Model Development Phase Template

Date	15 july 2024
Team ID	team-739770
Project Title	Predicting the energy output of wind turbine based on weather condition
Maximum Marks	5 Marks

Model Selection Report

In the model selection report for future deep learning and computer vision projects, various architectures, such as CNNs or RNNs, will be evaluated. Factors such as performance, complexity, and computational requirements will be considered to determine the most suitable model for the task at hand.

Model Selection Report:

Model	Description

Random Forest Regressor	- Random Forest Regressor is an ensemble learning method that constructs multiple decision trees during training and outputs the mean prediction of the individual trees. It is robust against overfitting and works well with both categorical and numerical data. - During development, the model was trained using historical weather data (wind speed, temperature, humidity) as input features and corresponding energy outputs of wind turbines as the target variable. - Hyperparameters such as n_estimators, max_depth, min_samples_split, and min_samples_leaf were tuned using techniques like GridSearchCV to optimize model performance. - The model's ensemble nature allowed it to capture complex relationships between weather variables and turbine energy output, making it effective for predictive modeling.
Support Vector Machine (SVM) Regressor	- Support Vector Machine (SVM) Regressor is a supervised learning model that analyzes data for regression analysis. It works by mapping input data to a high-dimensional feature space and finding a hyperplane that best separates the output variable. - During development, the SVM Regressor was trained using preprocessed weather data to predict wind turbine energy output. - Parameters such as kernel (linear, polynomial, radial basis function), C (regularization parameter), and epsilon (margin of tolerance) were optimized using techniques like GridSearchCV to maximize prediction accuracy. - SVM Regressor's ability to handle complex, high-dimensional data and its flexibility in defining the decision boundary made it suitable for capturing nonlinear relationships in weather conditions affecting turbine performance.
Neural Network (Multi-layer Perceptron)	- Neural Network (Multi-layer Perceptron) is a deep learning model composed of multiple layers of nodes, each connected