Machine Learning for Industry 4.0

Applied machine learning in the CDHAWs Industry 4.0 lab

Necessary delay times between the unlock and start of machines

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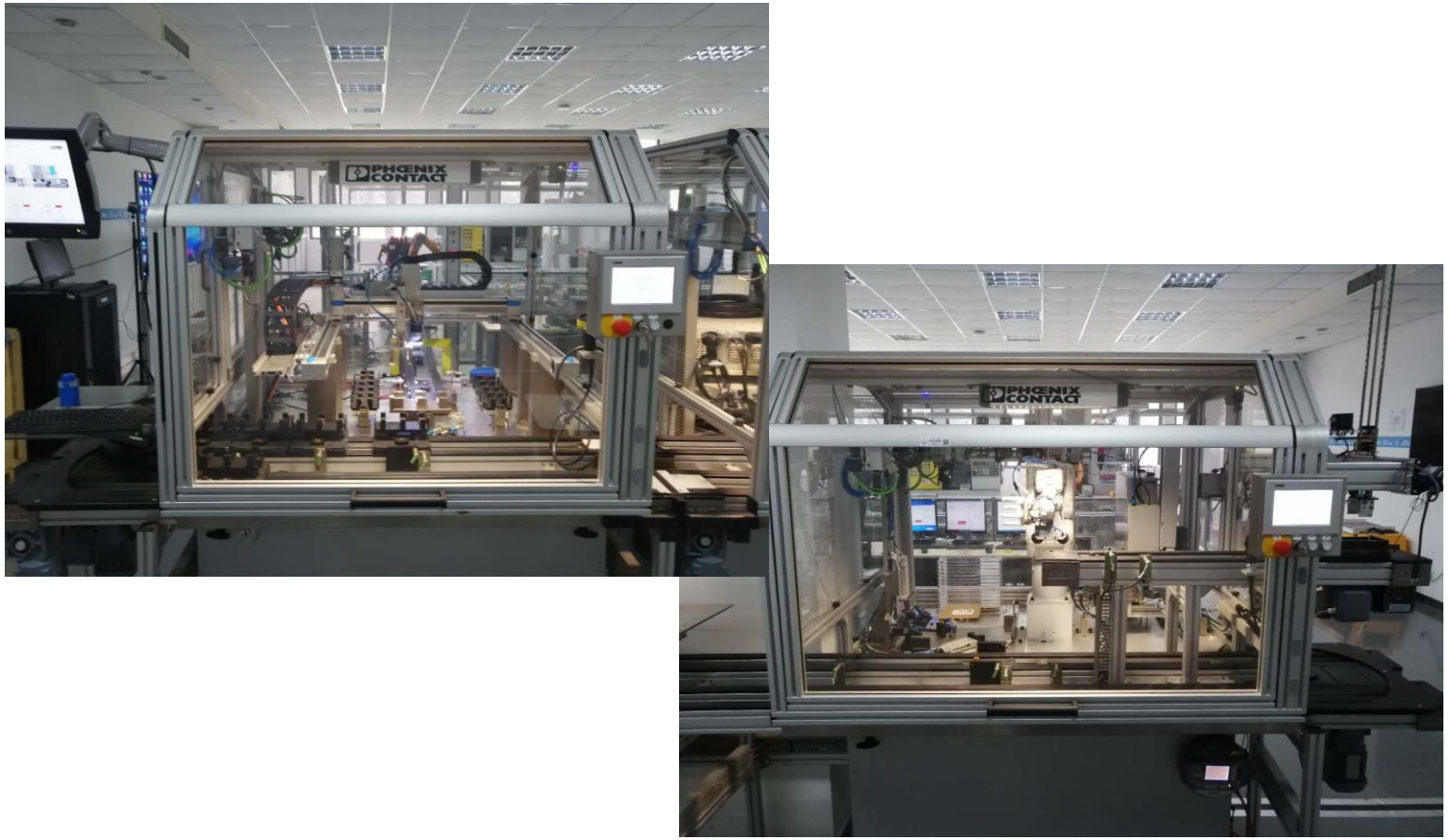


