This project is aimed at developing a supervised model for estimating daily maximum temperatures in urban areas, with a specific focus on Manchester. The model utilises data simulated across multiple scenarios, each generated from different initial conditions. Despite the dataset's coarse resolution and limited spatial coverage, which inherently restricts accurate estimation and predictions to a maximum of one day ahead, efforts were made to explore the potential of estimation and extending forecasts.

To address these challenges, a deep neural network model was developed, incorporating all available variables, except the target variable, to allow the model to uncover potential relationships. The initial results showed that the model performed reasonably well, significantly surpassing the baseline established by linear regression.

Interestingly, the model demonstrated an ability to produce reasonable estimation and accurate forecasts several days ahead, despite the limited information available, particularly in scenarios characterised by strong winds. This success might be attributed to strong correlation between input variables and target variables and coarse resolution. For prediction, this might be due to the model's capability to simulate seasonal variability, which was a prominent and regular feature in the dataset.

The methodology employed reaffirms the effectiveness of modelling as a valid approach to estimation and prediction, even when faced with substantial data limitations. Utilising multiple ensemble members for training proved to be a crucial strategy in enhancing the model's performance. However, when extending the estimation and forecast into the future (2070~2080), the model's accuracy was lower, likely due to its inability to adapt to the changing climatic conditions represented in the RCP8.5 scenario.

Overall, the project offered a valuable opportunity to compare different scenarios and assess the effectiveness of using multiple ensemble members in training the model. This experience has highlighted both the potentials and the boundaries of current modelling techniques in climate estimation and prediction under constrained data conditions.