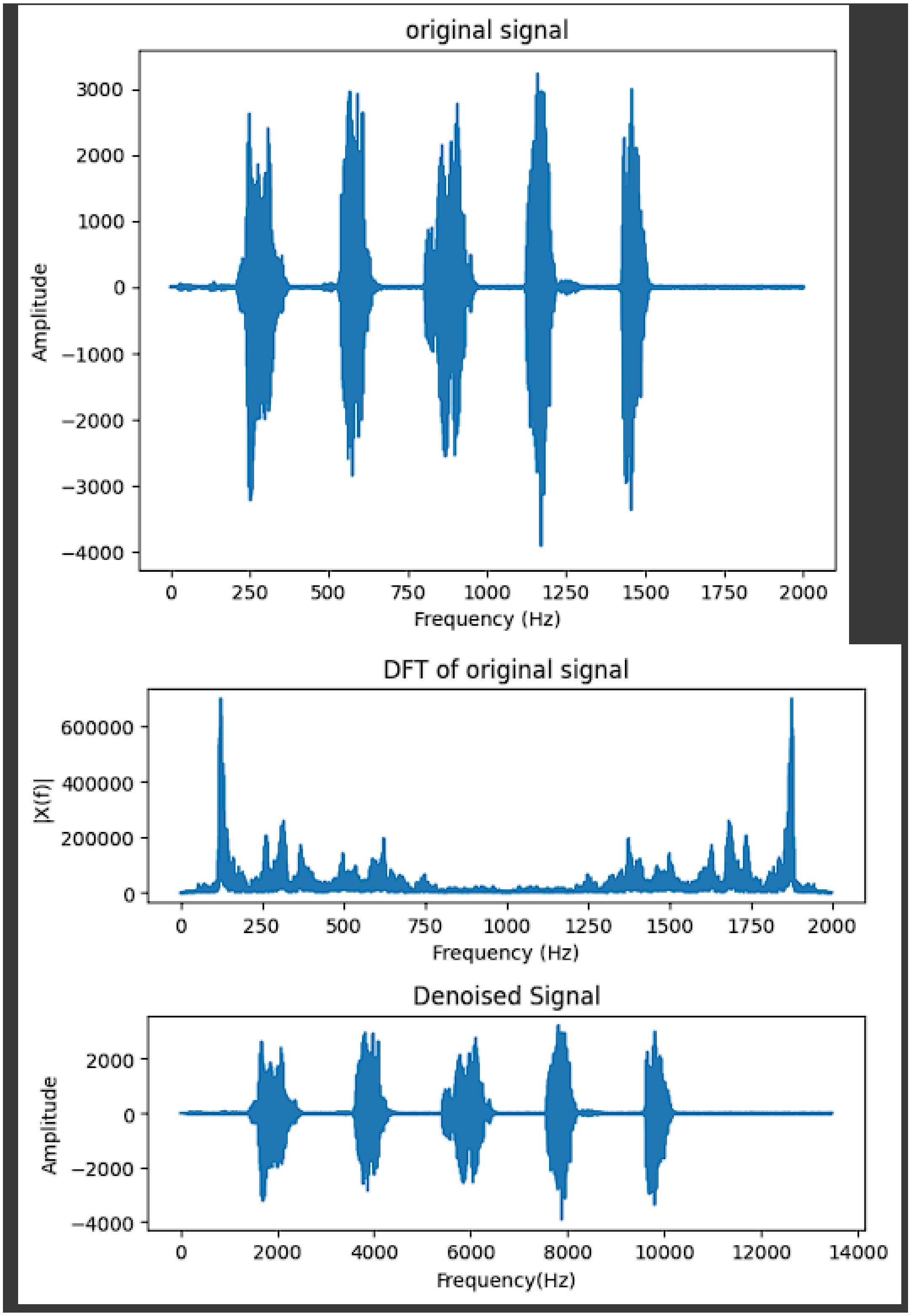
Frequency:- 500Hz
Sentence:- “B C D F G H K L M N”
Graph:-



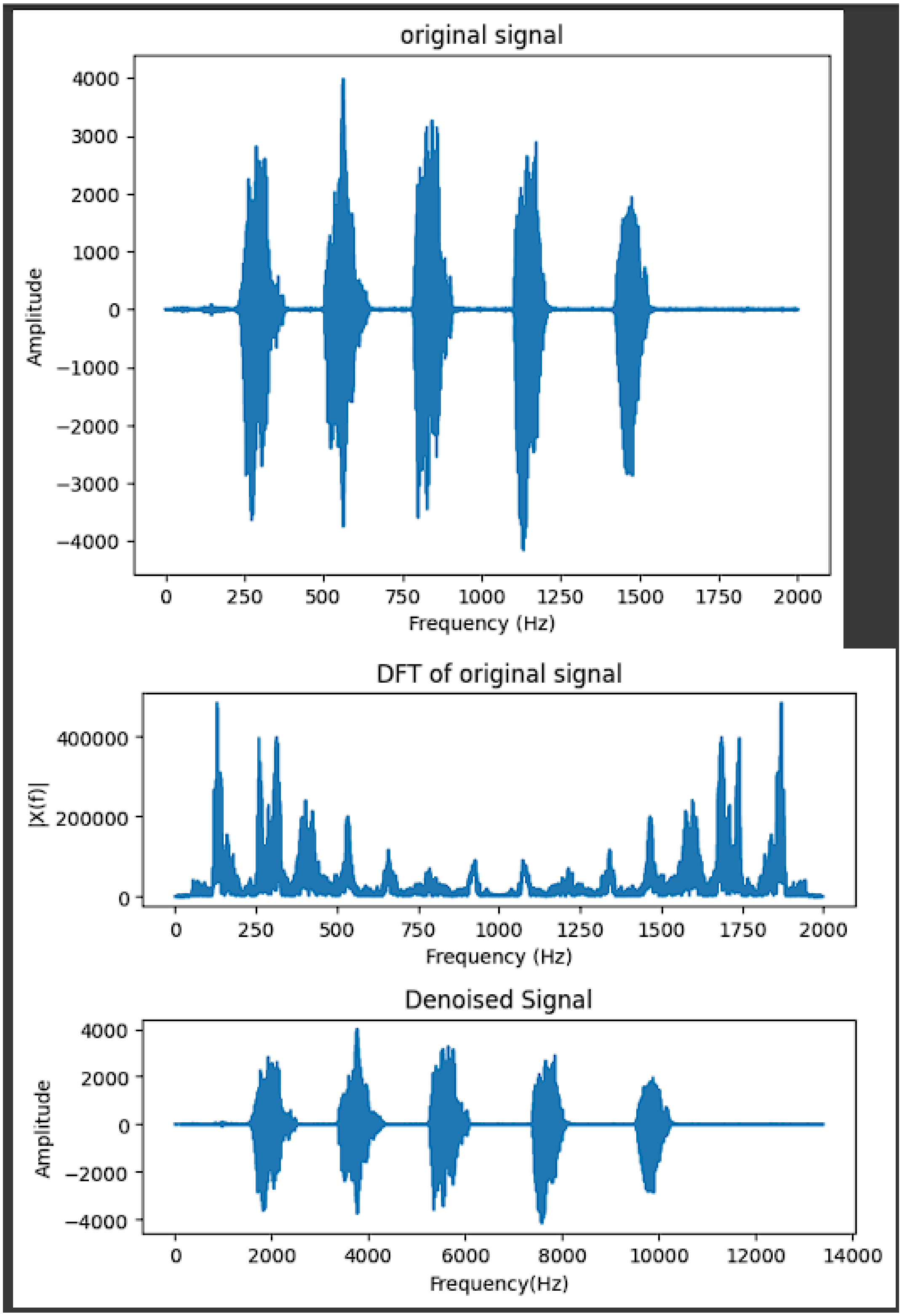
Frequency:- 500Hz
Sentence:- “A B C D E F G H I K L M N O”
Graph:-



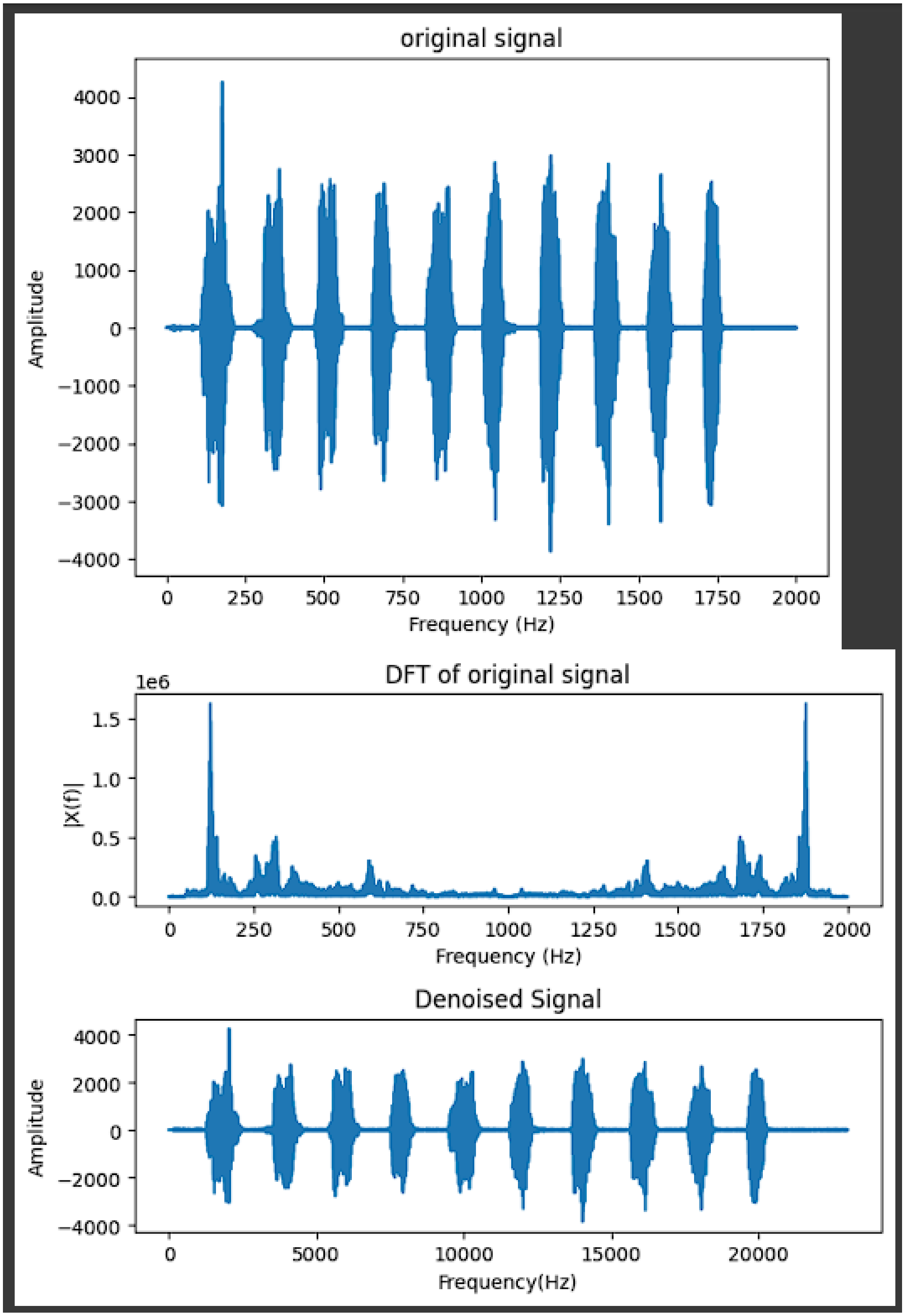
Frequency:- 2000Hz
Sentence:- “D F G H K”
Graph:-