Task Description

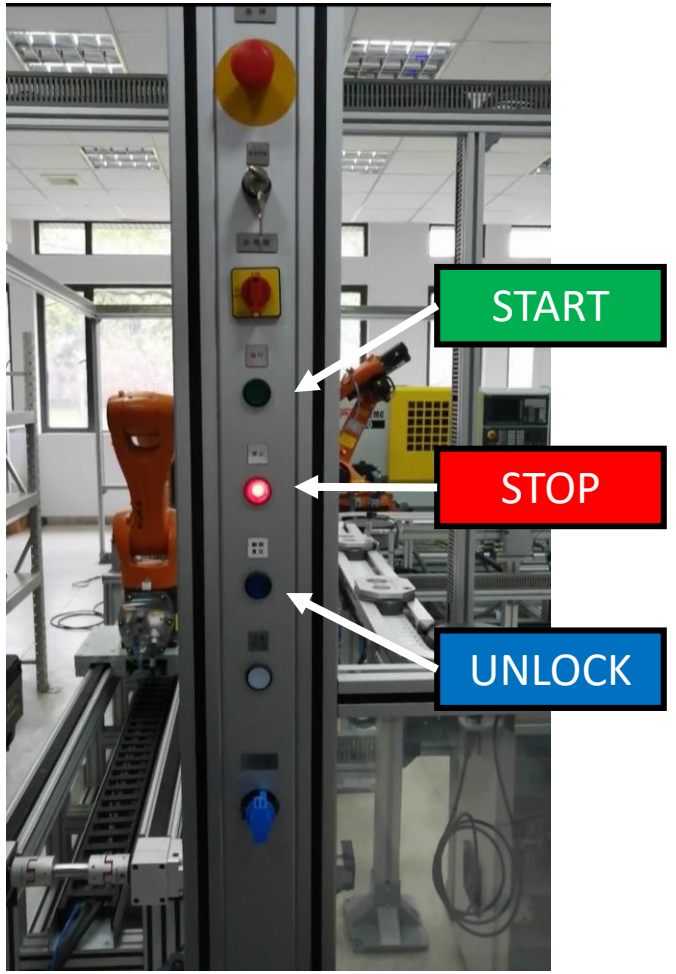
- Student project to practically apply learned knowledge
- Improve the understanding of Machine Learning

➢Problem:

- During manual start operation the unlock button must be pressed, followed by the start button
- Two buttons must be pressed with an unknown waiting period in between

➢Deliver a working waiting period

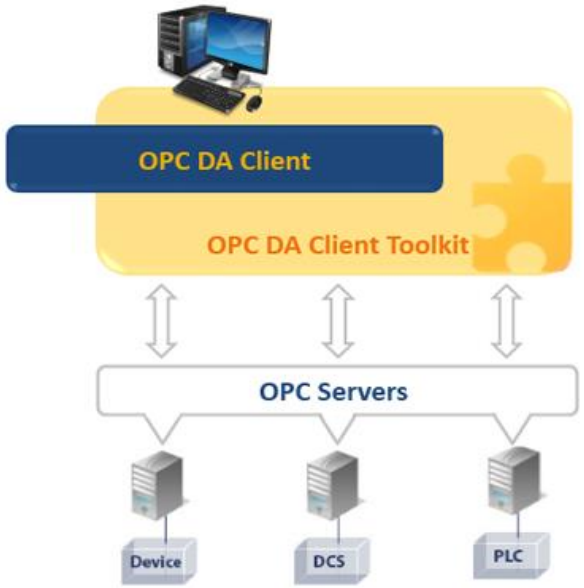
➢Incorporate a machine learning function.

