



School of Computer Engineering
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Final Project

Advanced Data Mining : Spring 1402 : Dr. Minaei
Due Sunday, Tir 25, 1402

Teacher Assistant: Armin Tavakoli

Outlier detection identifies and analyzes data points deviating significantly from expected patterns. Outliers are observations that differ markedly from others in values, distribution, or behavior. They can occur due to various reasons, including measurement errors, data corruption, anomalies in the data, or rare events. This ability plays a significant role in data analysis, quality assurance, anomaly detection, and decision-making processes, allowing for the identification and treatment of unusual observations that can have a significant impact on data interpretation and model performance.

In order to comprehensively understand the principles of outlier detection and learn its underlying process, we define the goal of this project as an implementation of a research paper's method, which is designed for detecting outliers using null space in neural networks. The paper is provided in <https://arxiv.org/abs/2007.01263>.

To complete the project, you should follow the subsequent steps accordingly:

- You need to study the method described in the paper, implement its algorithm with the Python programming language step by step, and provide comments and explanations throughout the code for better understanding.
- Conduct the experiments outlined in the paper using the specified implementation protocol and the corresponding dataset (If you encounter any issues regarding the computational resources required for the experiments, please contact the teacher assistant for further instructions).
- Provide a report detailing the step-by-step process for completing your projects. It has to include concise instructions that clearly explain each step concisely, providing necessary details, code snippets, or diagrams.

You are expected to be prepared for a **presentation** showcasing your successful completion of the final project and answering questions regarding your work. The presentation will take place in an online meeting (no PowerPoint is needed).

Notes

- Please be advised that the project deadline is firm and will not be changed or extended under any circumstances as the scores lock is impending.
- If you have any questions, feel free to ask. You can ask your questions in the Telegram group.
- Please upload your assignments as a zipped folder with all necessary components. Upload your file in FinalProject-YourStudentID-YourName.zip format.