SIGNAL & DATA ANALYTICS IN IoMT
Tech-in-Med Summer Camp

PREMANANDA INDIC, PH.D.

DEPARTMENT OF ELECTRICAL ENGINEERING

NSF Award OAC-1924117: Easy-Med: Interdisciplinary Training in Security, Privacy-Assured Internet of Medical Things

The University of Texas at TYLER Center for Health Informatics & Analytics

Research Design & Data Analysis Lab
Office of Research, Scholarship, and Sponsored Programs

OUTLINE

1. Different physiological signals
2. Features of the signals associated with health
3. Differentiating signals and data
5. Development of algorithms
6. Processing of signals
7. Data analytics
8. Converting algorithms into software code
9. Embedding the code in the sensors.

TYPES OF SIGNALS

- DISCRETE VS CONTINOUS

- EXAMPLES:

Blood Pressure, Heart Rate, Pulse Rate, SpO2, electrocardiogram, electroencephalogram.

GOALS OF ANALYSIS

- DIAGNOSTICS
- PREDICTION
- UNDERSTANDING FUNDAMENTAL PHYSIOLOGICAL MECHANISMS

FEATURES

- STATISTICAL (Mean, Variance, Skewness, Kurtosis)
- SPECTRAL (Amplitude, Frequency, Power. Coherence)

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- STATISTICAL (Mean, Variance, Skewness, Kurtosis)
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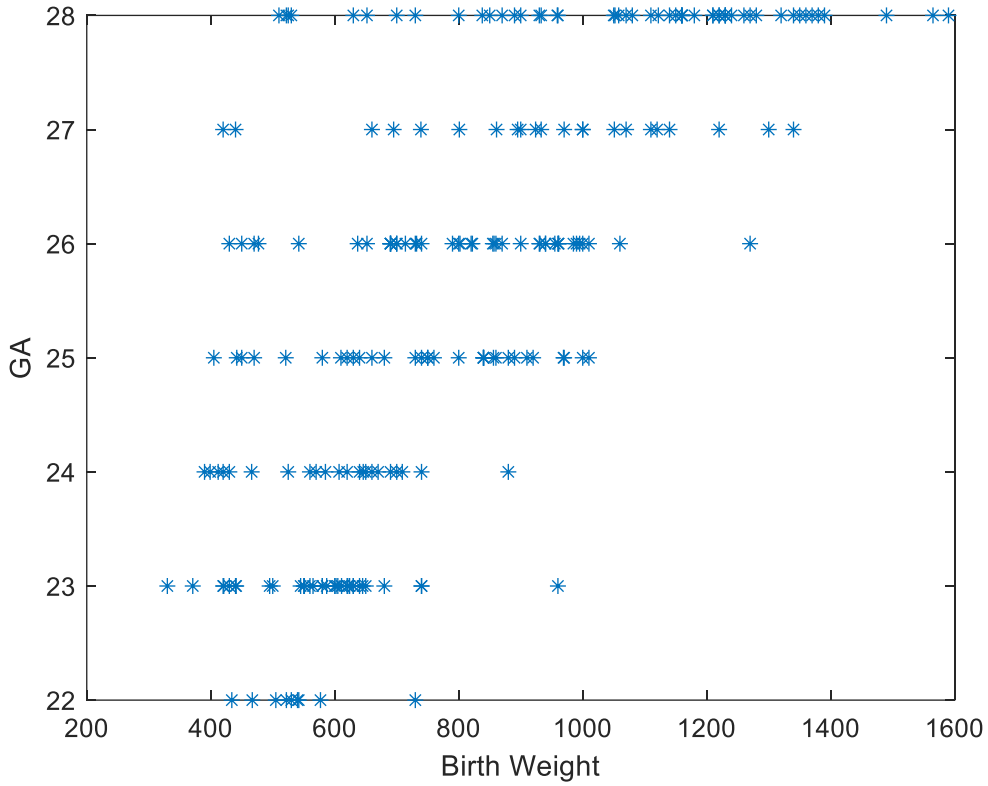
Exercise 1

To test the hypothesis that the birth weight of preterm infants associated with the gestational age.

Methods

Results

Conclusions



Correlation $r = 0.69$ $p < 0.05$

Exercise 2

To test the hypothesis that the more male infants are born premature than the female infants.

Methods

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Exercise 3

To test the hypothesis that the level of prematurity is more among male infants than the female infants.

