This thesis project develops a machine learning-based approach for long-distance wake modelling to assess the impact of wind park wakes on downstream wind farms. The research involves analysing engineering wind farm wake models and utilizing machine learning algorithms to capture the complex dynamics of wake effects. The model will be trained  
using wake data generated from established engineering models. This study aims to improve wake prediction accuracy, computational efficiency, to simplify the process of estimating the impact of interactions between neighbouring offshore wind farms.