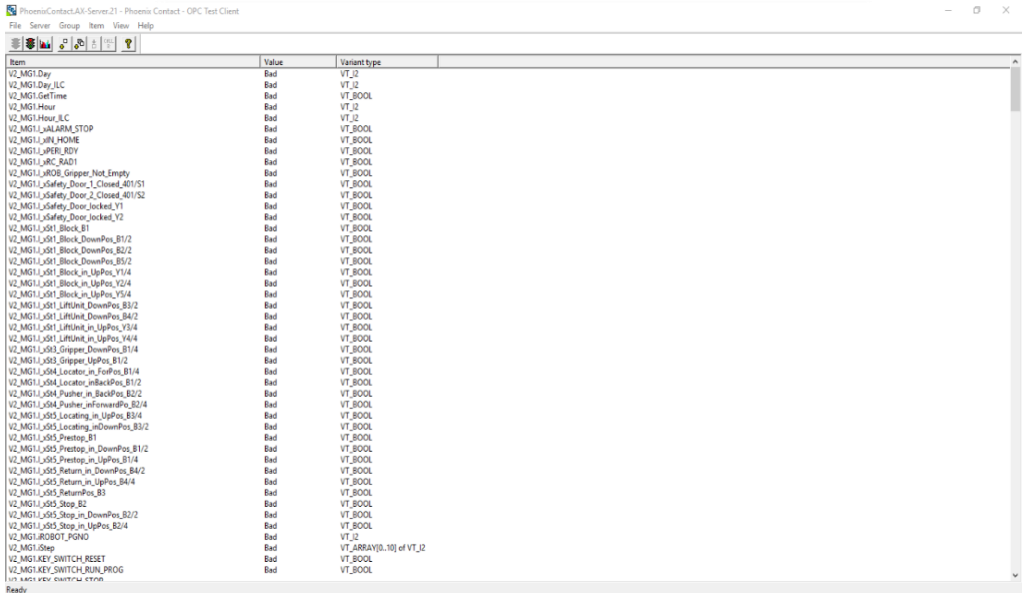


Soft- and Hardware

- OpenOPC, Phoenix Contact
  - OpenOPC library version 1.3.1

- Python
  - OPC-DA (Win32 COM based) industrial automation standard
  - Python 32-bit
  - Python version 2.7.xx.





