

Neural Networks (152118003)
Term Project (Submission deadline: 11.6.2021 via ESUZEM)

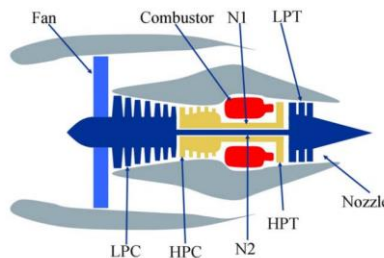
The scope of your term project is related to an exploration of a special topic where Neural Network algorithms are getting popular in the industry. In this regard, a publicly available dataset of which details are provided below shall be utilized and minimum of two Neural Network models performance will be compared against each other in the final report.

Problem description: In industry, in order to estimate the remaining useful life (RUL) of an equipment, various modelling approaches are used. The specific technical term “Prognostics” and health management refer to forecasting an equipment’s RUL. According to this prediction, maintenance activities are planned and unexpected downtimes for the factories are minimized.

Regarding the RUL estimation of an equipment, time-series data collected from various sensors are utilized and the equipment is continuously monitored. Machine's health state can be compared to previously observed failure scenarios. If the same equipment has already been failed and maintained before, a prediction can be made on how much of a useful life-time (e.g. number of days, hours, etc.) remained considering the previous failures of the same equipment in the past.

Dataset description: In this project, you will utilize a dataset generated by NASA simulated for a turbofan jet engine. It consists of 25 simulated sensor values collected from various locations on the jet engine (Figure below). The dataset also contains a column for remaining number of cycles until a “system failure”. Your task is to estimate the number of cycles of the jet engine by utilizing Neural Network models and compare it to the actual dataset given values.

The dataset can be downloaded from both Kaggle (Link1) and NASA's original web site link (Link2) given below.



Link1: <https://www.kaggle.com/behrad3d/nasa-cmaps>

Link2: <https://ti.arc.nasa.gov/tech/dash/groups/pcoe/prognostic-data-repository/>

Report format: It is expected that you provide your technical report based on the IEEE word template which is provided for you on the online learning system. It is also expected that you provide quality of figures, tables and plots explaining your results. Your results should also include training/testing performance of your Neural Networks with your hyperparameters. Please provide the source code of your project with your submission, as well. Note that plagiarism will not be tolerated and will receive zero credit. Max of two students per group is allowed.