

Signal Processing with CNNs

Mike Roberts

PyData Bristol / 2023-06-15

My background

- 17 years in Academic publishing
- Experience in NLP and time series forecasting
- Data Science MSc

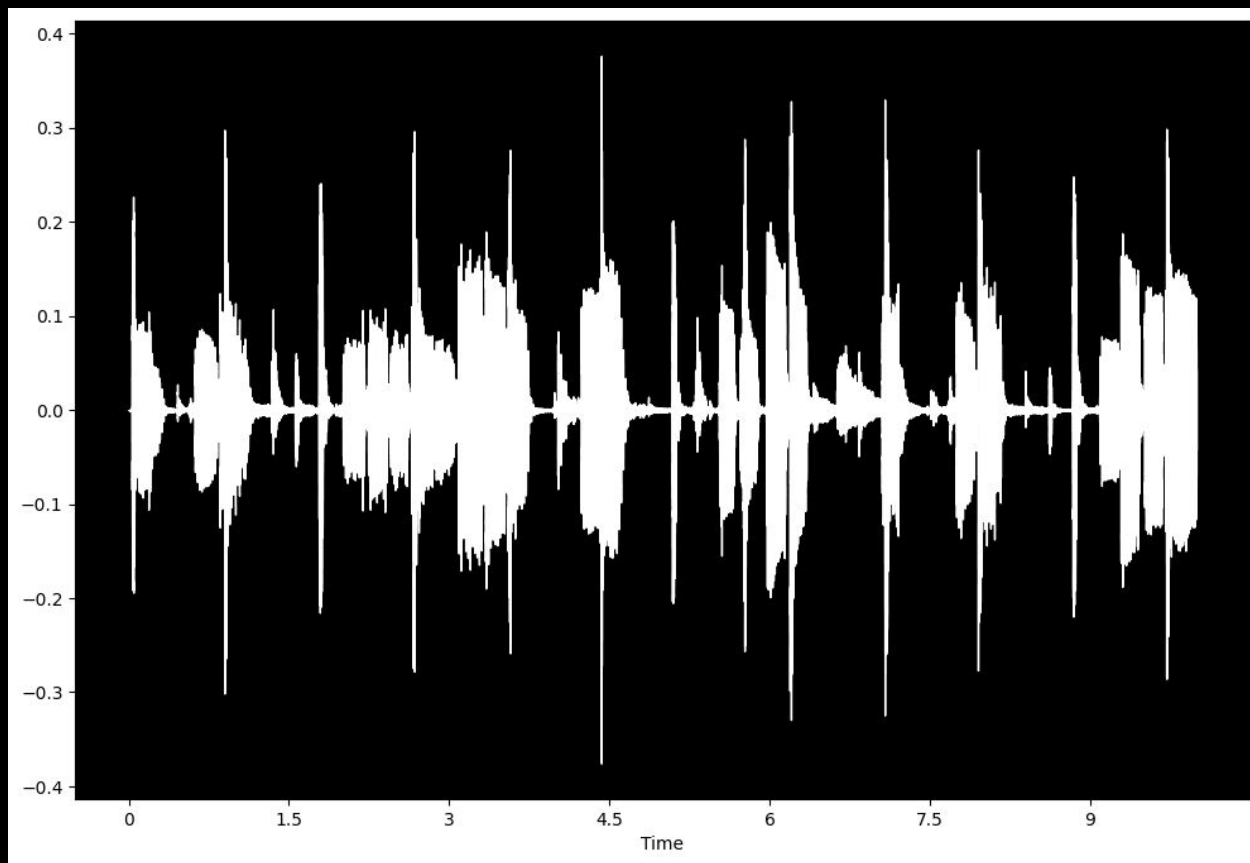
Why this topic?