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FEATURES

- STATISTICAL (Mean, Variance, Skewness, Kurtosis)
- SPECTRAL (Amplitude, Frequency, Power, Coherence)

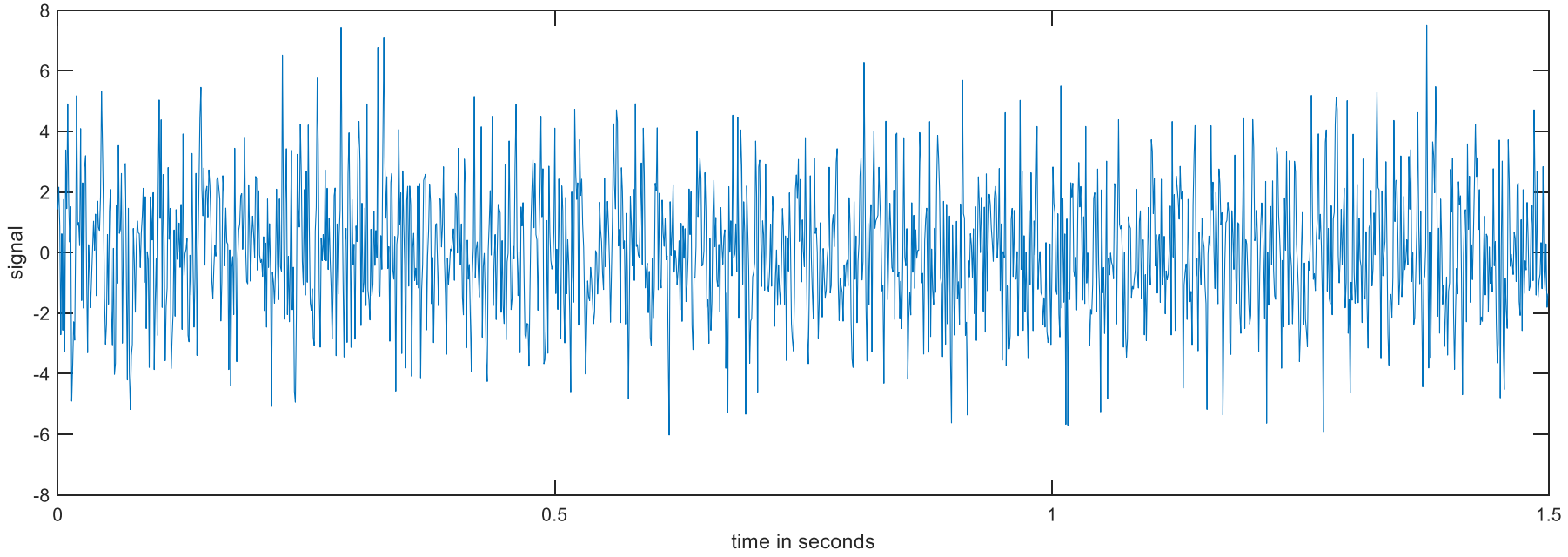
Exercise 4

To test the hypothesis that the given signal (signal.txt) has a unique frequency.

Methods

Results

Conclusions



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To test the hypothesis that the given signal has an unique frequency.

