Marwadi University Faculty of Engineering and Technology Department of Information and Communication Technology	
Subject: DSIP (01CT1513)	**AIM(Open Handed Assignment) Perform audio convolution**
Experiment No: 02	**Date:12/08/2025** **Enrolment No: 92301733054**

Code:

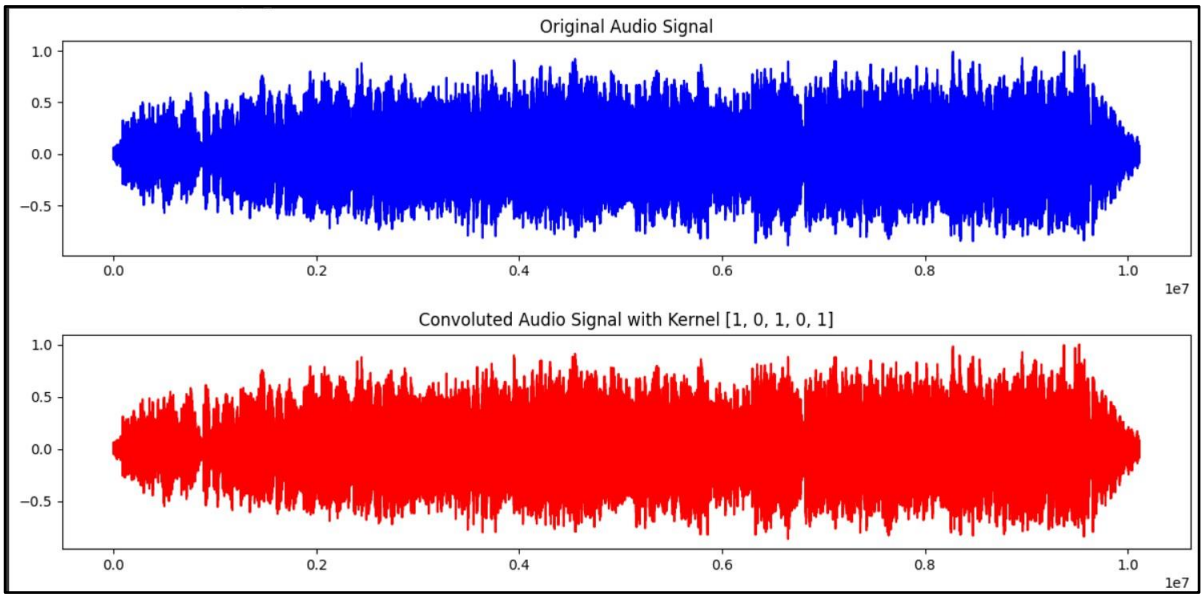
```
from pydub import AudioSegment
import numpy as np
import matplotlib.pyplot as plt
from scipy.signal import convolve

# 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(),
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()
```

Output:



Conclusion: This experiment showed that convolution can modify audio waveforms, producing effects like echo and filtering. By converting audio to mono, extracting samples, and applying a predefined kernel, we created and compared altered and original signal.