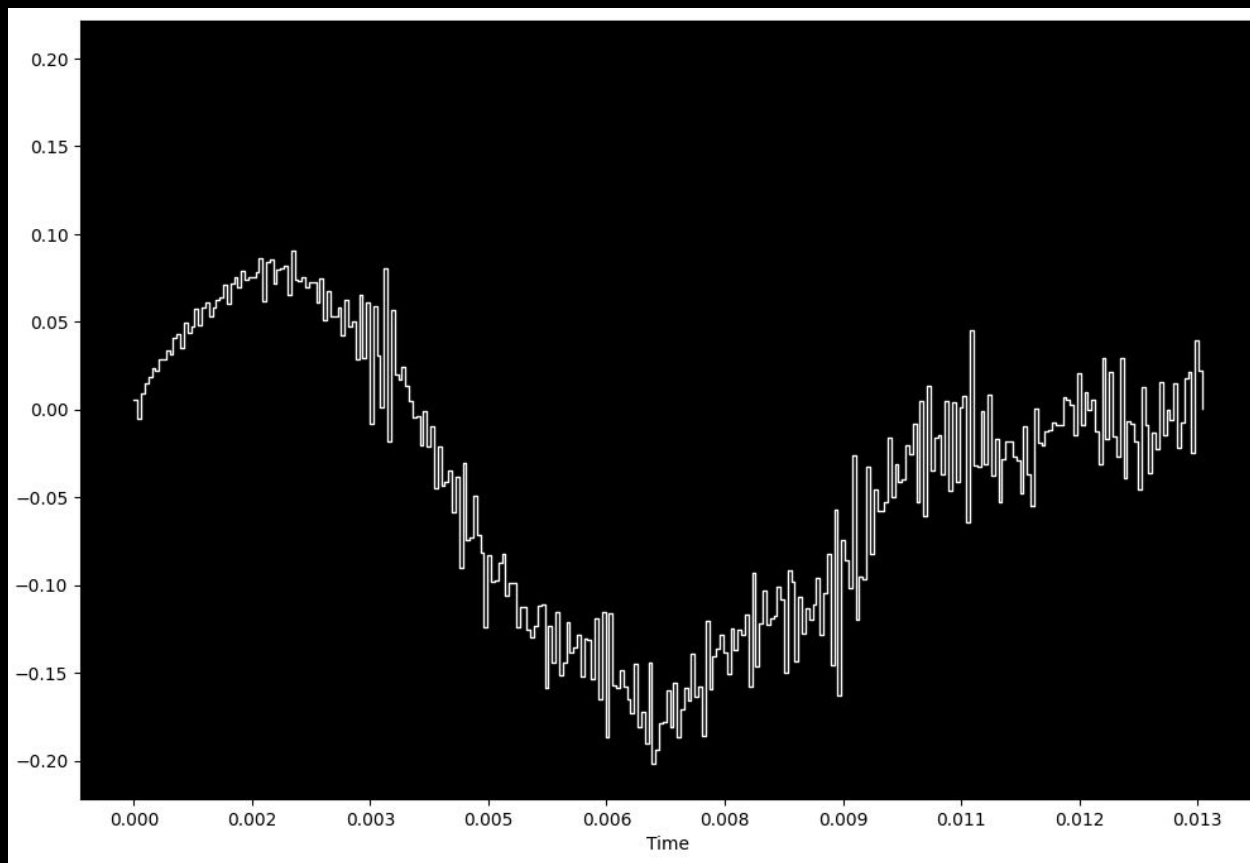
- Segment Boundary Detection in Music
- State-of-the-art algorithm uses CNNs

