

Performance Evaluation of CNN Model in Different Power Nuclear Power Fault Diagnosis

Begin: *Immediately*

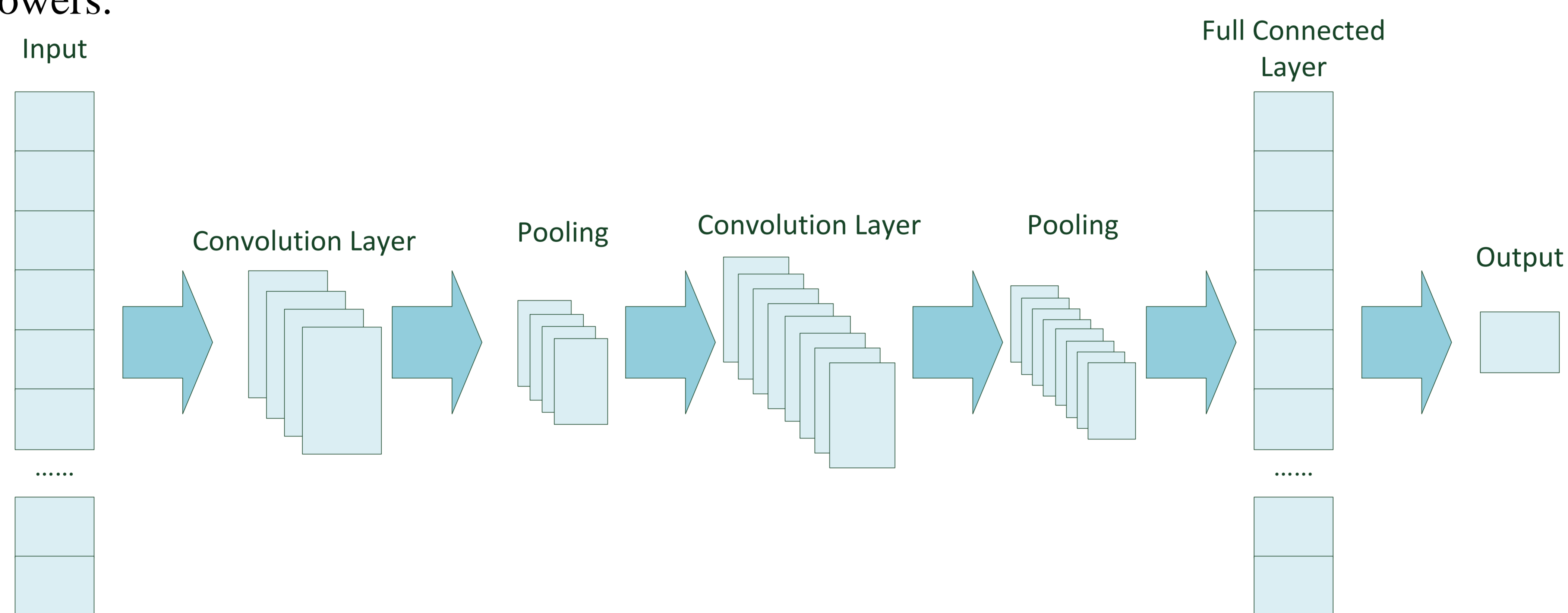
Proposal date: *12.01.2022*

Type of the work: *Simulation and Programing*

Domain: *Fault diagnosis and machine learning*

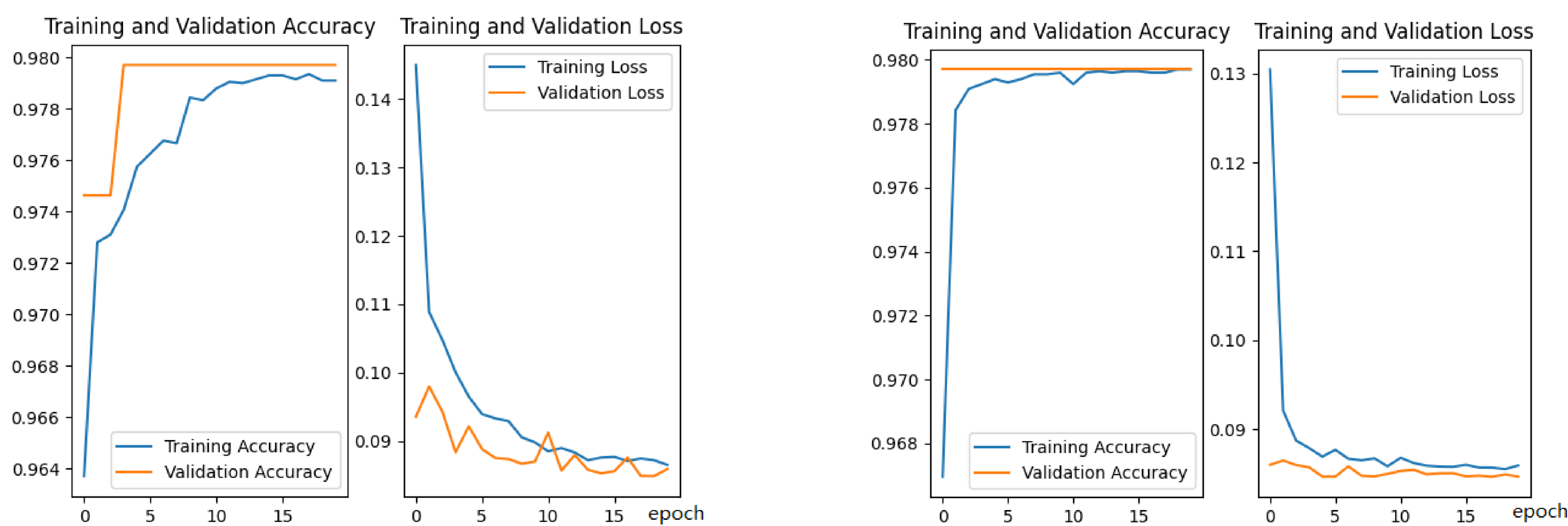
Convolutional Neural Network (CNN) is based on artificial neural network. It is widely used in various fields, especially in the field of image recognition. Some improvements to CNN have been proposed in recent years, such as pooling and drop out, which further improves the recognition ability of CNN and extends its application field beyond image recognition.

From the various applications of CNN, we found that it has a strong generalization ability for samples of the same pattern, so we hope to try to apply it to the field of nuclear power fault diagnosis to achieve fault diagnosis under different powers.



Schematic diagram of Convolutional Neural Network(1D)

In this work, we need to simulate a nuclear power plant based on an existing simulation model to generate data, train and test it using an unstructured CNN to evaluate the impact of various factors on the results. (Simulation model and CNN model we have already finished)



The influence of different input dimensions on the diagnosis results

Left: 1D; Right: 2D

- Tasks:**
1. Modifying simulation models to generate samples and test data (ATHLET);
 2. Training and testing CNN with different architectures;
 3. Analyzing the resulting data;
 4. Writing a master work report.

Prerequisites: Knowledge of the structure of the pressurized water reactor (PWR);
Interest in machine learning and programing ability (Python) .

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