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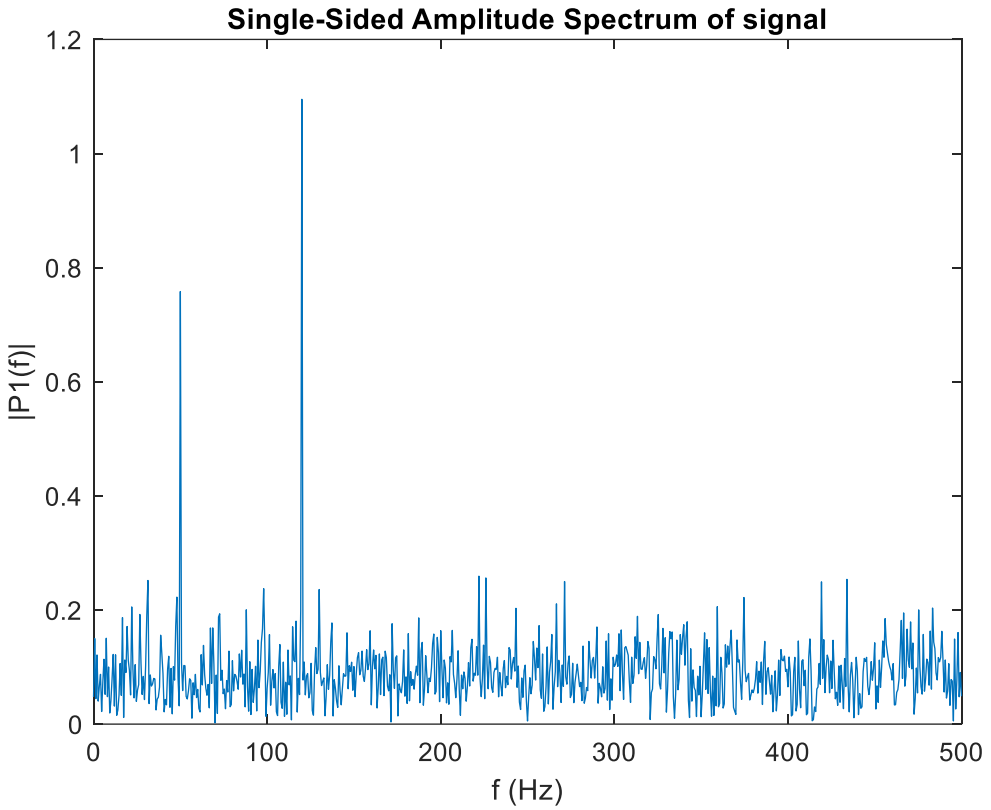
Conclusions