Audio data

CD quality sample rate : 44.1 kHz, 16-bit stereo

10MB / minute



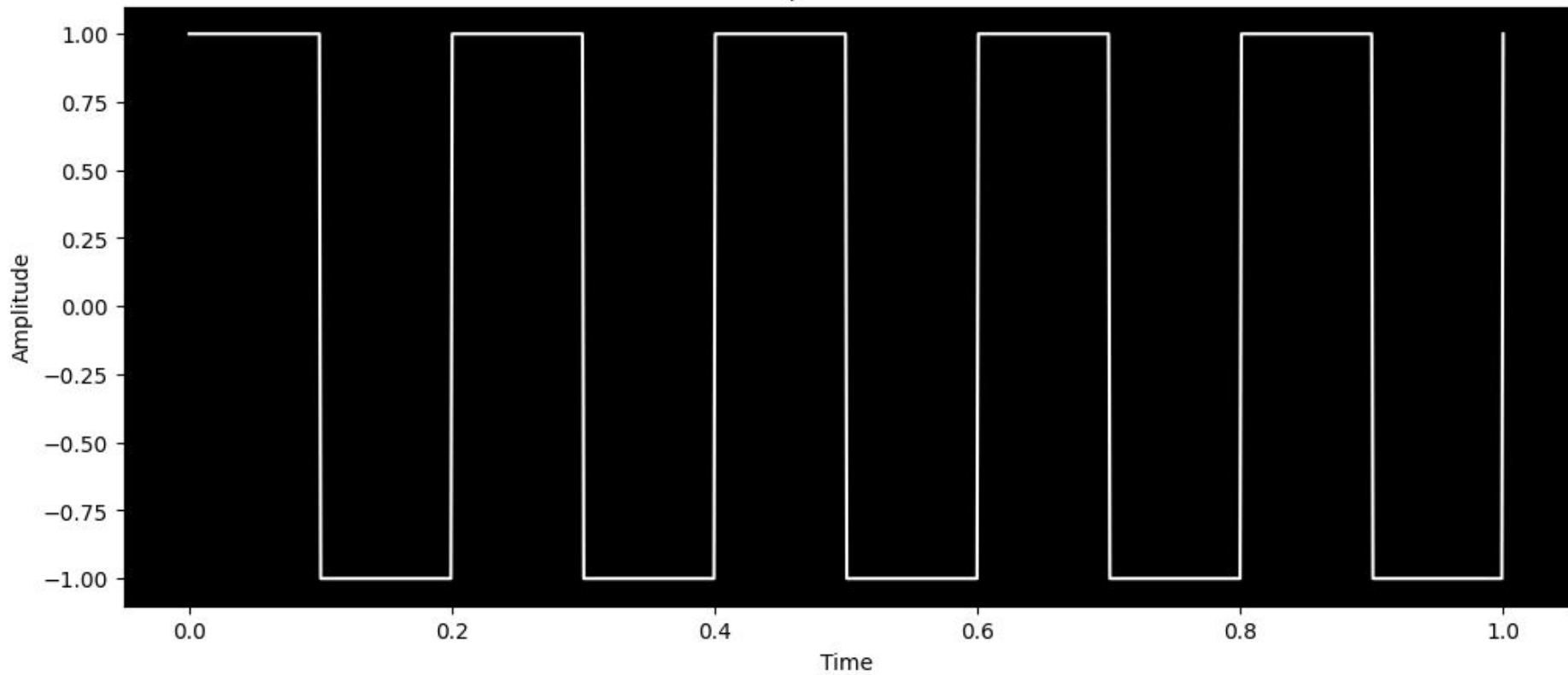


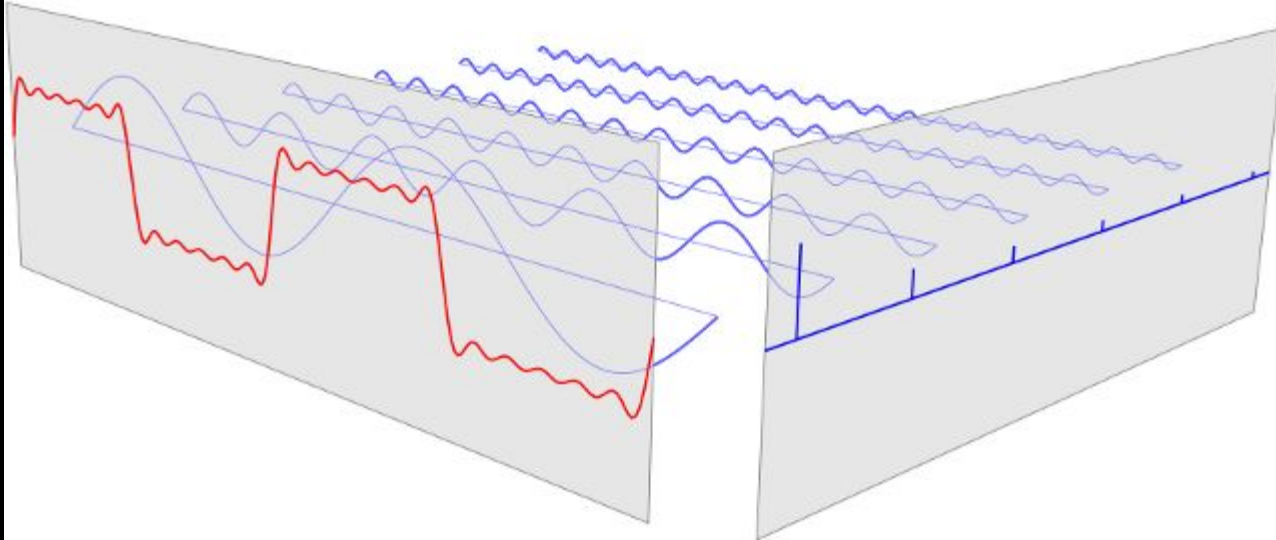
Changing the
problem domain

Fourier Transform

A periodic signal can be decomposed to the sum of a set of sine and cosine waves.

Square wave





<https://tex.stackexchange.com/a/127722>

Discrete Short-Time Fourier Transform

Fourier transformation of overlapping slices of the original signal

Original waveform



Log-frequency power spectrogram