Frequency:- 2000Hz
Sentence:- “A E I O U”
Graph:-



Frequency:- 2000Hz
Sentence:- “B C D F G H K L M N”
Graph:-

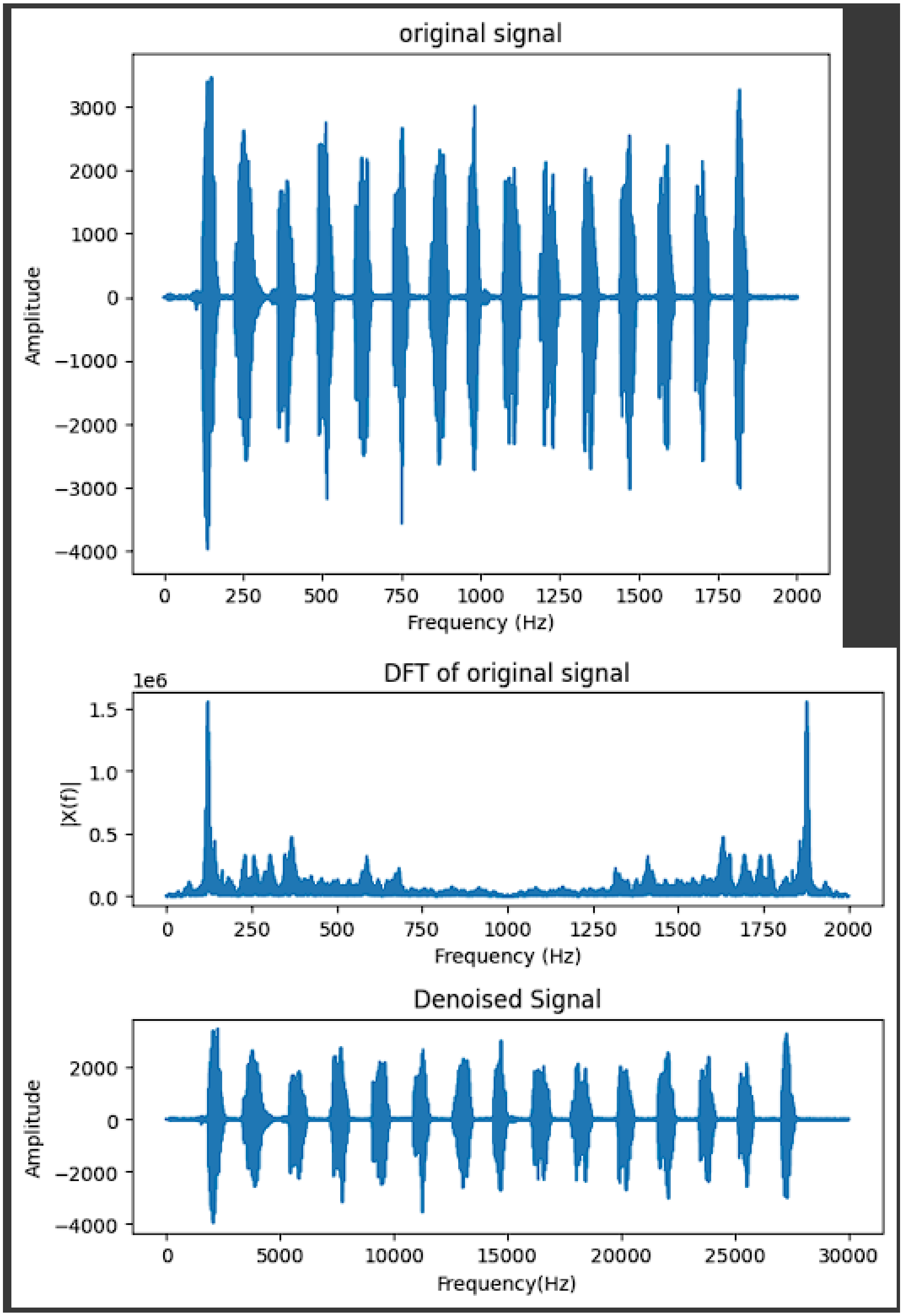


original signal

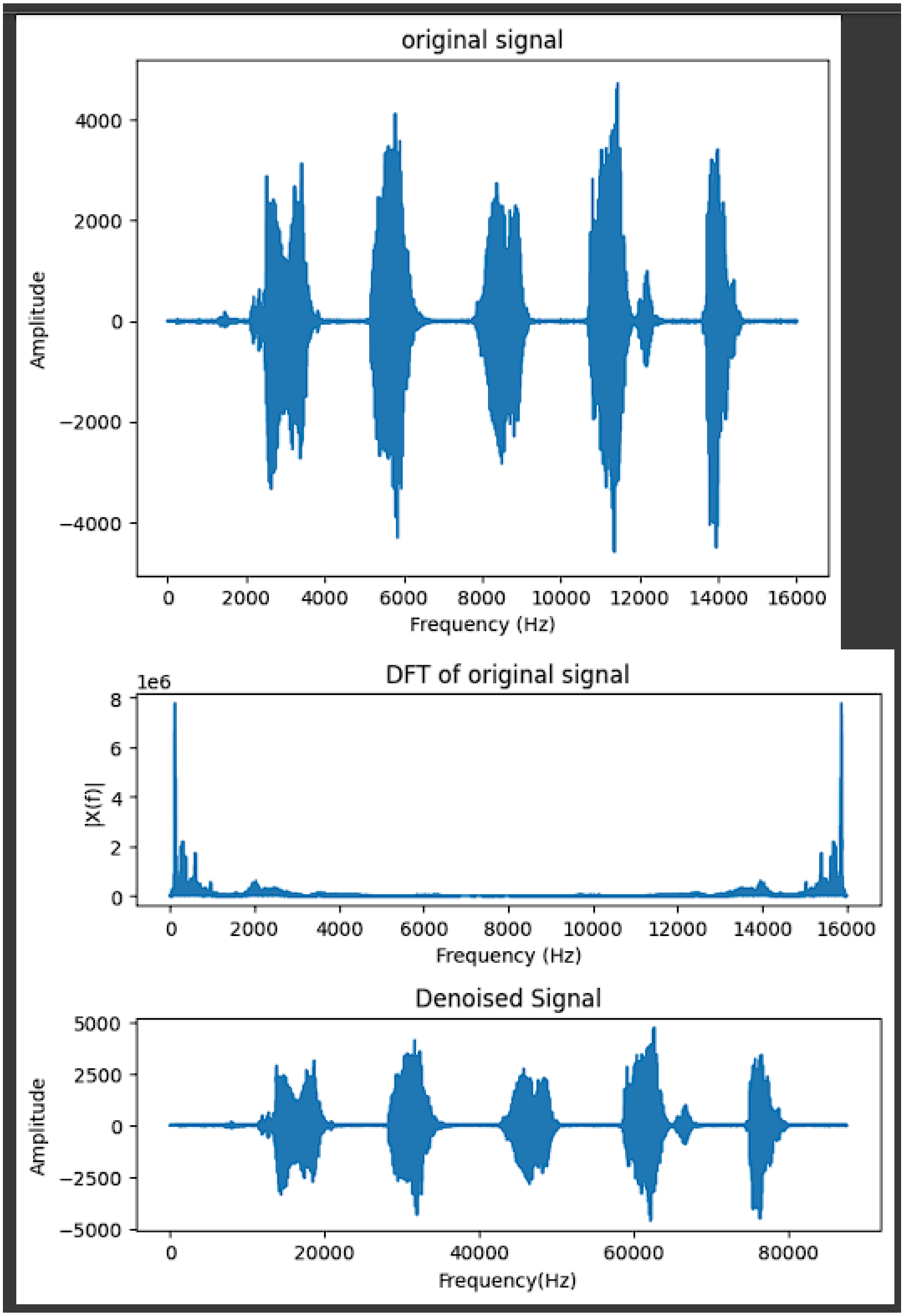
DFT of original signal

Denoised Signal

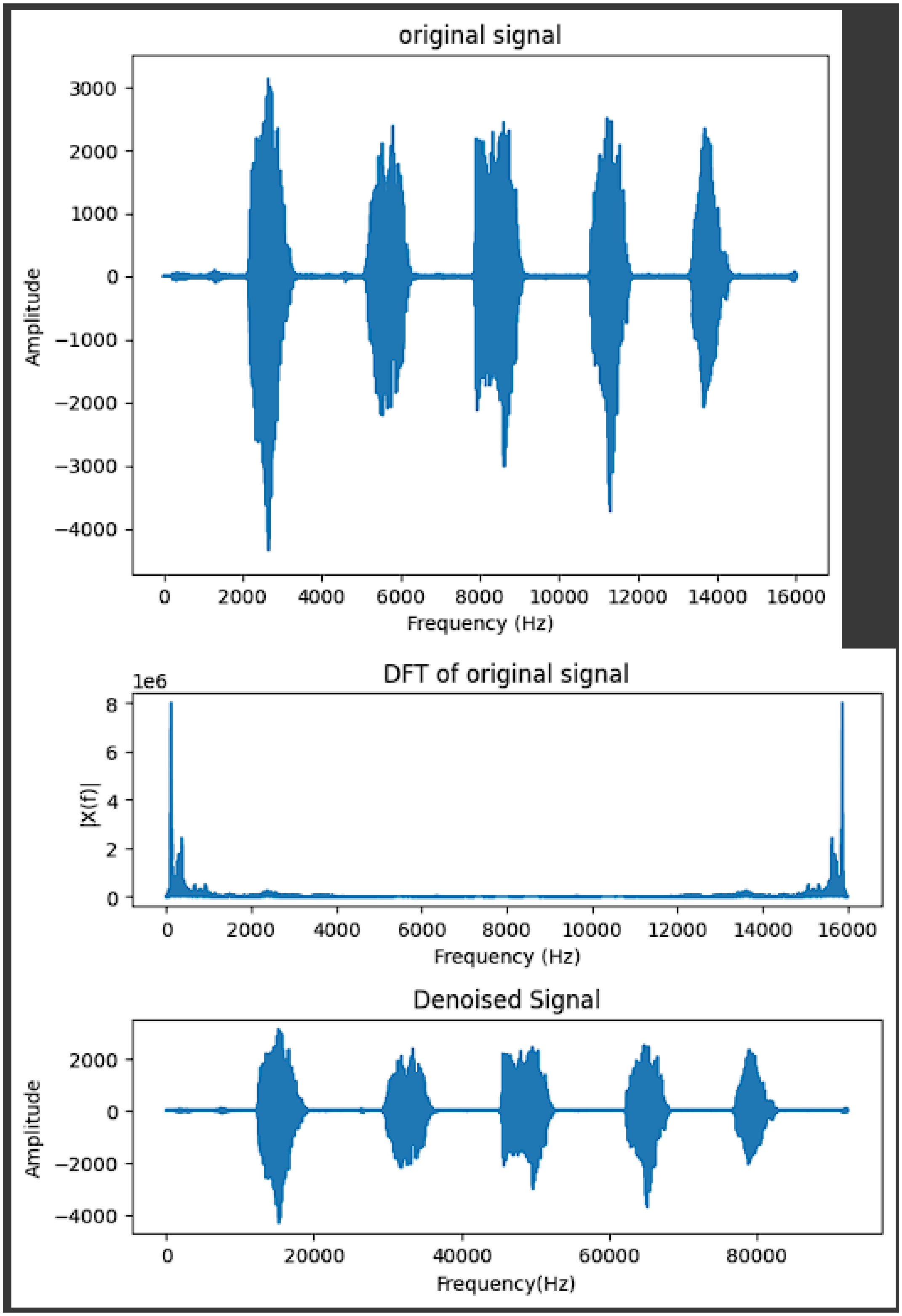