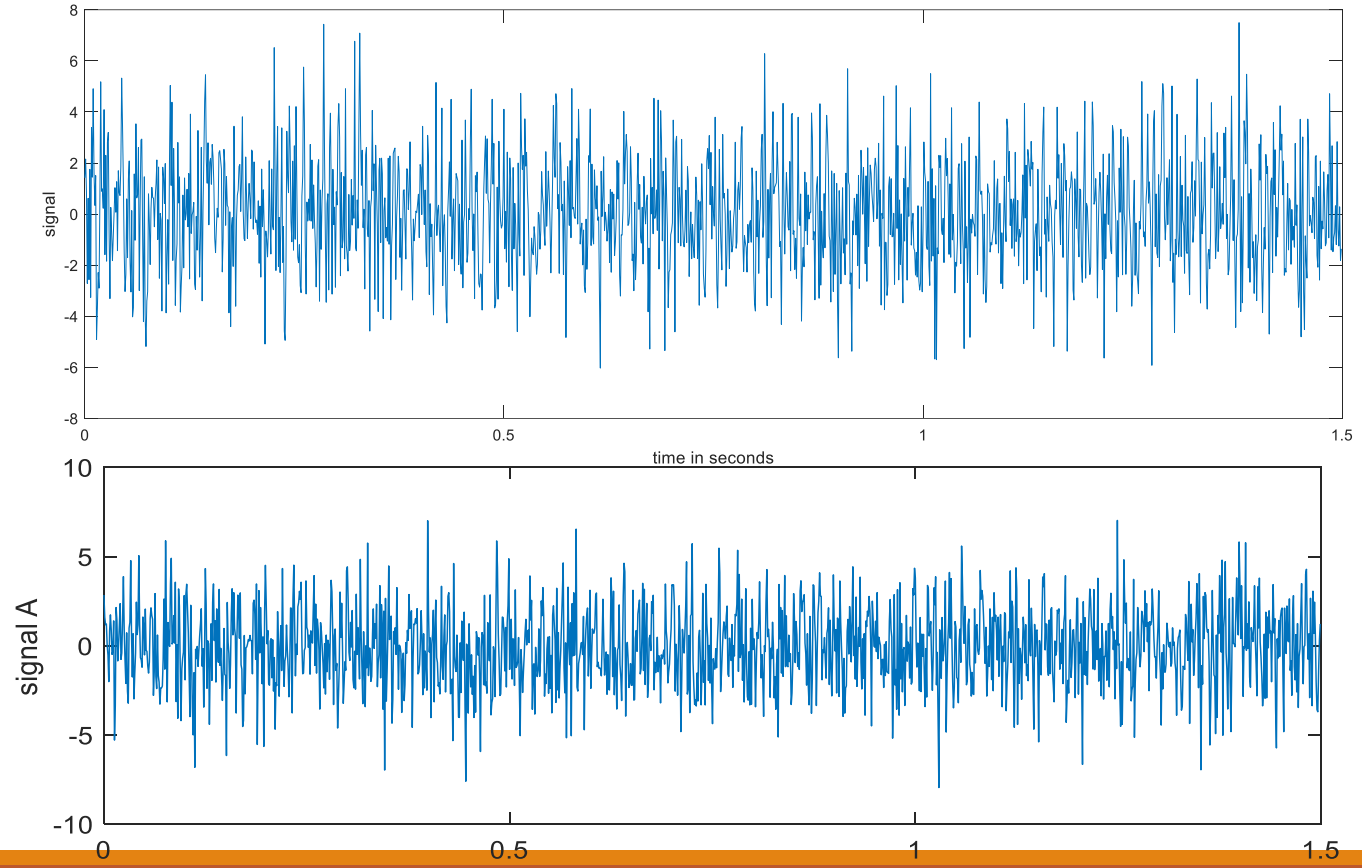
Exercise 5

To test the hypothesis that the previous signal has a relationship with signal A.

Methods

Results

Conclusions



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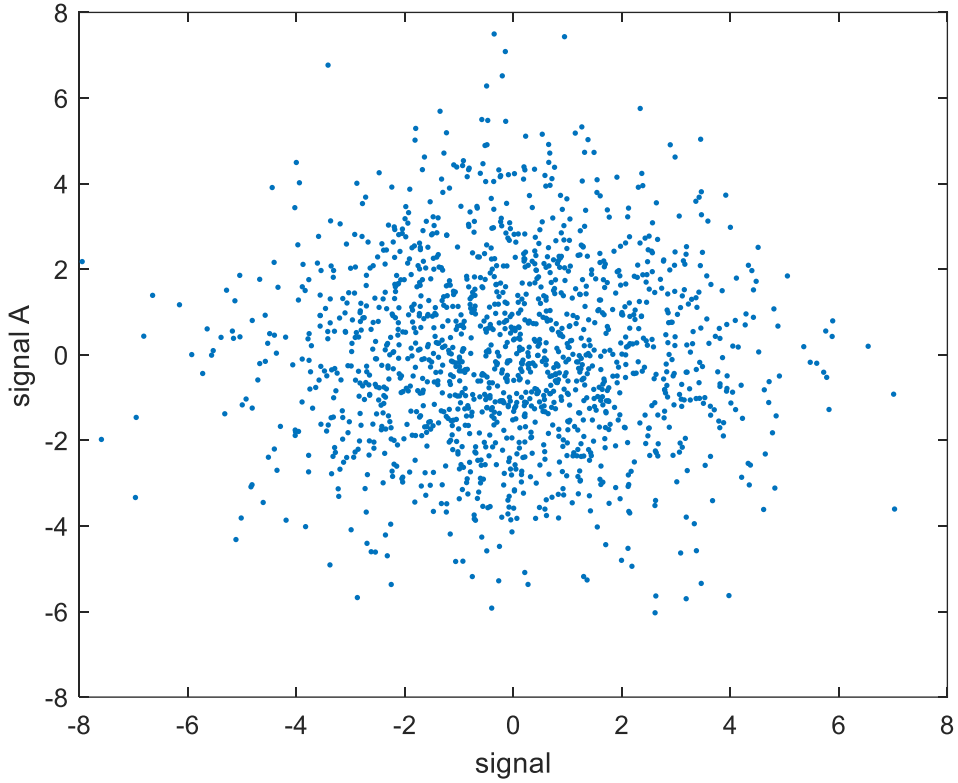

