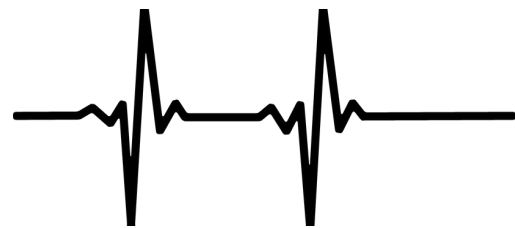
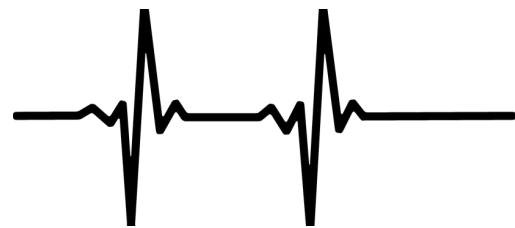
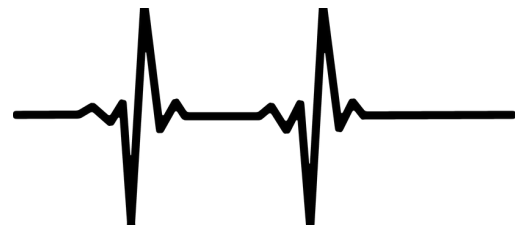


SIGNAL PROCESSING: CARDIAC CLASSIFICATION

Author: Calvin Chan



INTRODUCTION



What are electrocardiograms (ECGs)?

A record of the electrical signals in the heart

- 12 lead

Why are they useful?

It can capture the physiological state of the heart in a simple procedure (irregular beats, risk of heart attack, etc.)

DOCTORS MAKE MISTAKES TOO!

A META-ANALYSIS IN 2020 FOUND THAT THE ACCURACY OF ECG INTERPRETATIONS BY PHYSICIANS AND MEDICAL STUDENTS OF VARIOUS TRAINING RANGED FROM 4% TO 95%

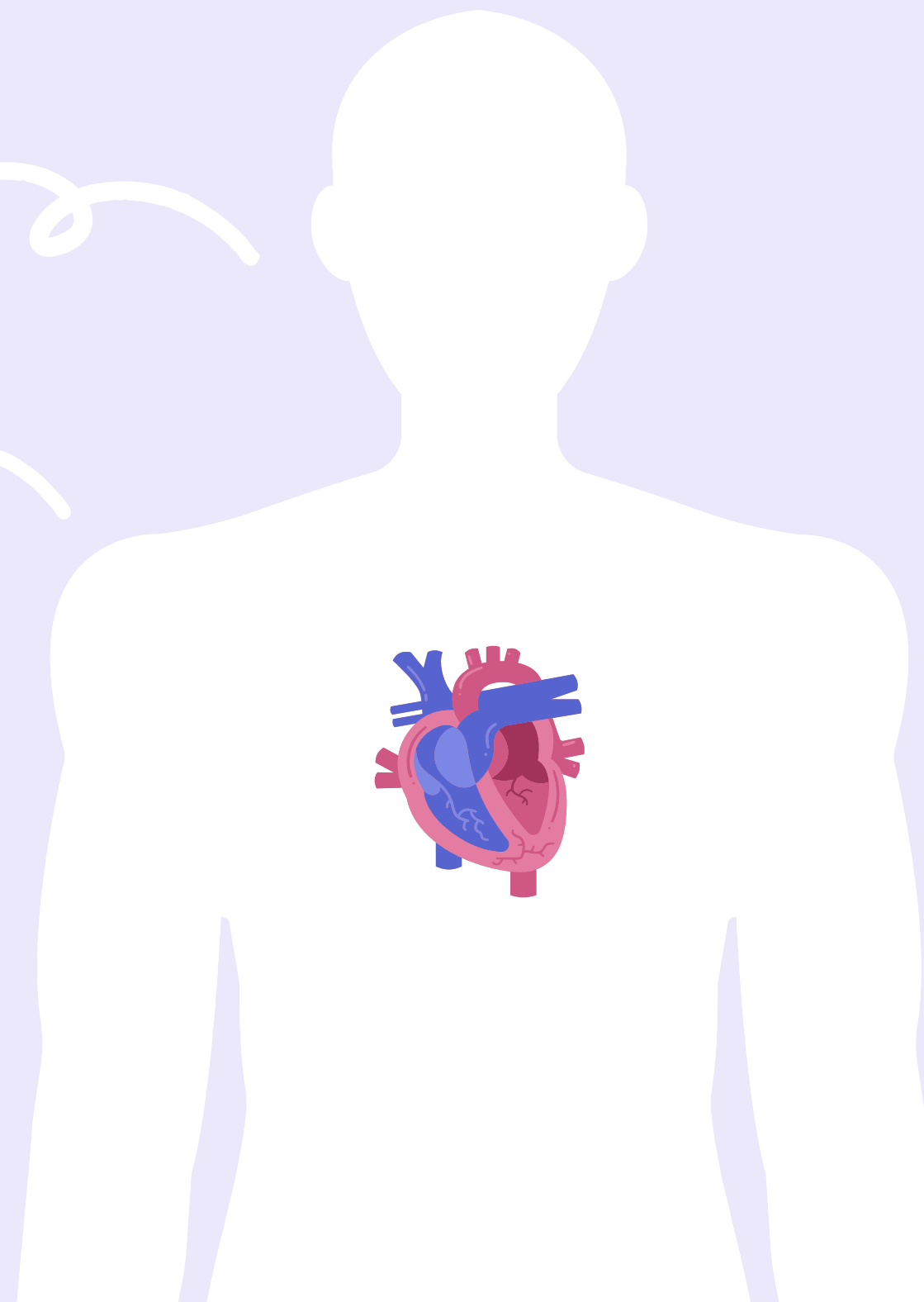
Even amongst cardiologist the average accuracy was only around 75%