Frequency:- 2000Hz
Sentence:- “A B C D E F G H I K L M N O”
Graph:-



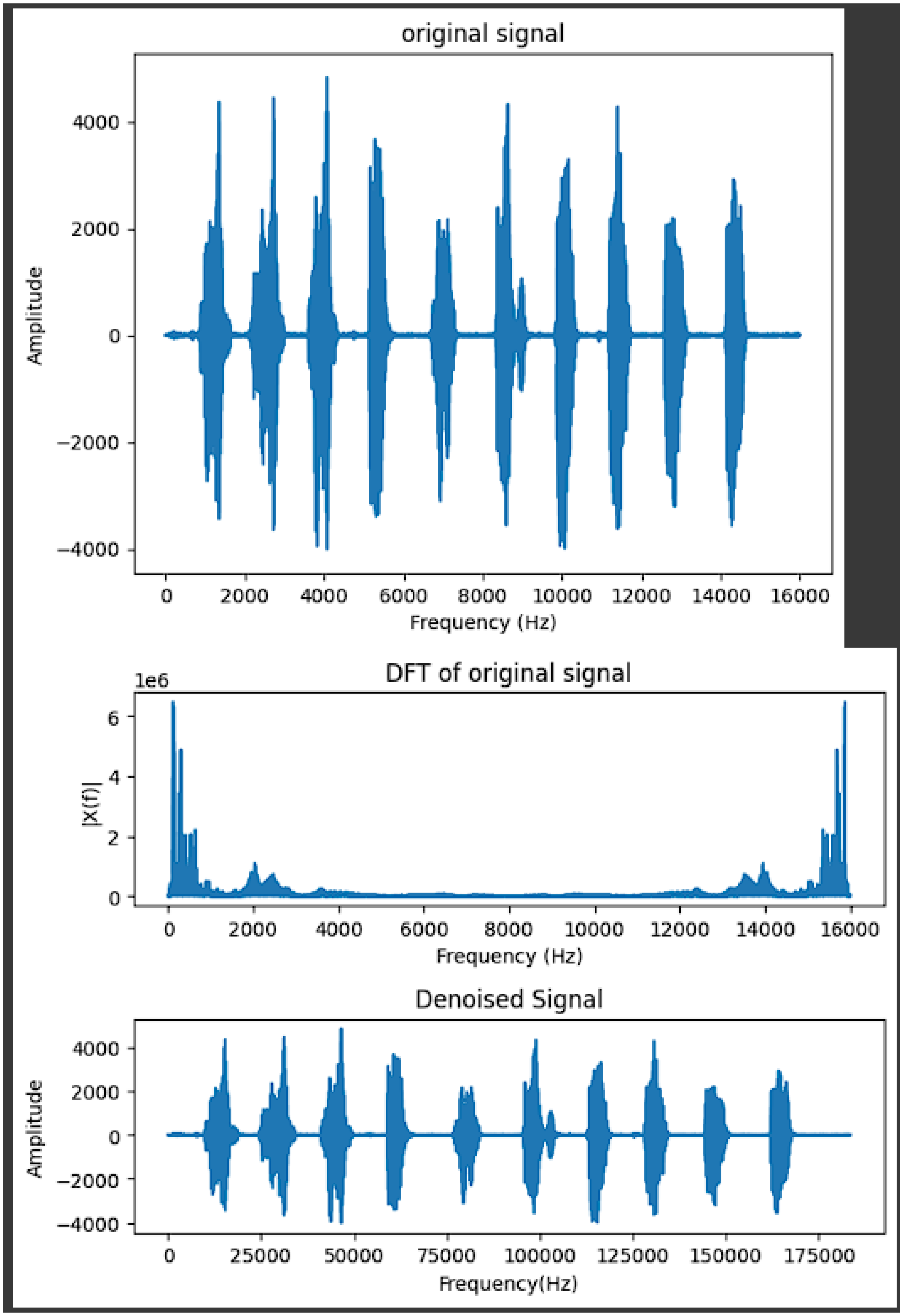
Frequency:- 16000Hz
Sentence:- “D F G H K”
Graph:-



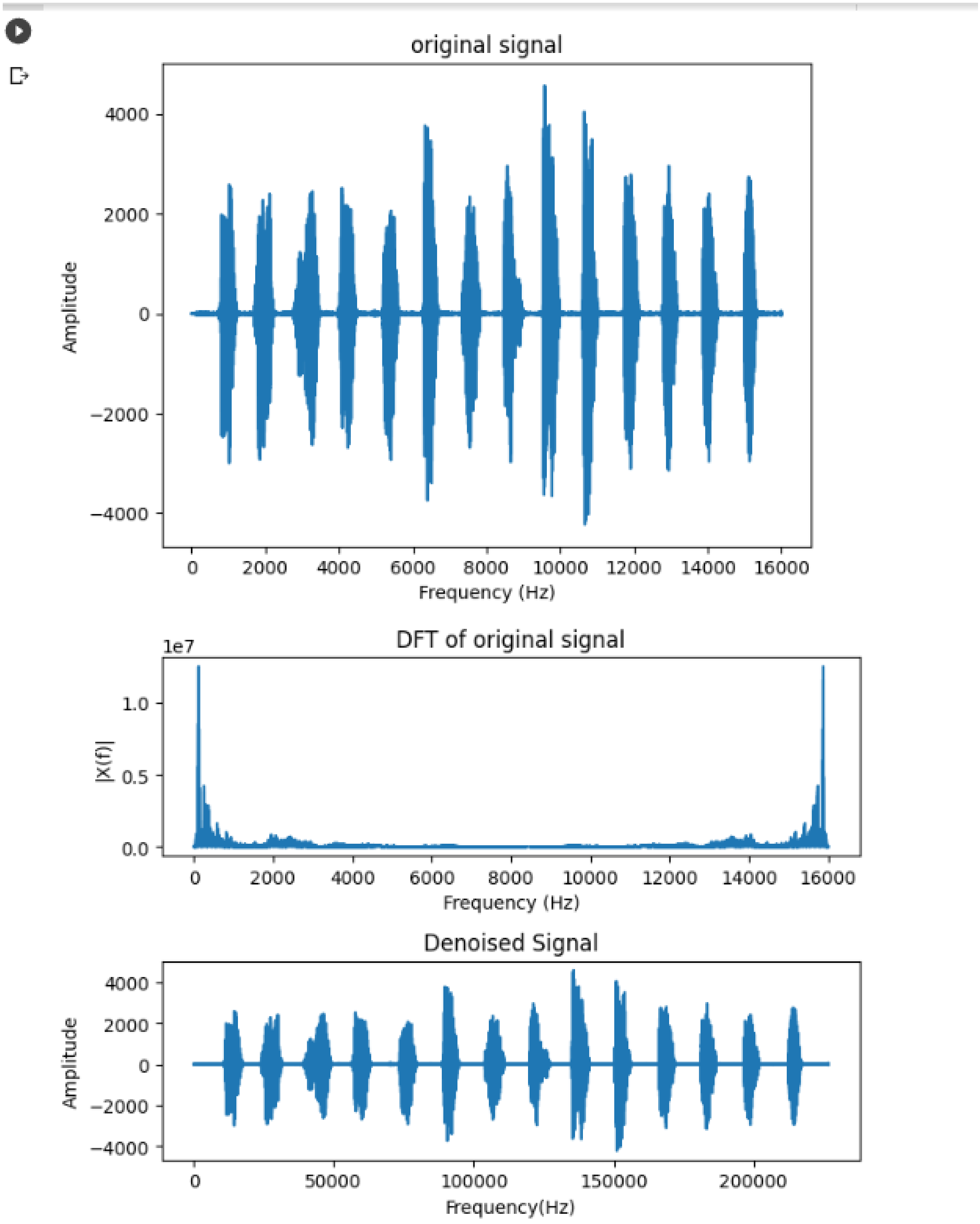
Frequency:- 16000Hz
Sentence:- “A E I O U”
Graph:-



