Introduction to Machine Learning and Artificial Intelligence, Summer 2024 (ET1550)

Project 1

In this project, a neural network model for a regression application will be investigated. According to the lectures, a neural network contains several learning layers, each layer containing a number of nodes that would map the input features to the output. This relationship (model) will be learned through training to predict the output of a given new input. Neural networks are often employed to model complex and nonlinear systems, particularly if a large dataset is available. On the other hand, linear regression models can also be used as a baseline for prediction. They are especially effective if the system is not complex or the dataset is relatively small.

The Dataset

Concrete is one of the most important components in construction. Therefore, the concrete compressive strength analysis, which is a highly nonlinear function, becomes crucial. In this project, the concrete compressive strength is investigated. To do so, a dataset is used that contains several input features, including the ingredients and age of the concrete and their corresponding compressive strength as the output. This dataset is from the University of California Irvine Machine Learning Repository and is also available through their server.

The Code

The project can be implemented/completed in either Google Colab or Jupyter Notebook (please refer to the Project IDE document).

The Report

For the project report, you only need to provide answers to the questions. In addition, include your written codes (from the places that are specified in the code) for each question. The project report should be a PDF file containing your answers to the questions, codes and possible outputs (from the specified parts).

The deadline for submission is **19 July 2024**.