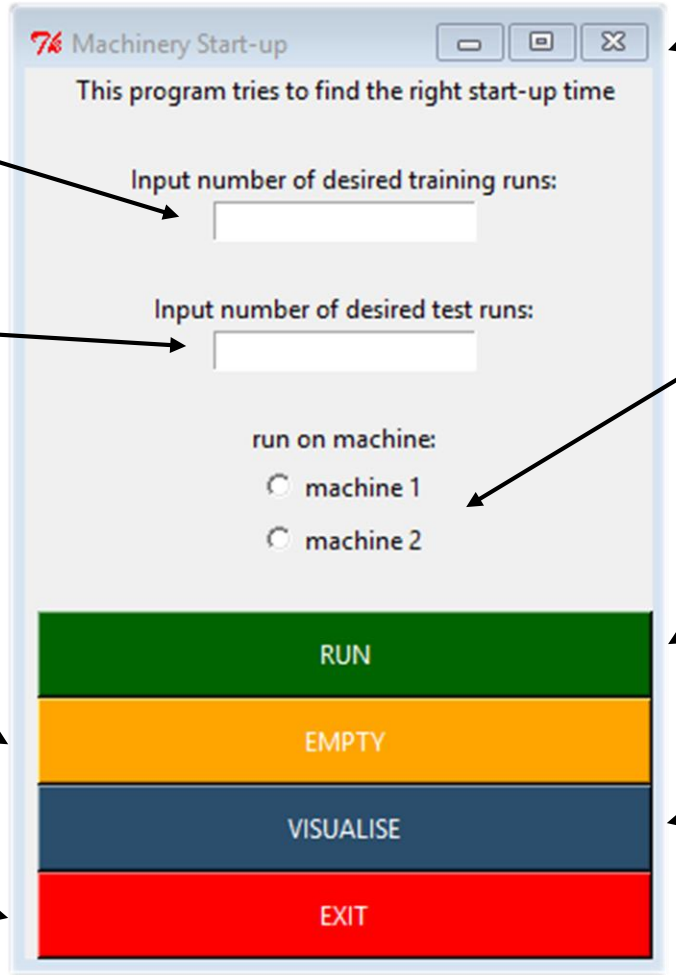
User Interface

Training runs for machine learning

Actual test runs

Empty Database

Close Window, End Program



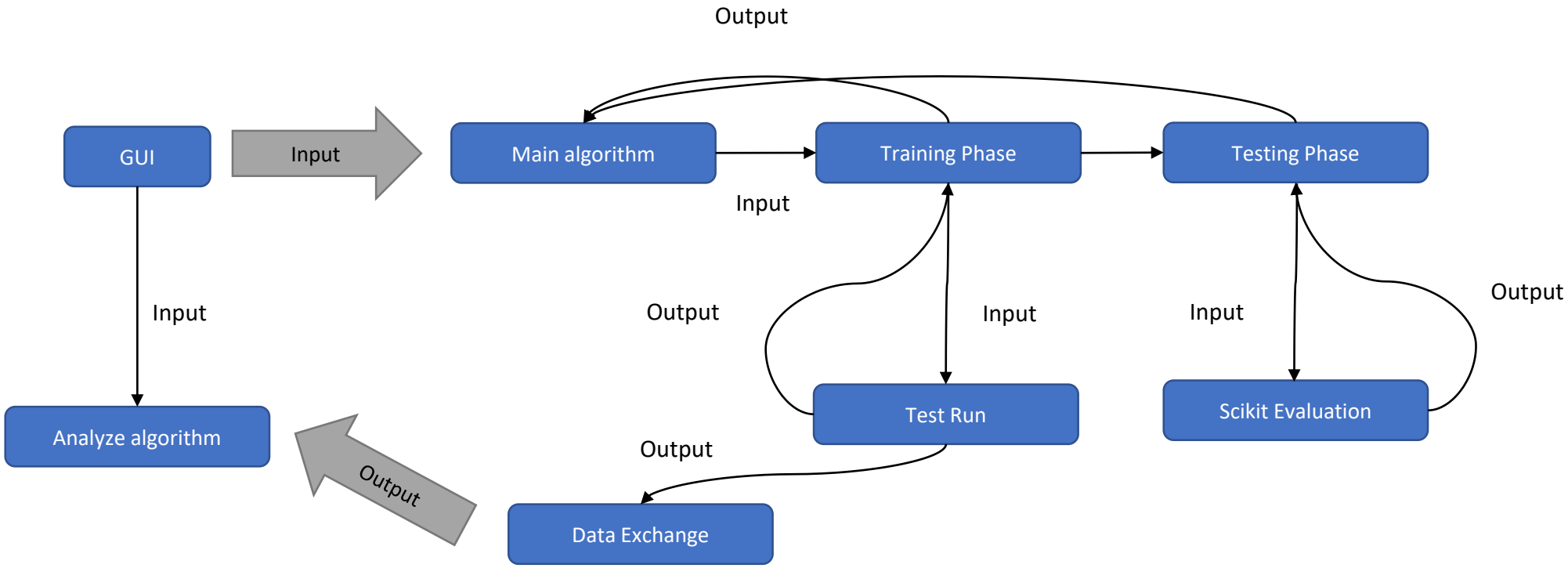
Tkinter Window

Machine Selection

Execution Function

Visualisation Function

Principle

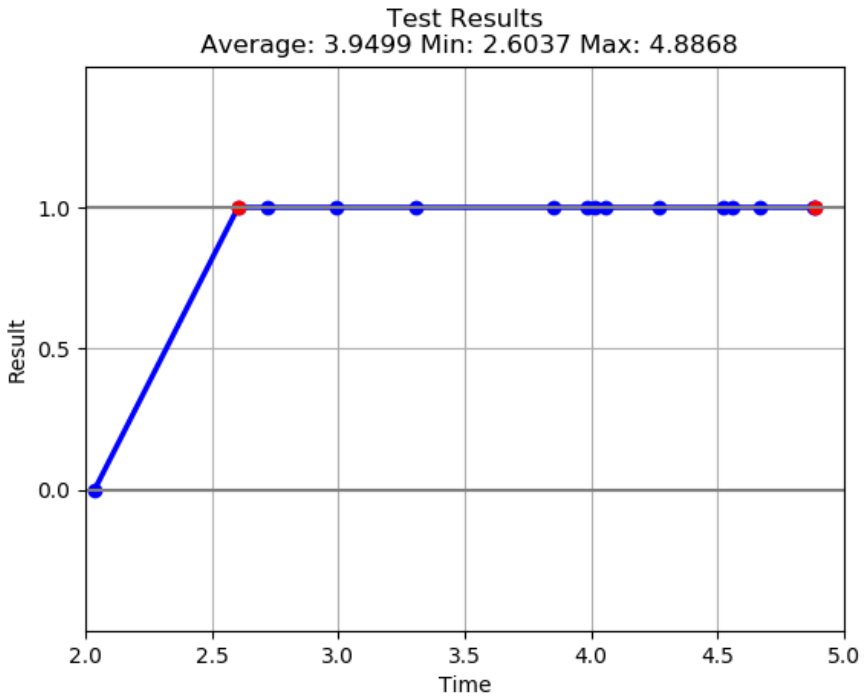

Output
GUI
Input