Frequency:- 16000Hz
Sentence:- “B C D F G H K L M N”
Graph:-



Frequency:- 16000Hz
Sentence:- “A B C D E F G H I K L M N O”
Graph:-



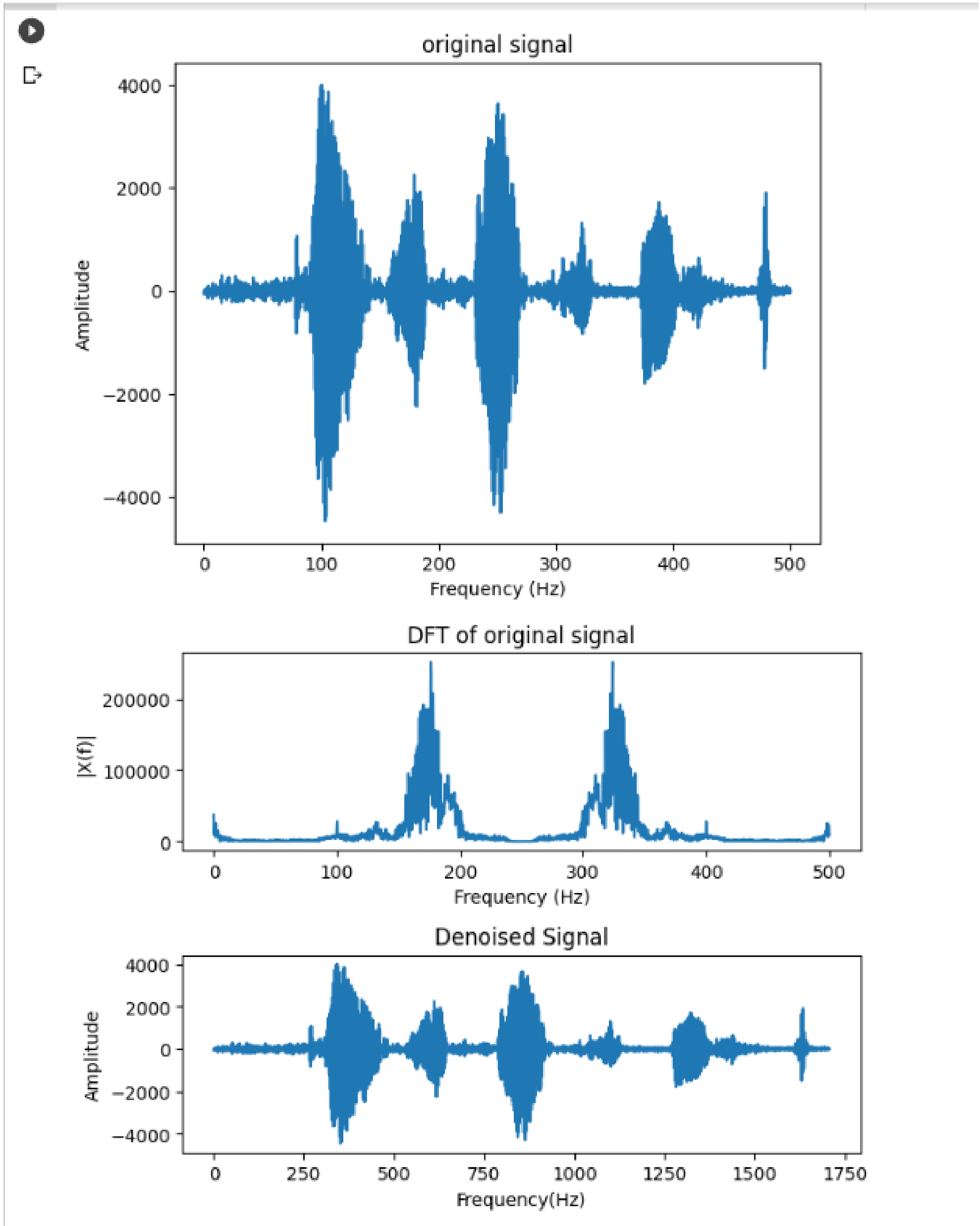
original signal

DFT of original signal

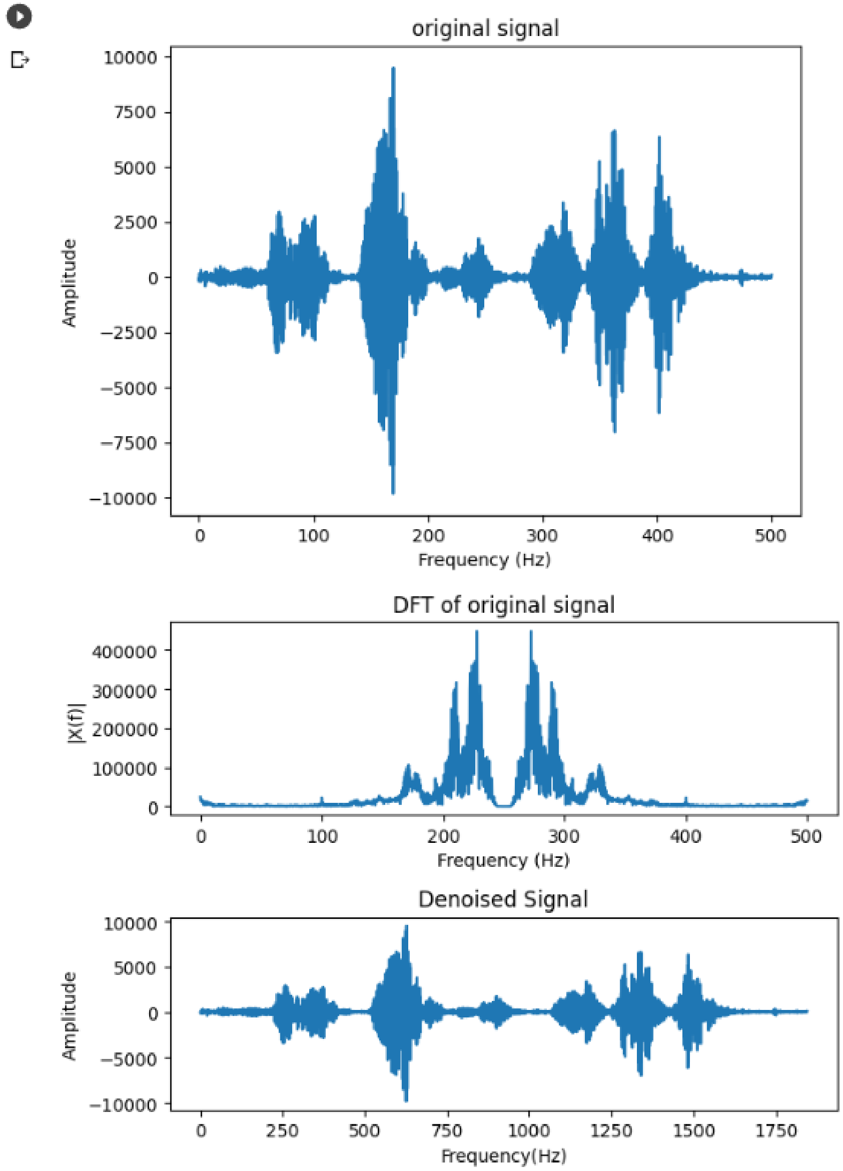
Denoised Signal

MAYANK SRIVASTAVA B21CH016

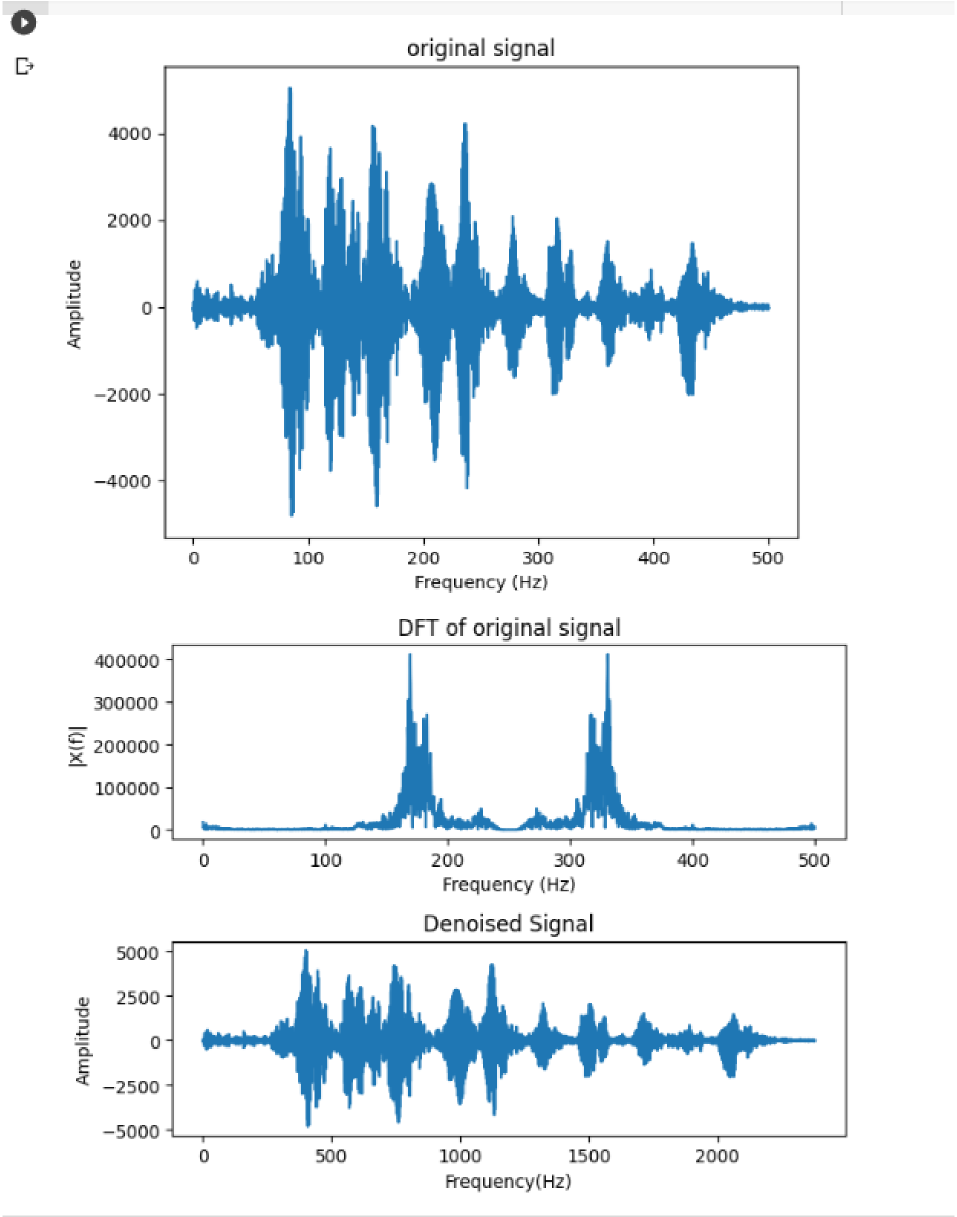
Sentence 1: “D F G H K”
FREQUENCY 500Hz


original signal
4000
2000
0
−2000
−4000
Amplitude
0
100
200
300
400
500
Frequency (Hz)
DFT of original signal
200000
100000
0
|X(f)|
0
100
200
300
400
500
Frequency (Hz)
Denoised Signal
4000
2000
0
−2000
−4000
Amplitude
0
250
500
750
1000
1250
1500
1750
Frequency(Hz)