CLASSIFYING ECG SIGNALS USING DATA SCIENCE TECHNIQUES

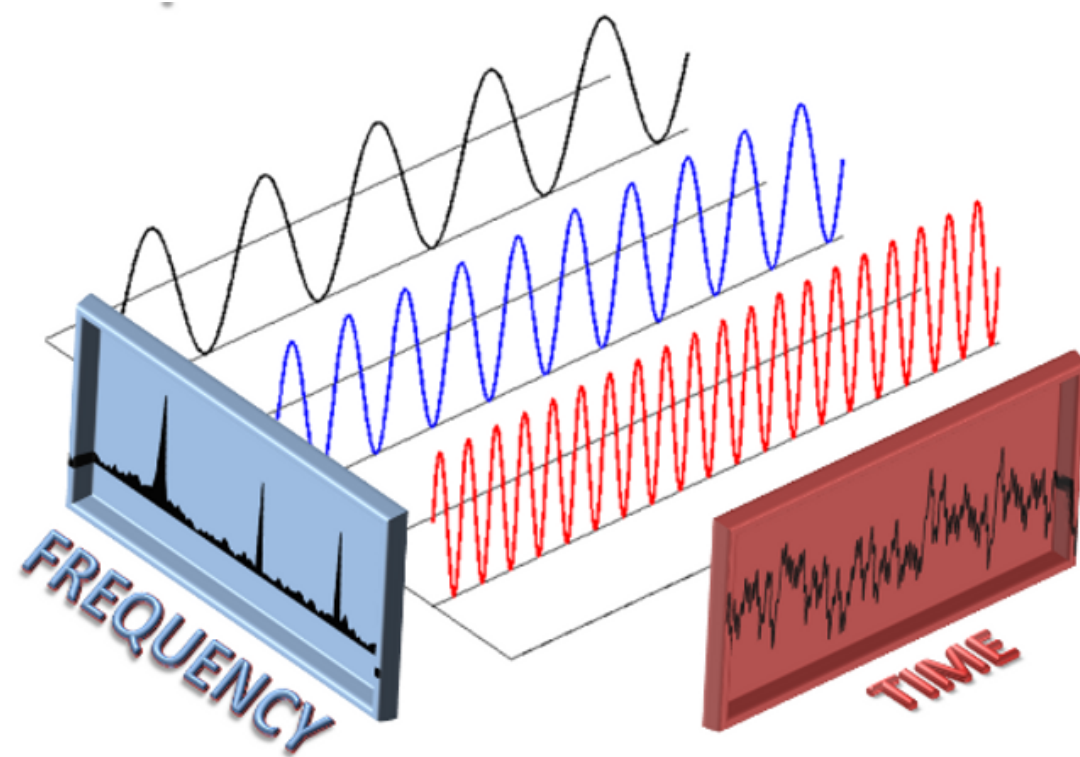
**TRAINING MODELS TO
LOOK FOR PATTERNS
AND WAVEFORMS**

**INCREASING DIAGNOSTIC
ACCURACY FOR
PHYSICIANS AND
MEDICAL STUDENTS**

**EARLY DETECTION
THROUGH TECHNOLOGICAL
APPLICATIONS**



EXPLORING THE DATA



Source

PTB-XL (PhysioNet)