Main algorithm
Training Phase
Testing Phase
Input
Input
Output
Input
Input
Output
Test Run
Scikit Evaluation
Analyze algorithm
Output
Output
Data Exchange

Functions

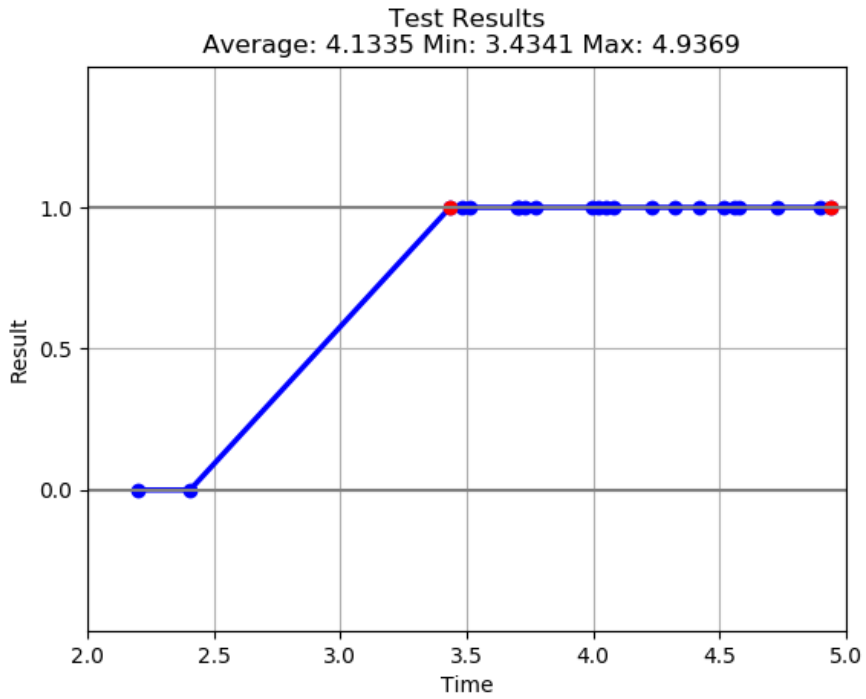
Full code available in the project file and report.

Results

Machine 1, Min Delay 2.6 seconds



Machine 3, Min Delay 3.4 seconds



Demonstration