Sentence 2: “A E I O U”
FREQUENCY 500Hz



Sentence 3: “B C D F G H K L M N”
FREQUENCY 500Hz

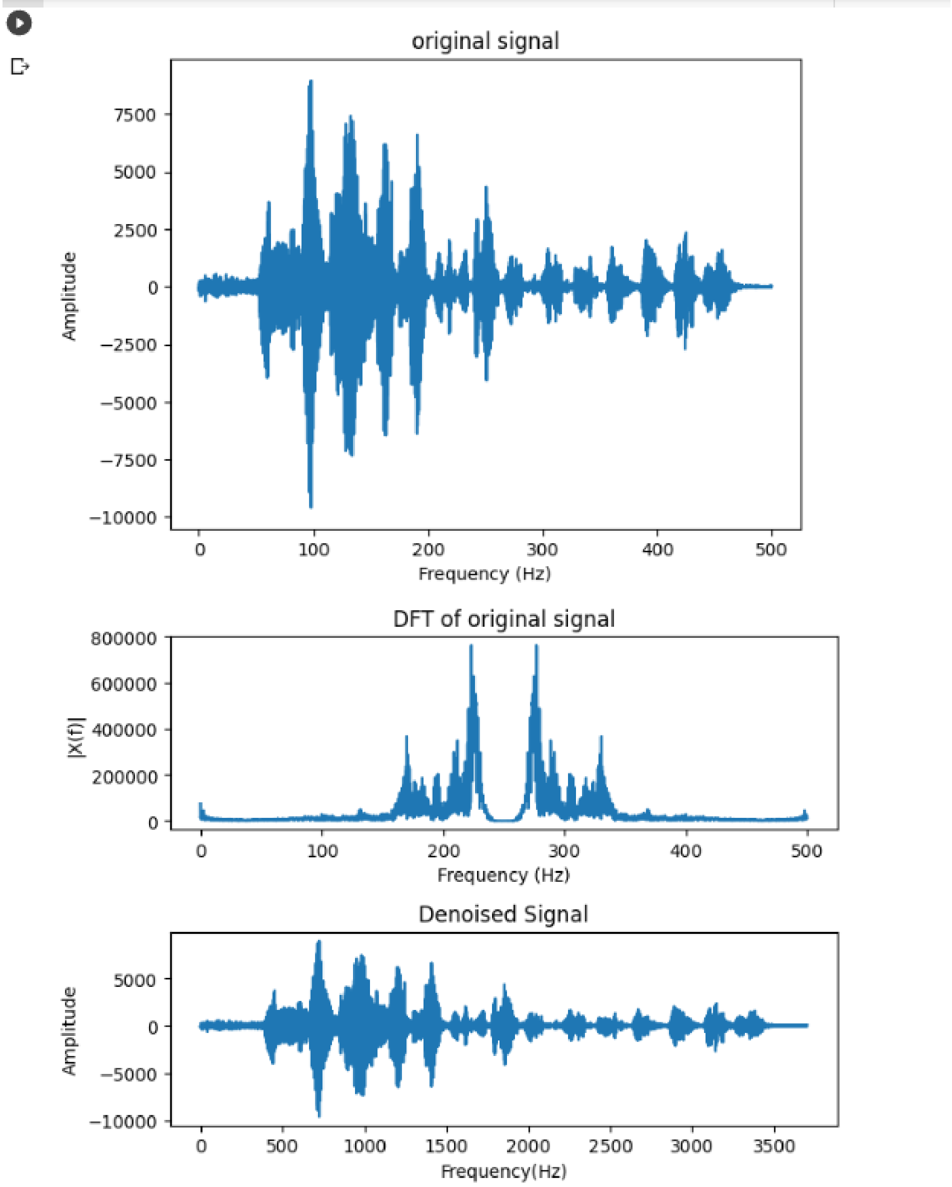


original signal

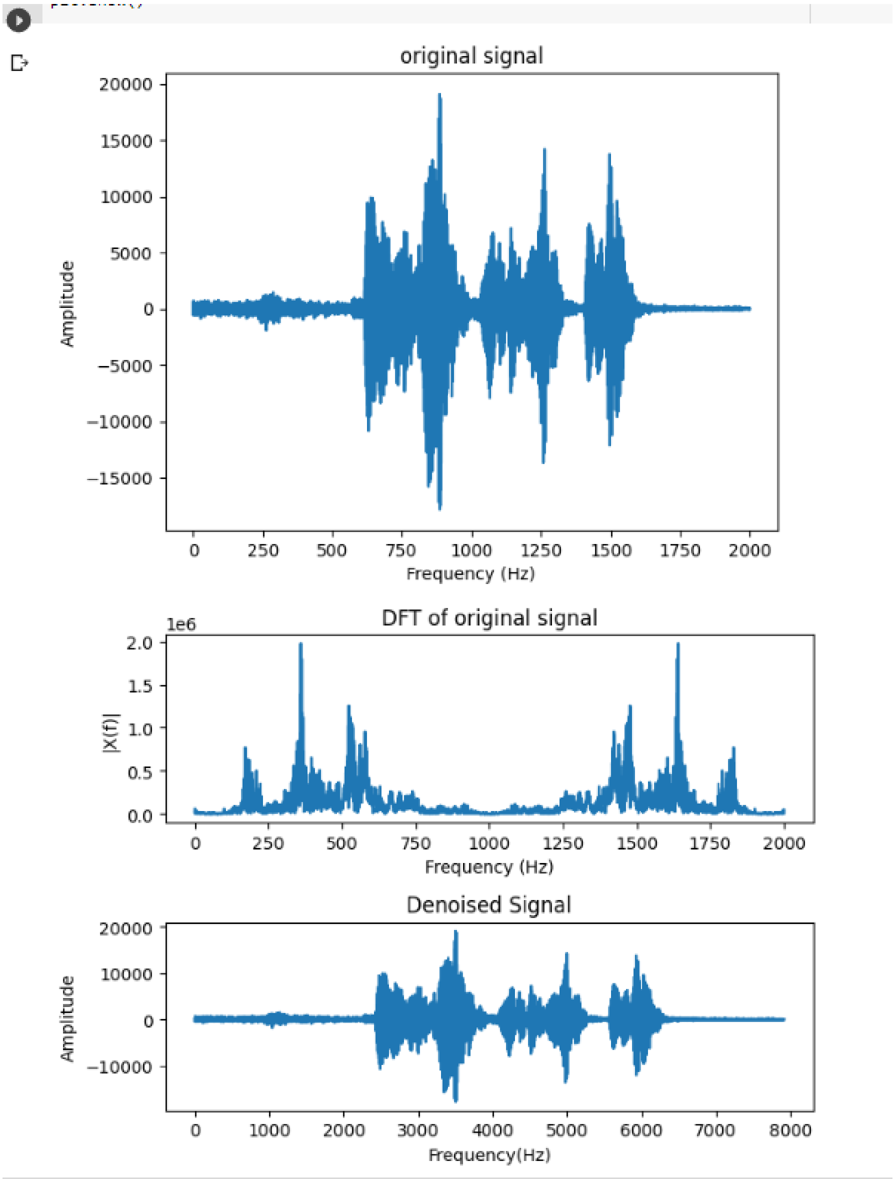
DFT of original signal

Denoised Signal

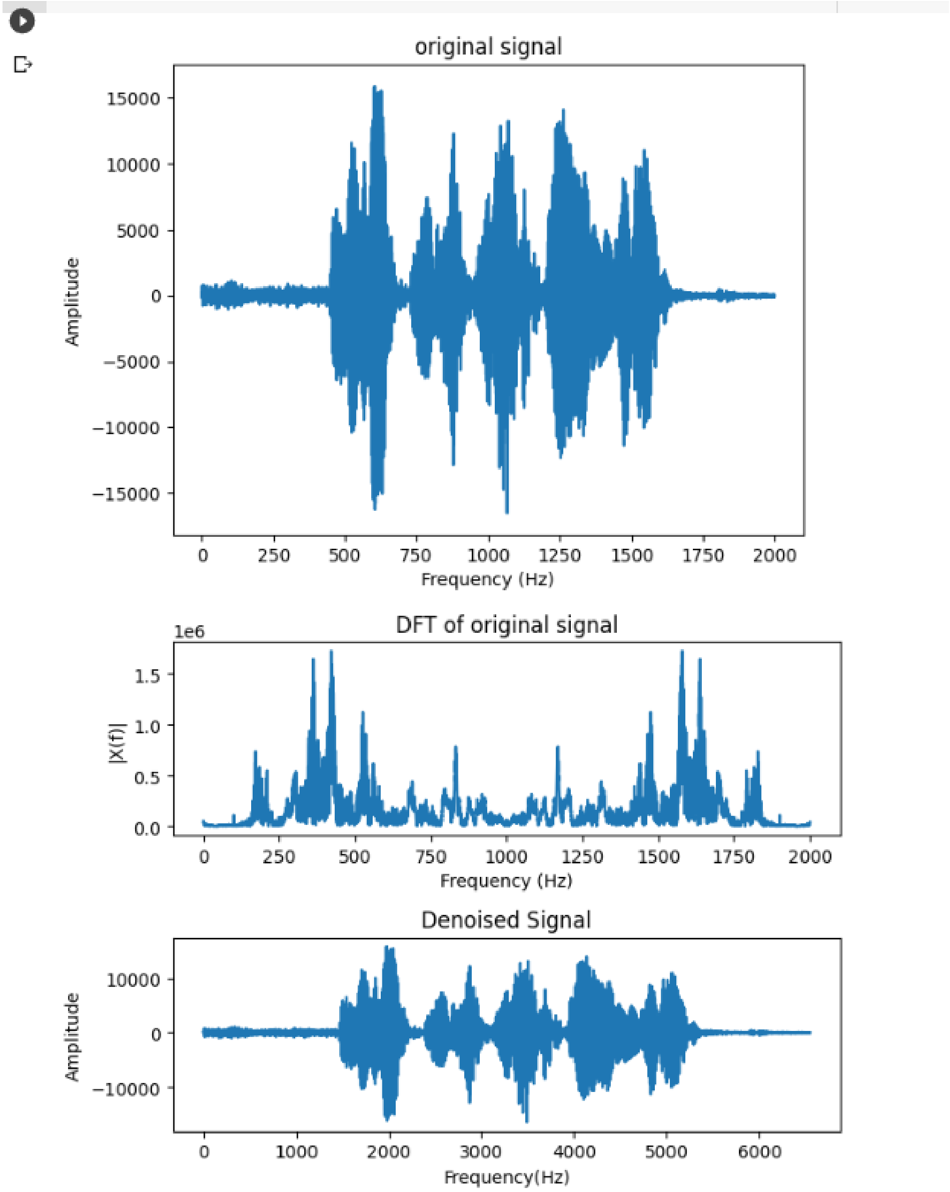
Sentence 4: “A B C D E F G H I K L M N O”
FREQUENCY 500Hz



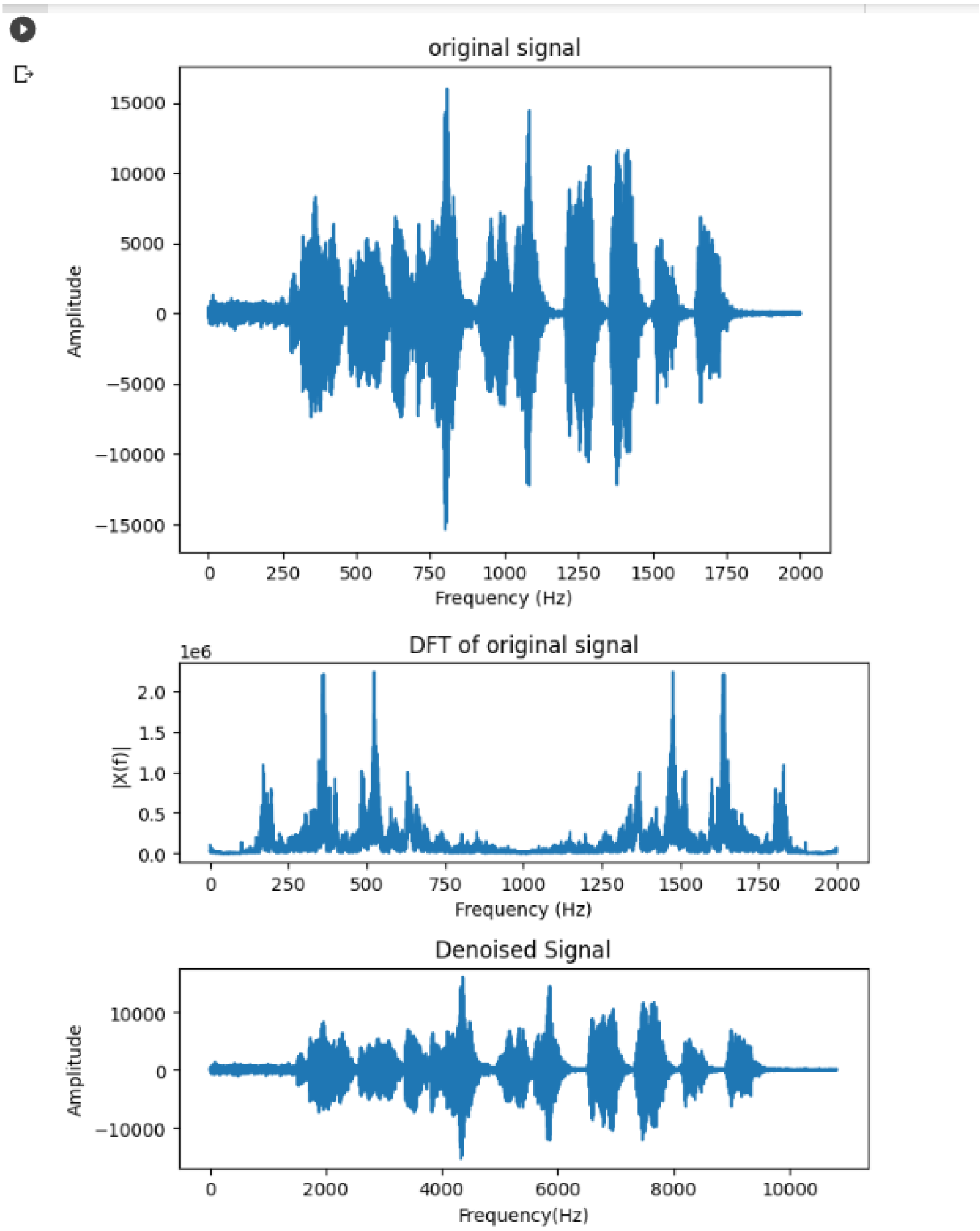
Sentence 1: “D F G H K”
FREQUENCY 2000Hz


original signal
Amplitude
20000
15000
10000
5000
0
−5000
−10000
−15000
0
250
500
750
1000
1250
1500
1750
2000
Frequency (Hz)
DFT of original signal
1e6
|X(f)|
2.0
1.5
1.0
0.5
0.0
0
250
500
750
1000
1250
1500
1750
2000
Frequency (Hz)
Denoised Signal
Amplitude
20000
10000
0
−10000
0
1000
2000
3000
4000
5000
6000
7000
8000
Frequency(Hz)

