Task 5.2: Computer vision and custom vision

Please complete this task if you are aiming for D and HD.

This document supplies detailed information on Assessment Task 5.2 for this unit.

Key information

- **Deadline: Monday 24 April 2022 by 8.00 pm (AEST)**
- **This assignment is only for students who are aiming D and HD.**
- **This assignment is graded (from Pass to Distinction), and you can submit this assignment only once and there is no chance of resubmission.**

Overview:

During week 5, you have learnt about the computer vision as one of the important AI services and we have discussed some of the advanced machine learning models in this area. We also explored Azure computer vision and went through the codes how you can use Azure computer vision and custom vision services. We have briefly discussed custom vision in Azure.

In this task, you need to complete two parts:

1) developing a program using Azure computer vision model to make a near real-time face detection using a webcam. You can use Azure computer vision for face detection and face attributes. Please consider the application must be developed by **Python language**. This will help you to understand how to build a real-time face detection model.
2) you need to develop a custom vision program using Azure custom vision to classify images. This assignment helps you to understand how to build your own image classifier.

Submission details:

For this task you need to complete two parts:

1) develop a near real-time face detection application. Your application should analyse video frames from webcam in near real-time using azure computer vision APIs. Azure computer vision contains different APIs, but for this application you need to use the face detection API and extract face attributes such as age, gender, and

emotions. Therefore, your application read the stream of frames from webcam and select which frames should be analysed. **To decrease the cost of API usage, you need to send one frame per second to the API**. The selected frames will be sent to the face APIs to detect face/faces along with face attributes like age, gender and emotion.

Your application should show two windows:

- The left side window shows a preview of the live video from webcam.
- The right-side window, the most recent result of API on the selected frame. The result should contain the face in the bounding box and the face attributes like age, gender, and emotions. Tip: You can use OpenCV library to capture frames using webcam.

2) In this part, you need to develop a custom vision program using Azure custom vision to classify images. This assignment helps you to understand how to build your own image classifier. You can download the dataset from the following link: https://www.kaggle.com/chetankv/dogs-cats-images
Or from the dataset resources. This dataset comprised of photos of dogs and cats. You need to answer the question: is it cat or dog? In another words, you need to differentiate cat and dog images. You need to build a custom vision model using Azure custom vision SDK and evaluate the performance of the model (precision, recall and accuracy). To do this task, you can refer to the slides and video for week 5 (extra slides).

Submit the following files to Ontrack:

- **Submit your answers as a PDF file into the Ontrack. You need to explain cell by cell of your code and the process for each part. You need to provide the Screen shot of your codes running. (Please note that your task will be graded based on the quality of the explanation for each part)**