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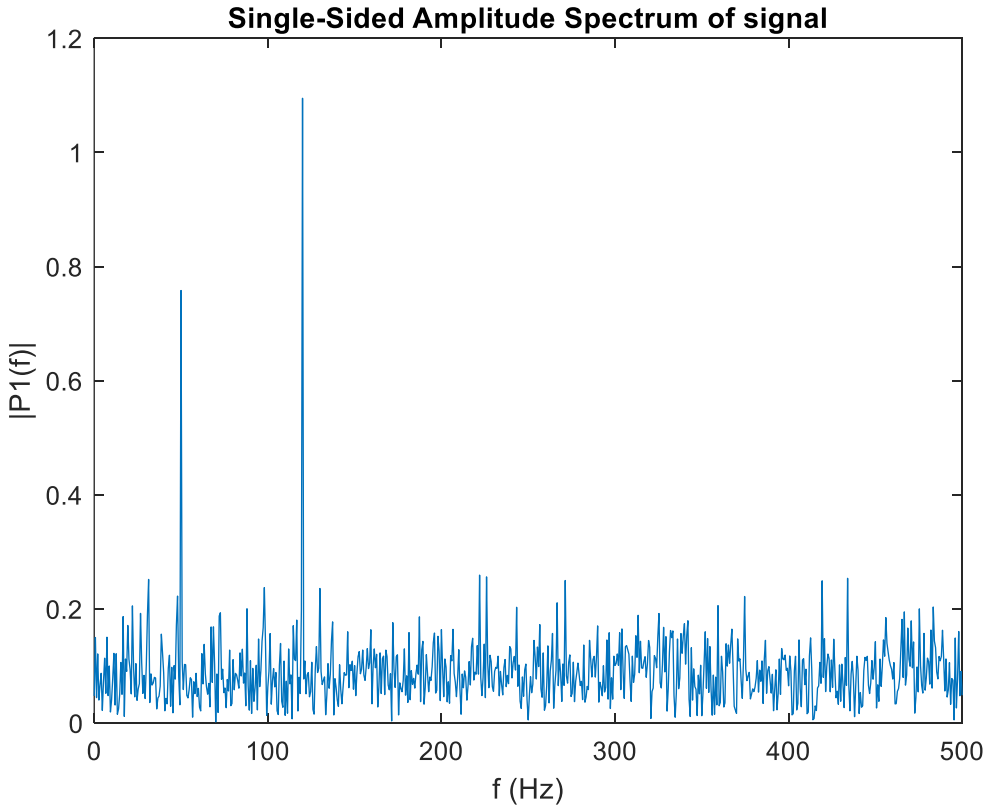

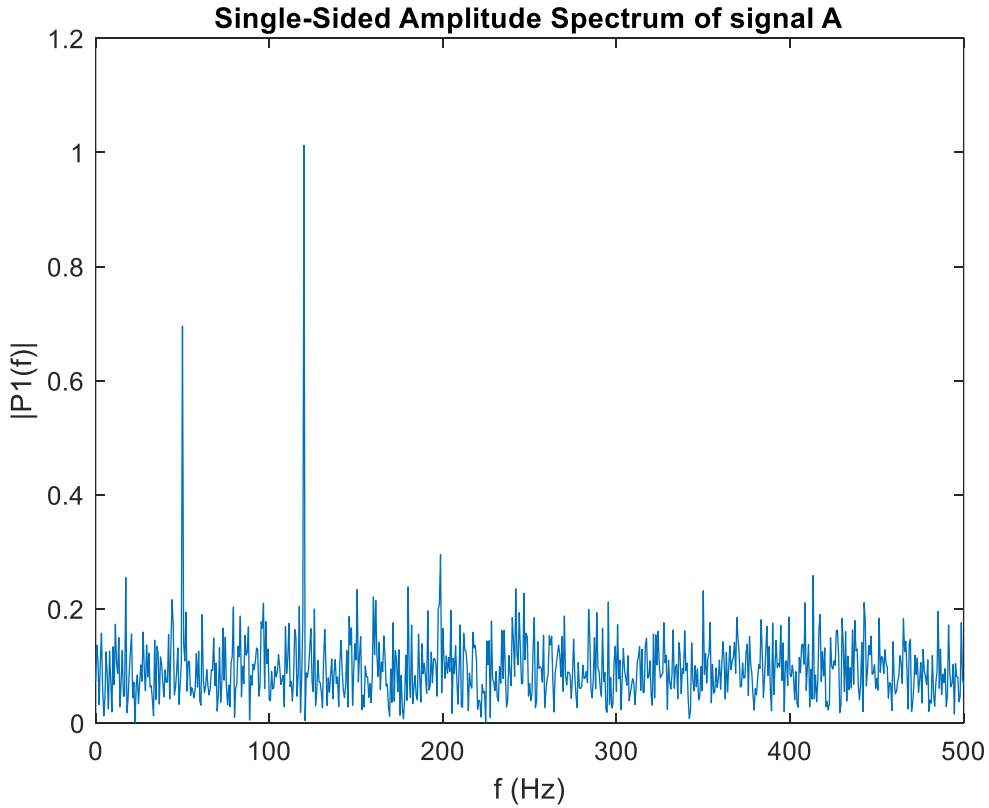

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