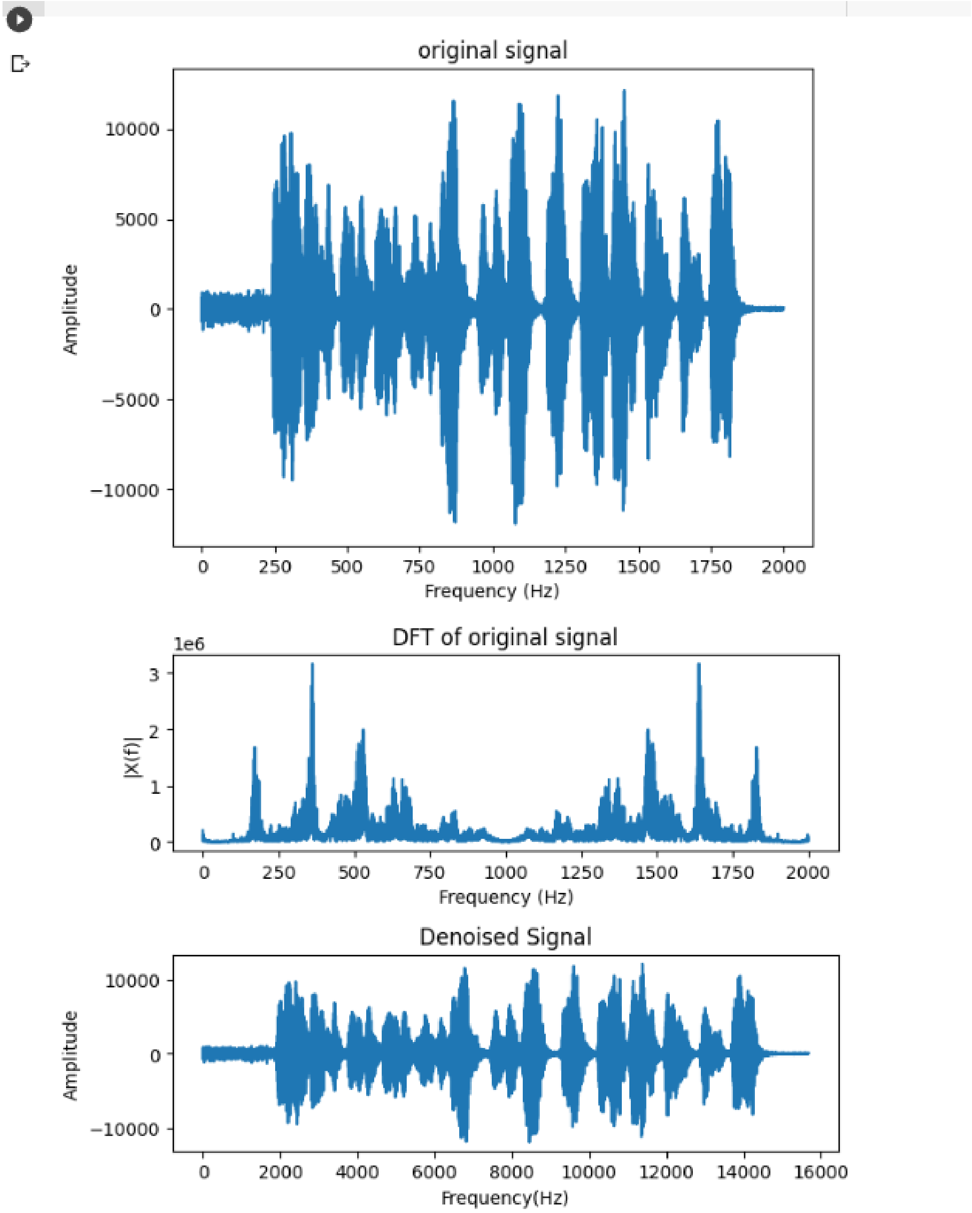
Sentence 2: “A E I O U”
FREQUENCY 2000Hz


original signal
Amplitude
15000
10000
5000
0
−5000
−10000
−15000
0
250
500
750
1000
1250
1500
1750
2000
Frequency (Hz)
DFT of original signal
1e6
|X(f)|
1.5
1.0
0.5
0.0
0
250
500
750
1000
1250
1500
1750
2000
Frequency (Hz)
Denoised Signal
Amplitude
10000
0
−10000
0
1000
2000
3000
4000
5000
6000
Frequency(Hz)

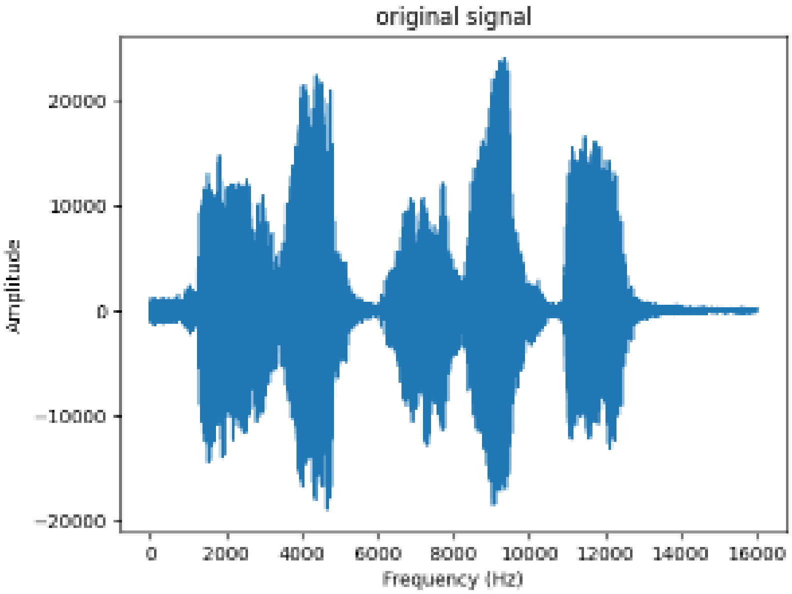
Sentence 3: “B C D F G H K L M N”
FREQUENCY 2000Hz

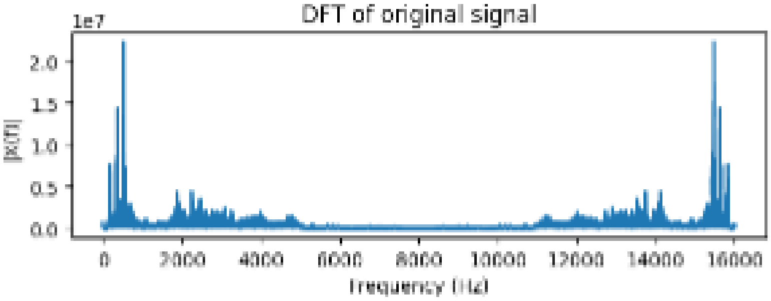


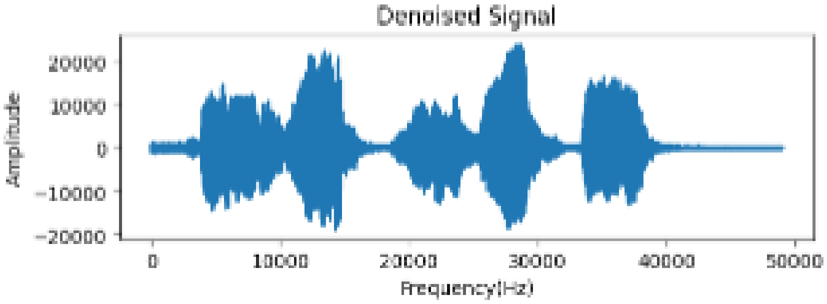
Sentence 4: “A B C D E F G H I K L M N O”
FREQUENCY 2000Hz



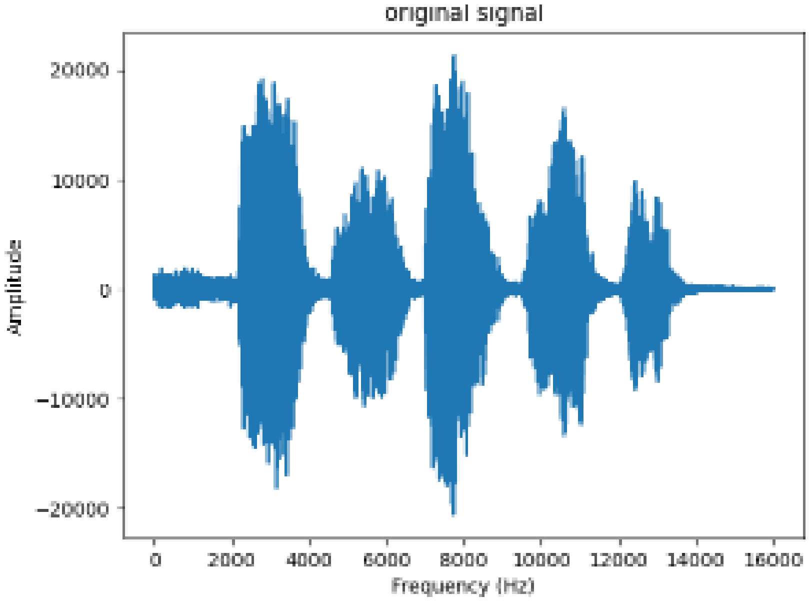
Sentence 1: “D F G H K”
FREQUENCY 16000Hz

