

Project Number: P6

Project Title: Automatic Image Annotation using Deep Multi-Label Learning

Project Clients: Dr Jiaojiao Jiang, School of Computer Science and Engineering

Project Specializations: Software development, Deep Learning, Data Science, and HCI;

Background:

Automatic image annotation is the process that automatically assigns labels in the form of captioning or keywords to a digital image. This can be regarded as a multi-class image classification problem in machine learning and deep learning.

Deep multi-label learning, which aims to recognise all the relevant labels in an image, is a fundamental task in computer vision applications, such as scene understanding, surveillance systems and self-driving cars. In real-world applications, multi-label recognition systems should learn tens of thousands of labels, locate them in images, and even deal with many unseen labels. To date, classic multi-label classification methods trained and tested with seen labels are far from fulfilling the requirements for real applications, where plenty of unseen labels exist.

Requirements and Scope:

To tackle the above issues, the project aims to address the following requirements:

1. Introduce a deep contrastive learning model to optimise deep multi-label learning,
2. Develop a corresponding tool for automatic image annotation, and
3. Write a research report to systematically introduce the model and the tool.

This project involves both a theoretical understanding and a practical implementation of deep learning models. It also involves design and development of User Interface (UI) for automatic image annotation. Further details can be discussed in the client requirements.

Required Knowledge and skills:

- Theoretical understanding of deep learning models.
- Hands on experience with deep learning models (e.g., Python libraries)
- Familiarity with UI design and development
- Interested students should have complete (or learned the topics covered in) COMP9444 (or COMP9517) and COMP3511 (or equivalent).

Expected outcomes/deliverables:

- Source code of developed models and its evaluation
- A tool for automatic image annotation
- Project documentation in the form of written report