CO3519 Assignment 2 – Facial Emotion Recognition using Advanced AI

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## ***Introduction***

Facial Emotion Recognition (FER) encompasses computer vision tasks which are aimed at identifying various human emotions depicted via a face and then categorizing them into various emotional categories. The process of detecting emotions normally revolves around analysing facial landmark positions such as nose, eyebrows and mouth. Changes to these positions can be analysed and then categorised into emotions.

FER is deemed to be an important and advantageous application of Artificial Intelligence technologies, since much communication is non-verbal. The exact amount is contested, however some studies suggest up to 60-80% of communication is non-verbal, providing a significant area for potential use and deployment. FER also has numerous applications across various sectors from education, to autopilot systems, to neuroscience.

The previous paper on this topic discussed the implementation of an FER algorithm using Machine Learning via Histogram of Oriented Gradients feature extraction and Random Forest Emotion Classification. This was somewhat powerful; however, it also had some limitations.

* Performance was mixed across various emotions. Whereas the algorithm performed well on some emotions such as happiness and surprise, the algorithm struggled with classifying anger and sadness.
* Due to the simplicity of the model. underfitting was a problem. This meant that certain patterns in the data couldn’t be captured, and performance on the testing data for some emotions was comparatively poor.
* While some of the observed discrepancies could’ve potentially been due to biases in the training datasets, there was nonetheless deemed to be areas for improvement which could be built on by using a more complex algorithm.

To try and improve the performance of FER, this paper will discuss the implementation of an Advanced AI algorithm based on Convolutional Neural Networks (CNNs) **MORE TO BE ADDED**

## ***References***

European Data Protection Supervisor (2021). *Facial Emotion Recognition*. [online] Available at: https://www.edps.europa.eu/system/files/2021-05/21-05-26\_techdispatch-facial-emotion-recognition\_ref\_en.pdf.