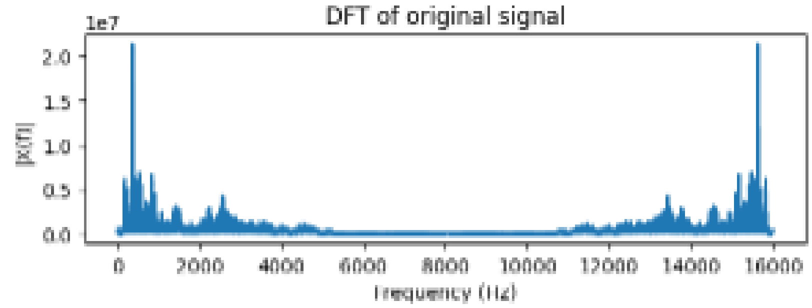

original signal

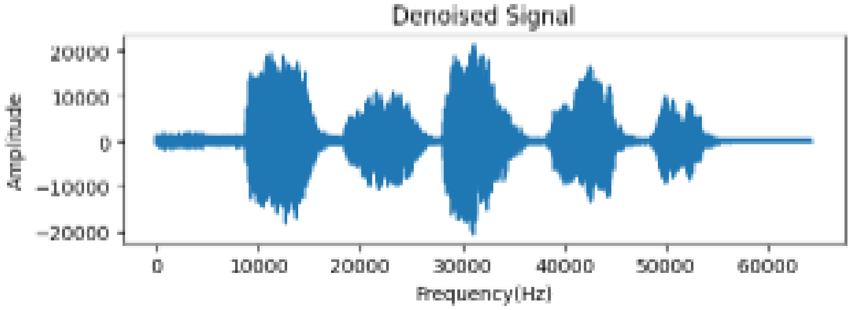

DFT of original signal


Denoised Signal

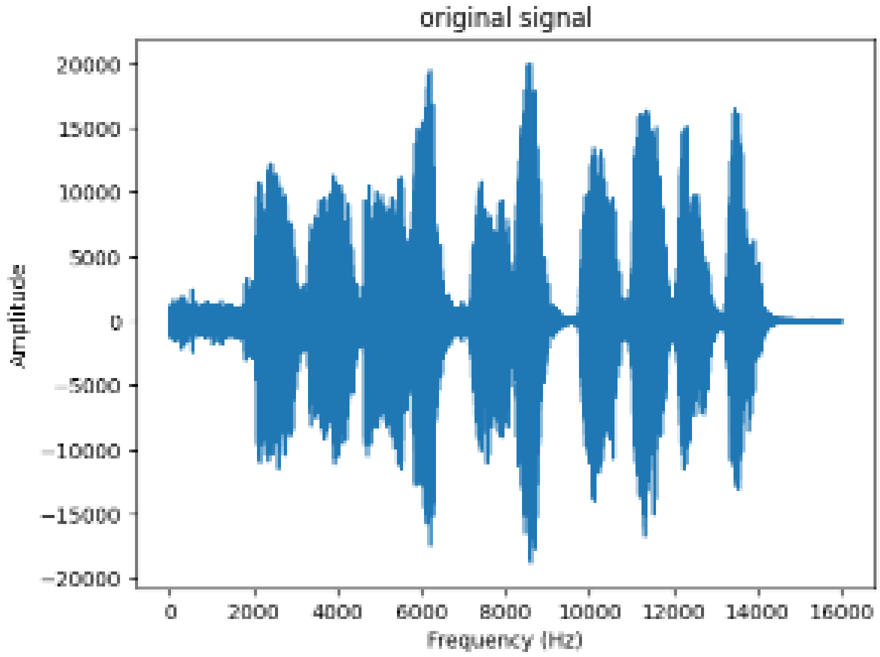
Sentence 2: “A E I O U”
FREQUENCY 16000Hz

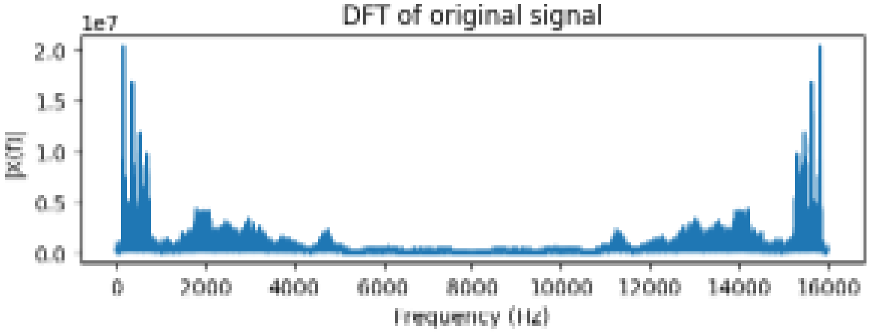

original signal

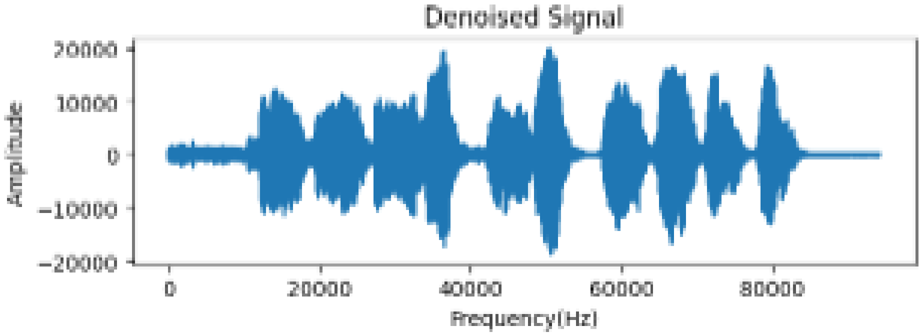

DFT of original signal


Denoised Signal

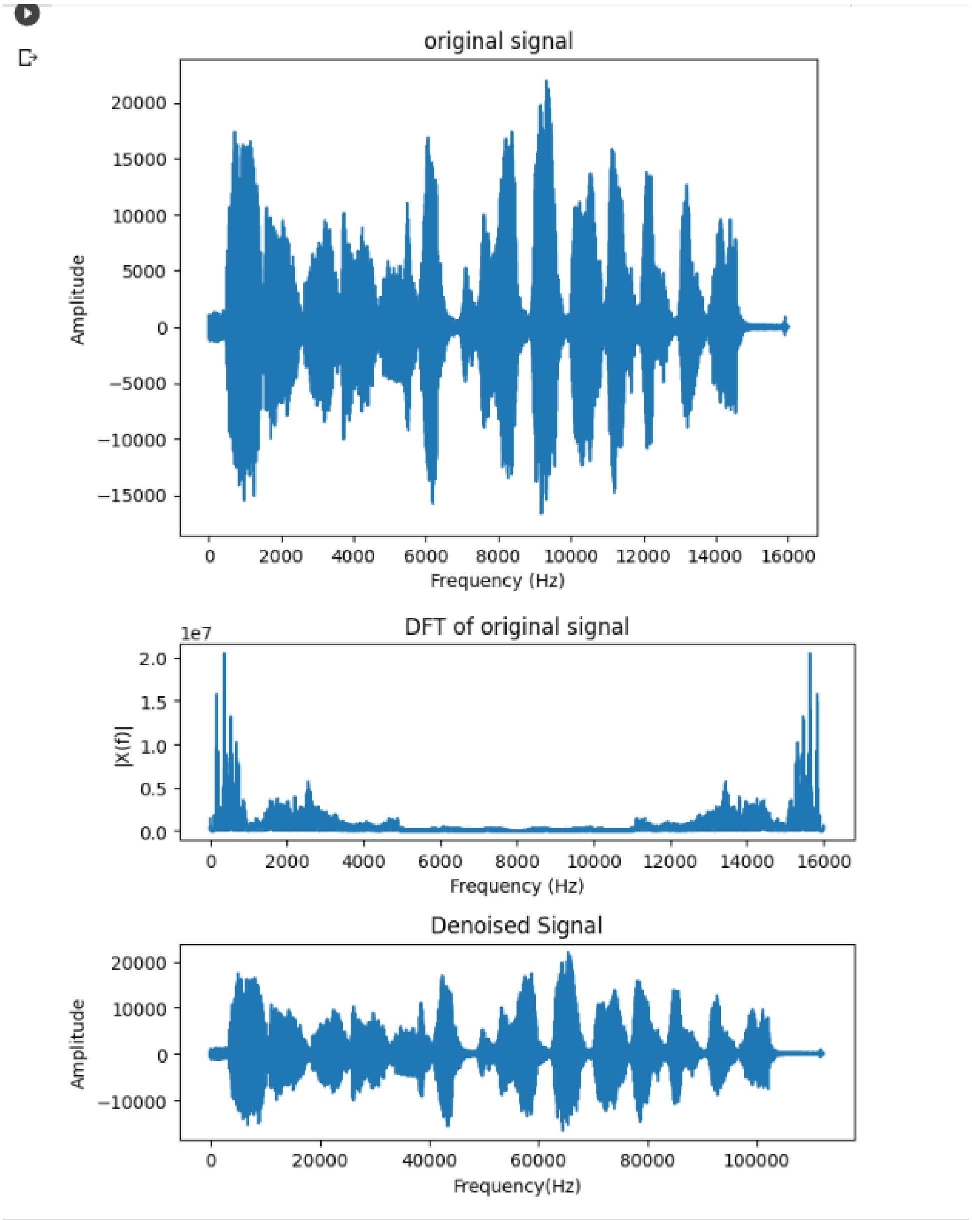
Sentence 3: “B C D F G H K L M N”
FREQUENCY 16000HZ







Sentence 4: “A B C D E F G H I K L M N O”
FREQUENCY 16000Hz



original signal

DFT of original signal

Denoised Signal

ANALYZING THE FREQUENCIES PRESENT IN OUR RECORDINGS….

The output graph for the given code includes three plots, which are:

1. The plot of the original signal, which shows the amplitude of the signal as a function of frequency in Hz.
2. The plot of the magnitude of the discrete Fourier transform (DFT) of the original signal, which shows the frequency spectrum of the signal.
3. The plot of the denoised signal, which shows the amplitude of the signal as a function of time.

SOME INTERESTING OBSERVATIONS ABOUT THE PLOTS:-

- The original signal plot shows a clear pattern with some noise. This pattern may represent some underlying structure in the signal.
- The DFT plot of the original signal shows several frequency components with different magnitudes. The frequency components with higher magnitudes may represent the dominant frequencies in the signal.
- The denoised signal plot shows a smoother version of the original signal, with less noise. This suggests that the wavelet denoiser effectively removed some of the noise in the signal while preserving its underlying structure.
- The denoised signal plot also shows some oscillations in the beginning and end of the signal. These oscillations may be due to the edge effects of the wavelet transform, which can introduce artifacts near the boundaries of the signal.
- The 500Hz sampled rate frequency has less resolution and the 16000Hz sampled rate signal has more resolution.
- At less sampled frequency of 500Hz, highest peaks of DFT are closer to each other while at high sampled frequency, higher frequency peaks are far apart.
- Plots are mirror images(symmetrical) at center.A high sample rate along with a high bit depth or sample format will deliver the best audio quality.