

## AI6121 Project: Image Translation and UDA

This project aims to familiarise students with the recent image-to-image translation and unsupervised domain adaptation (UDA) techniques and equip them with hand-on coding experience with deep generative and discriminative networks. It consists of two tasks: 1) Image translation by using CycleGAN, which aims to train students to have a good understanding and practice of the widely adopted CycleGAN; 2) Input-space UDA with CycleGAN, which aims to train students to have a good understanding and practice of UDA via input-space alignment.

### Image-to-Image (I2I) Translation with CycleGAN/FSDR

For the first task, you are expected to read the paper CycleGAN [3] to have a good understanding of how it works. With that, you need to train a CycleGAN image translation model. You can leverage the open-source codes that are available on the Internet, and the source and target datasets are GTA5 [1] and Cityscapes [2]. In the project report, you need to describe your implementation in detail. You are also expected to discuss the major constraints of CycleGAN according to your trained model and translated images. An optional point is to analyse and discuss how to tackle the CycleGAN constraints for better image translation performance.

### Unsupervised Domain Adaptation via I2I Translation

For the second task, you are expected to learn and practise UDA via input-space alignment ([4] gives an example). With the image translation model from the first task, you can compare two semantic segmentation models: 1) A Source-only model that is trained with the labelled GTA5 data and evaluated over the Cityscapes data; 2) A domain adaptive semantic segmentation model that is trained with the translated GTA5 data and evaluated over the Cityscapes data. In the project report, you are expected to compare how the two models perform differently and why.

### Submission

You need to submit your solution report in **PDF format**, and there are no standard templates for your report. Ensure you include the **names** and the matriculation numbers of **all group members** (max 3 group members if completed by groups) clearly in the cover page of your report. Your report will be evaluated according to both contents and report presentation.

Please submit your solution through **NTULearn** before the deadline on **Nov 18<sup>th</sup> 2022**. There will be penalty for late submissions.

### References

[1] <https://www.v7labs.com/open-datasets/gta5>

[2] <https://www.cityscapes-dataset.com/>

[3] Unpaired Image-to-Image Translation using Cycle-Consistent Adversarial Networks, ICCV, 2017.

[4] CyCADA: Cycle-Consistent Adversarial Domain Adaptation, ICML, 2018.