

COMPSYS 306 Artificial Intelligence and Machine Learning

Project Part 1 (20%), due 30th Sept 3pm

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The project is designed for the purpose of engaging you in the process of designing a real-world machine learning application. This first part of the project requires you to design machine learning models for a real-world traffic sign recognition application using popular neural network (Multi-Layer Perceptron, MLP) and Support Vector Machine (SVM) models that you have learned during the lectures and the laboratories (lab 3 and 4). You will use the following public dataset to train, validate, and evaluate your models.

Kaggle dataset link: <https://www.kaggle.com/datasets/flo2607/traffic-signs-classification>

This part of the project is an individual assessment. In this part, you will follow the steps that you have been introduced in the lecture and lab exercises to import the data, design and implement the models, do the necessary pre-processing and hyperparameter tuning, and run the evaluation. You can consult with the GTAs and/or the Lecturer during lab sessions or after lectures.

With the designed models, you will need to conduct performance evaluation (as introduced in the lecture) to compare the performances between the two models (i.e. MLP and SVM).

The **deliverables** of this part of the project include:

1. **A report (20%) with the template on Canvas.** The report (up to 8 pages using the provided template) should include discussions of the following aspects:
 - Data and application description.
 - Model designs and configurations (e.g. the model architecture and hyperparameter values used and why).
 - Data pre-processing (e.g. standardization/normalization, data split) and why.
 - The comparative analysis (e.g. accuracy, precision, recall, F1-score) of the model performance.
2. A UPI.zip (0%) (e.g. iwan006.zip) containing all your code files. Your code should be well commented and there should be a README document to clearly tell the purpose of each file.

The report as .pdf file (and the code as .zip) should be submitted via Canvas by the due date/time. For late submissions, there will be a 30% penalty within 24 hours from the due time, 60% penalty between 24 to 48 hours from the due time, and zero mark after 48 hours.