AJOU UNIV. 1973

# Data **Analysis**

## Final Project

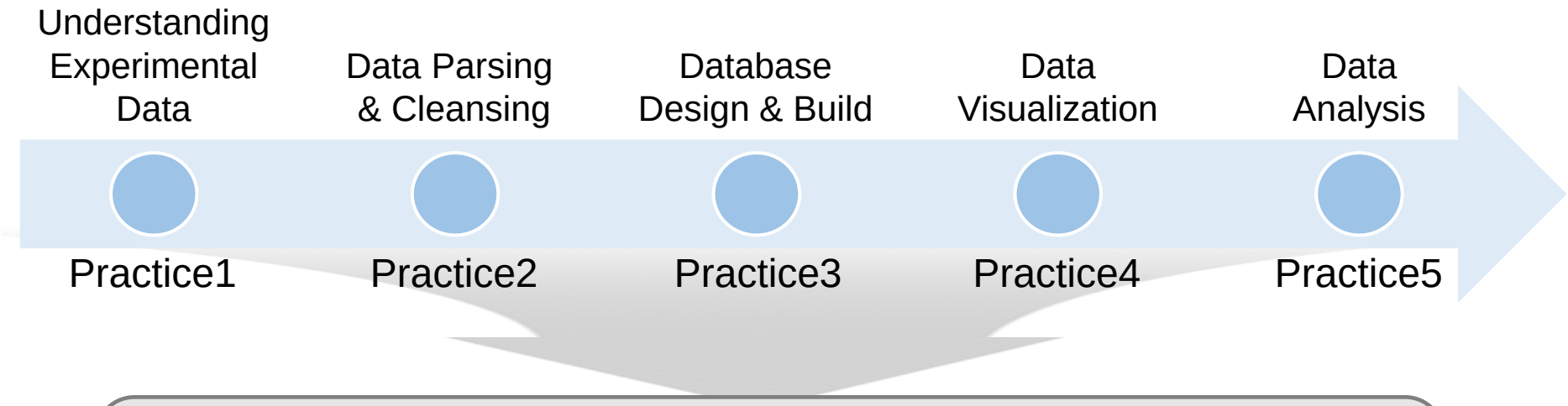
[2024-1] *Sensor Bigdata Processing*

2024.06.03

# Final Project Proposal



- Practice Roadmap




**Final Project**

- Comprehensive application of the contents learned during the semester
- Performing an overall analysis of the data provided in its initial shared state as an open dataset
- Applying relevant analytical techniques using the knowledge and methods from previous practices to accomplish individual data analysis goals.

# Time-series Sensor Dataset



- **Dataset 1** - Condition Monitoring of Hydraulic Systems
  - Condition assessment of a hydraulic test rig based on multi sensor data (https://www.kaggle.com/datasets/jjacostupa/condition-monitoring-of-hydraulic-systems)
  - Dataset File Format
    - Text File
  - 8 Sensor types
    - Pressure (PS1-6), Motor power (EPS1), Volume flow (FS1/2), Temperature (TS1-4), Vibration (VS1), Efficiency factor (SE), Virtual cooling efficiency (CE), Virtual cooling power(CP)
  - 5 Different Labels
    - Cooler condition, Valve condition, Internal pump leakage, Hydraulic accumulator, stable flag
  - Relevant Papers
    - [1] Helwig, Nikolai, Eliseo Pignanelli, and Andreas Schütze. "Condition monitoring of a complex hydraulic system using multivariate statistics." 2015 IEEE International Instrumentation and Measurement Technology Conference (I2MTC) Proceedings. IEEE, 2015.
    - [2] Helwig, Nikolai. "Detecting and Compensating Sensor Faults in a Hydraulic Condition Monitoring System-Eliseo Pignanelli." Andreas Schutze, Germany (2015).
    - [3] Schneider, Tizian, Nikolai Helwig, and Andreas Schütze. "Automatic feature extraction and selection for classification of cyclical time series data." tm-Technisches Messen 84.3 (2017): 198-206.
  - See the documentation.txt file for more information.

# Time-series Sensor Dataset



- **Dataset 2** - MotionSense Dataset Smartphone Sensor Data
  - Human Activity and Attribute Recognition: Phone Accelerometer and Gyroscope (https://www.kaggle.com/datasets/malekzadeh/motionsense-dataset)
  - Dataset File Format
    - CSV File
  - 2 Sensor types
    - accelerometer sensor, gyroscope sensor
  - 6 Different Labels
    - dws: downstairs, ups: upstairs, sit: sitting, std: standing, wlk: walking, jog: jogging
  - Relevant Papers
    - [1] Malekzadeh, Mohammad, et al. "Protecting sensory data against sensitive inferences." Proceedings of the 1st Workshop on Privacy by Design in Distributed Systems. 2018.
    - [2] Malekzadeh, Mohammad, et al. "Privacy and utility preserving sensor-data transformations." Pervasive and Mobile Computing 63 (2020): 101132.
    - [3] Tang, Chi Ian, et al. "Exploring contrastive learning in human activity recognition for healthcare." arXiv preprint arXiv:2011.11542 (2020).

# Contents



- Design a data analysis process and explain the analysis results logically
  - 1) Define Data Analysis Topic
  - 2) Design Data Analysis Process
    - A. Dataset to use (choose one of dataset1,2)
    - B. Algorithm to apply (e.g. clustering, classification, stochastic algorithm …)
    - C. Process of analysis (detailed explanation, flow chart ...)
  - 3) Implementation of your Data Analysis Task/Process
    - Exploratory Data Analysis (Data Visualization and Analysis …)
    - Additional analysis or techniques using analysis results
  - 4) Verification and Evaluation of your work
  - 5) Conclude your data analysis project

# Evaluation Criteria



- The evaluation is based on the following criteria.
  - 1) The appropriateness of the subject
    - - Does it have enough motivation?
  - 2) The technical depth of data analysis
    - - How difficult is it to implement an analysis algorithm?
  - 3) The degree to which it is well implemented
    - - Did you implement it well for the initial purpose?
    - - Did you get the results correctly?
  - 4) The effectiveness of data visualization
    - - Was sufficient analysis from various angles performed using various visualization?
    - - Did you logically analyze the data visualization results?
  - 5) The results analysis level
    - - How detailed have you verified the results?
    - - How logically did you evaluate the work?
  - 6) The organize your results
    - - Have you wrapped up the results obtained?

# Submission



- Due Date : 6/21 23:59

- File Format
  - Implementation code(.py, .ipynb)
  - Report(.hwp, .doc)
    - Need to explain implementation code and analyze implementation results

# Q&A

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