Marwadi University Marwadi Chandarana Group NAAC A+	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: DSIP (01CT1513)	**AIM: Perform audio convolution**	
Experiment No: 02-open handed	**Date:**	**Enrolment No: 92301733046**

Code:

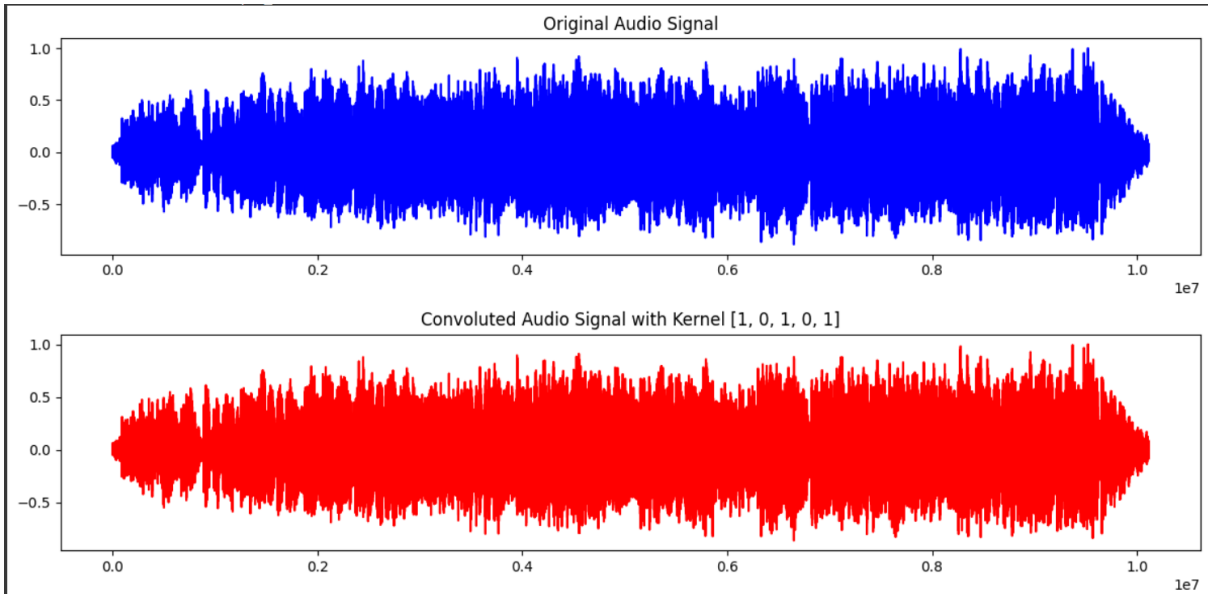
```
from pydub import AudioSegment
import numpy as np
import matplotlib.pyplot as plt
from scipy.signal import convolve

# Load MP3 file
audio = AudioSegment.from_mp3("/content/Yeh Jeevan Hai (Piya Ka Ghar) - (Raag.Fm).mp3")
# Convert to mono and extract raw samples

audio = audio.set_channels(1)
samples = np.array(audio.get_array_of_samples()).astype(np.float32)

# Define convolution kernel
kernel = np.array([1, 0, 1, 0, ], dtype=np.float32)

# Perform convolution
convoluted = convolve(samples, kernel, mode='same')

# Normalize to int16 range for saving
convoluted = convoluted / np.max(np.abs(convoluted))
convoluted_int16 = (convoluted * 32767).astype(np.int16)

# Save as WAV using PyDub
convoluted_audio = AudioSegment(
convoluted_int16.tobytes(),
```

Marwadi University Marwadi Chandarana Group NAAC A+	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: DSIP (01CT1513)	**AIM: Perform audio convolution**	
Experiment No: 02-open handed	**Date:**	**Enrolment No: 92301733046**

```
frame_rate=audio.frame_rate,
sample_width=2, # 16-bit samples = 2 bytes
channels=1
)

# Export to file
convoluted_audio.export("output_convoluted.wav", format="wav")
print("Convoluted audio saved as 'output_convoluted.wav'.")

# Plot original and convoluted signals (optional)
samples_norm = samples / np.max(np.abs(samples))
convoluted_norm = convoluted

plt.figure(figsize=(12, 6))
plt.subplot(2, 1, 1)
plt.plot(samples_norm, color='blue')
plt.title("Original Audio Signal")
plt.subplot(2, 1, 2)
plt.plot(convoluted_norm, color='red')
plt.title("Convoluted Audio Signal with Kernel [1, 0, 1, 0, 1]")
plt.tight_layout()
plt.show()
```

Marwadi University Marwadi Chandarana Group NAAC A+	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**	
Subject: DSIP (01CT1513)	**AIM: Perform audio convolution**	
Experiment No: 02-open handed	**Date:**	**Enrolment No: 92301733046**

Output:



Conclusion:

In this experiment, we altered the waveform of an audio signal by performing convolution on it using a predefined kernel. We showed how convolution can be used to change audio properties by first converting the audio to mono, then extracting its samples, and finally applying the convolution operation. The outcome, which displayed observable variations in waveform shape, was saved as a new WAV file and displayed alongside the original signal. This demonstrates how convolution can be used practically in digital audio processing for sound effects like echo and filtering.