

Task 8

- 1) At the beginning of the dissertation, I had very little knowledge about the area of studies I was researching which is creating models using Convolution neural networks. I started by researching the basic terms such as AI, neural networks and computer vision. After watching several videos and reading reviewed papers I got a better understanding of what the technology is how it works and its capabilities. As I got a better understanding of the technologies I started to focus more on the technologies related to my subject area such as convolution neural networks and face recognition. It was intriguing to learn about the technologies often mentioned in the research community, to understand and find out how these mechanisms of these technologies really worked. Implementing a prototype allowed me to grasp better challenges found in my field of research which I was not aware of at the start of the dissertation, such as facial recognition of people wearing sunglasses and overfitting or underfitting a model. While working on the prototype, research was ongoing because any faults with the prototype necessitated a deeper grasp of the underlying technology. It was fascinating to tackle so many difficulties in a specific area simply by examining other scholars' work and using different web resources throughout the process. This experience taught me how to conduct research and the critical processes that must be followed to conduct fair and accurate research.

- 2) Initially, the research methodology aimed to develop a model that was tuned for high accuracy rates in recognising individuals in distorted images. Although it was still unclear at this point in the research which technology will be employed to generate these models, I had already decided that some form of artificial intelligence would be required. The model would be trained using images of myself which would be taken in a variety of different environments and settings. I also intended to have a large dataset with over 1000s of different images. After that, I would have introduced the distortions to the test dataset to determine the model's accuracy rates without using distortions on the training dataset. I'd next add the distortions to the training dataset and compare the accuracy rates of the models to see whether there were any changes between the two types of models. Before conducting any research, I decided that the images would be modified using software such as photoshop. I would have tested the models after they had been trained using images of myself, which were not part of the dataset to ensure that fair testing is carried out. I would

have calculated the accuracy of these models and other metrics such as false positives and true negatives after running numerous of these types of tests.

- 3) After conducting preliminary research for the literature review, I realized that the majority of the technologies and approaches I had anticipated adopting would be different or unnecessary. Even if most of the technologies and approaches I had in con were erroneous, they served as a rough foundation for how the approach of the study should be carried out. During my literature review, I noted that the LFW (Labelled face in the wild) dataset was cited several times, and one paper even proposed that this dataset be used to perform fair research so that the findings could be easily replicated (). As a result, I realised that a large number of different individuals were required in the dataset for the study to be accurate and fair, thus I chose the LFW dataset for the dissertation. Since the dataset changed in, I realized I needed a more efficient approach to add distortions to the dataset, so I decided to programmatically add all of the different distortions so that the images could be edited in bulk. When I was exploring the technologies often used in my field of study, I saw that many researchers used pre-trained models rather than building the model architecture themselves. This was done to save time by using models that already have a specified architecture that is capable of handling the task at hand. As a result, rather than constructing proprietary models, I've chosen to take this approach and concentrate on transfer learning. When it came to analysing metrics, I discovered that models would generate metrics based on their accuracy, among other variables to consider, so I wouldn't have to test each model individually for every instance of distortion. Instead, I would have the data of the metrics generated by the prototype.
- 4) The methodology chosen had a positive outcome on the results. The methodology chosen made use of distortions on the different datasets used throughout the study. The methodology included adding distortion in increments of five to the training dataset. Using smaller increments helped me better understand the difference between models with distortion on the test and training dataset and images with distortion on just the test dataset. This approach helped to improve the results of the models when compared to models which did not have the distortions on the training dataset. The methodology also

helped to increase the accuracy of the model with two types of distortions applied to them. However, this approach was only successful when blur was added to the noise.

- 5) As further research was conducted throughout the study, it became clear that the dissertation had a number of flaws. The key constraint was the processing capability of the devices employed to create these models. Even with a small number of people in the dataset, the model took a substantial amount of time to be completed. Due to the large number of tests that needed to be performed, the number of images and various individuals in the dataset had to be reduced. However, this is a restriction in and of itself because the number of individuals in the dataset was reduced, making the results less relevant when compared to a large number of different individuals. Another constraint was that, as a novice in the field, there were some aspects of the model that could have been improved by code, but I lacked the technical abilities to improve this code, even if I understood how it worked. As a result, I found it difficult to improve the models from this aspect. Finally, while the problem has been studied extensively, most studies have focused on low resolutions rather than distortions, thus I was unable to compare my findings to earlier research. Some of the difficulties encountered should be investigated further in order to turn them into opportunities.
- 6) The accuracy of the models with distortions on both the testing and training datasets surpassed the models with distortions on only the testing dataset, making the dissertation a success. In future research, it would be intriguing to see if researchers with suitable hardware recreated the study and tested it on a more significant number of people than the models were tested on for the dissertation. After that research is completed, it would be fascinating to do another study that uses a dataset of images of individuals captured by CCTV cameras so that the model may be applied to a real-world scenario. A similar study was conducted. However, it reduced the resolution of the images in the training dataset to match the images inside the test dataset; this study would focus more on distortions such as noise and blur. It would also be interesting if researchers used a hybrid strategy in which they attempted to make the images in the testing dataset as clear as possible, then distort the training data with the same levels and types of distortions as the testing dataset.

