COMP9517 Group Project – Semantic Segmentation

An innovative approach to 2D WildScene Natural Environments

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*Abstract*—TODO. The output module is generated using a computer with GPU memory NVIDIA GeForce RTX 3060 6G, programming with python 3.8.19. A python requirements.txt can be found in the submission

Keywords—semantic segmentation, deep learning, image classification, convolutional networks, Jaccard similarity, Intersection over Union (IoU), U-Net, SegNet, VGG, Deep CNN, ensemble learning, semantic scene understanding

# Introduction

Semantic segmentation (per-pixel class labelling) is a critical task in computer vision (Szeliski, 2021, p.413) and it has gained a lot of attention in the research field recently. This task is significant in applications such as autonomous driving, environmental monitoring, search and rescue, and automation, where understanding of surrounding environments is required to navigate and perform tasks effectively. (Vidanapathirana et al. 2023). While there are many notable structured 2D and 3D urban scene datasets to study the urban environment semantic segmentation (Vidanapathirana et al. 2023), natural scene semantic segmentation is less common and therefore warrants increased focus.

This project aims to implement natural scene semantic segmentation using state-of-the-art deep learning models such as U-Net, SegNet and VGG. We will leverage powerful architectures to achieve high accuracy in segmenting various natural elements that are above the benchmarks published in the original research paper. Additionally, techniques like superpixels and Conditional Random Fields (CRFs) will be incorporated to refine the segmentation boundaries, enhancing the overall performance of the model.

# Literature Review

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##### Acknowledgment *(Heading 5)*

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##### References

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