LAPORAN TUGAS PENGOLAHAN SINYAL DIGITAL
“FILTER DAN ANALISA SUARA KUCING DAN ANJING”

Oleh:

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GitHub:

https://github.com/Blindheroes/FILTER_DAN_ANALISA_SUARA_KUCING_DAN_ANJING.git

Sumber dataset:

https://www.kaggle.com/datasets/mmoreaux/audio-cats-and-dogs

Langkah 1: Prepare Library dan File Audio

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.io import wavfile
from scipy.fft import fft, ifft
from IPython.display import Audio

sample_rate, data = wavfile.read("cat_2.wav")

data = data.astype(float)
```

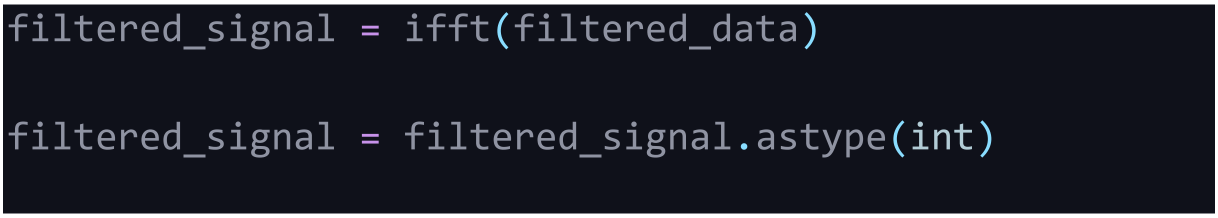
Langkah 2: Menghitung Transformasi Fourier Cepat (FFT)

```
signal_length = len(data)
fft_data = fft(data)
```

Langkah 3: Filtering

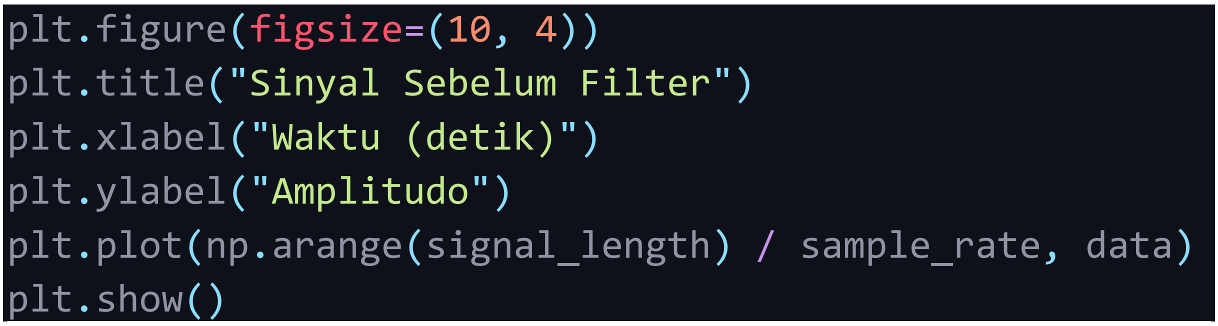
```
frequencies = np.linspace(0.0, sample_rate, signal_length)

dog_frequency = 500
cat_frequency = 2000

dog_index = np.abs(frequencies - dog_frequency).argmin()
cat_index = np.abs(frequencies - cat_frequency).argmin()

filtered_data = np.copy(fft_data)

filtered_data[:dog_index] = 0
filtered_data[cat_index:] = 0
```

Langkah 4: Transformasi Fourier Cepat Balik (Inverse FFT)

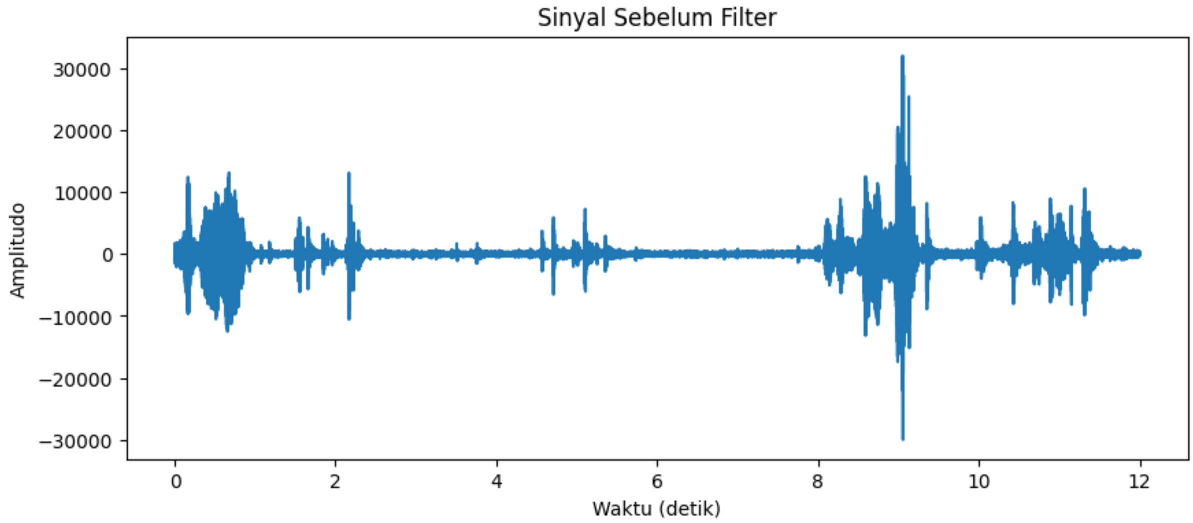


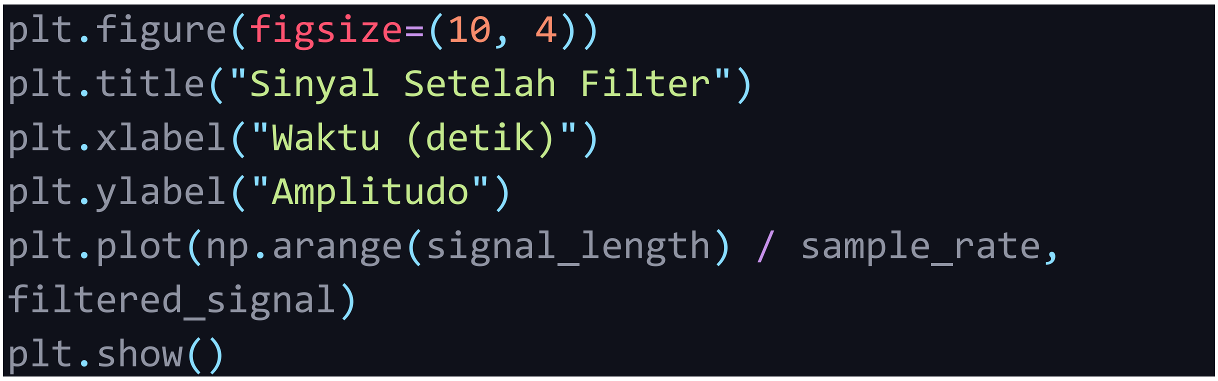
```
filtered_signal = ifft(filtered_data)