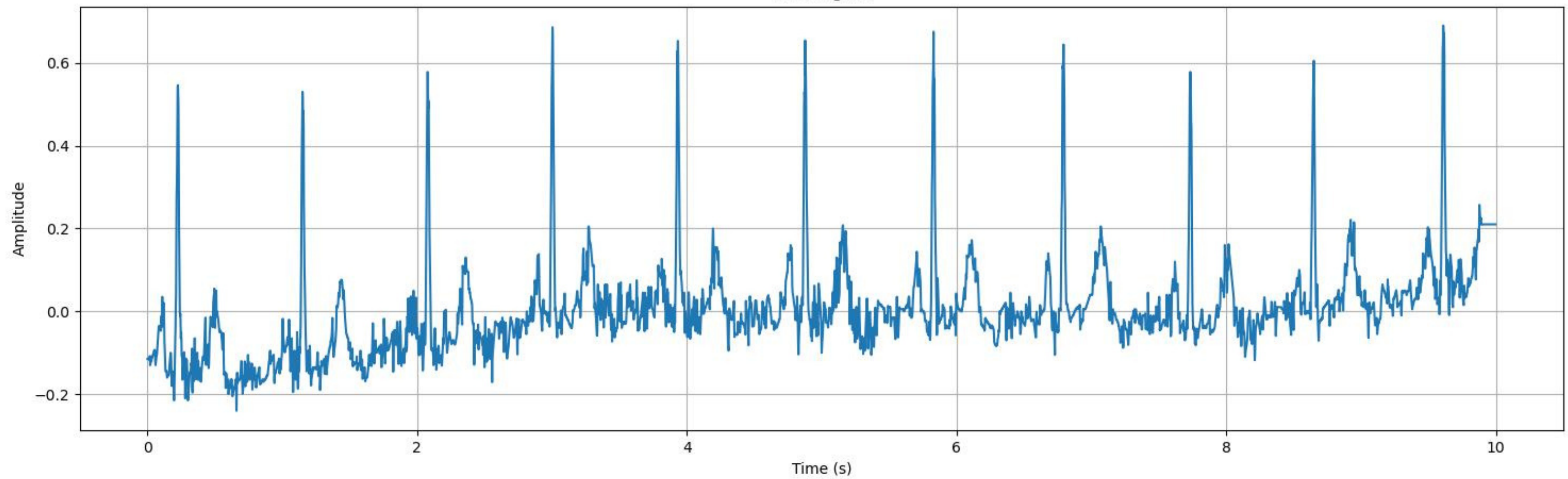
- Contains 21799 clinical 12-lead ECG recordings of 18869 patients
- Metadata including patient information (age, weight, height)

Fourier Transforms

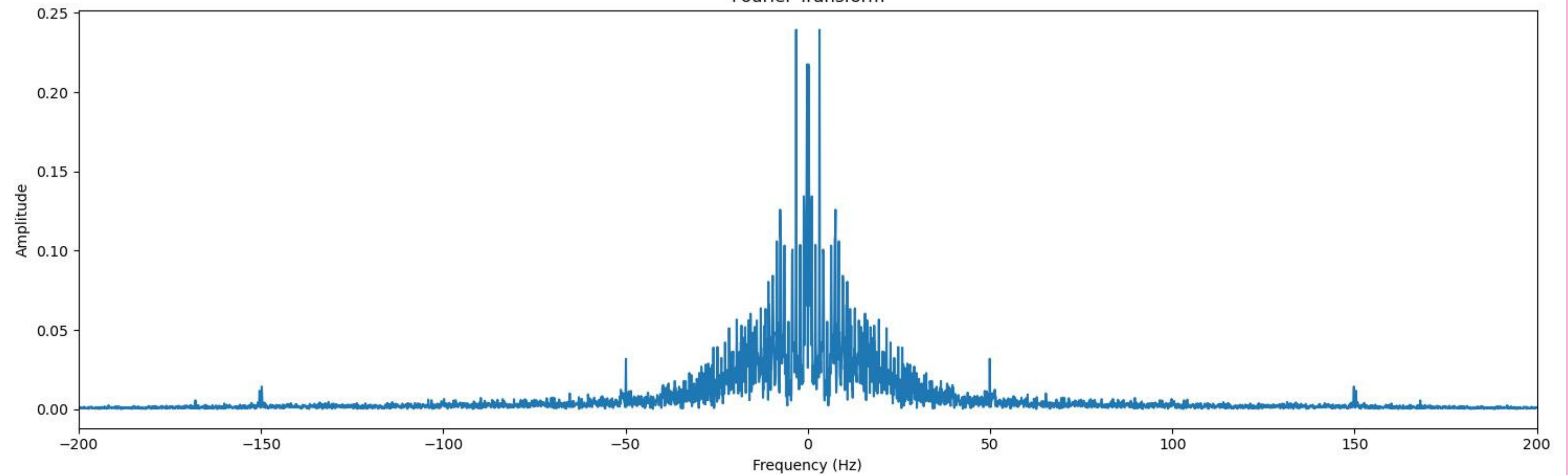
- Looking at time series data in terms of frequency

Record 00001_hr Lead I

ECG Signal



Fourier Transform



WHAT NEXT?

- 01 Metadata cleaning
- 02 Signal denoising
- 03 Fourier Analysis
- 04 Model Selection