filtered_signal = filtered_signal.astype(int)
```

Langkah 5: Visualisasi

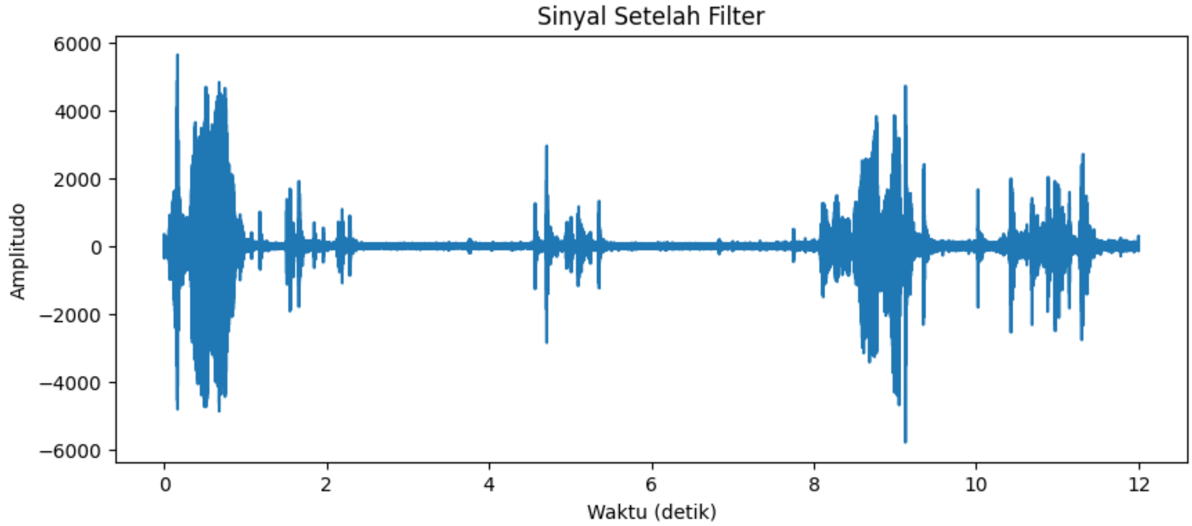


```
plt.figure(figsize=(10, 4))
plt.title("Sinyal Sebelum Filter")
plt.xlabel("Waktu (detik)")
plt.ylabel("Amplitudo")
plt.plot(np.arange(signal_length) / sample_rate, data)
plt.show()
```





```
plt.figure(figsize=(10, 4))
plt.title("Sinyal Setelah Filter")
plt.xlabel("Waktu (detik)")
plt.ylabel("Amplitudo")
plt.plot(np.arange(signal_length) / sample_rate,
filtered_signal)
plt.show()
```



Langkah 6: Output Pemutar Audio

```
# Memainkan file audio asli
wavfile.write("filtered_output.wav", sample_rate,
filtered_signal)

Audio(data, rate=sample_rate)
# Memainkan file audio yang telah difilter
filtered_audio = wavfile.read("filtered_output.wav")
Audio(filtered_audio[1], rate=sample_rate)
```

Langkah 7: Analisis suara (anjing atau kucing)

```
dog_amplitude =
np.max(np.abs(filtered_signal[:dog_index]))
cat_amplitude =
np.max(np.abs(filtered_signal[cat_index:]))

if dog_amplitude > cat_amplitude:
    print("Suara hasil adalah suara anjing.")
else:
    print("Suara hasil adalah suara kucing.")
```