

Master Thesis/Bachelor Thesis Implementing AI methods on a PLC system

MASTER THESIS AT THE AUTOMATION TECHNOLOGY LAB

Prof. Dr.-Ing.
Andreas Schwung

Department of Electrical
Energy Technology

**Fachhochschule
Südwestfalen**
University of Applied Sciences

Contact

Gavneet Singh Chadha
Lübecker Ring 2
59494 Soest

Tel.: 02921 378 3491
E-Mail:
chadha.gavneetsingh@fh-
swf.de

or

Prof. Dr.-Ing.
Andreas Schwung
Lübecker Ring 2
59494 Soest

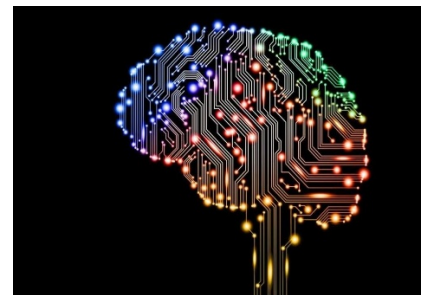
Tel.: 02921 378 3419
E-Mail:
schwung.andreas@fh-swf.de

Motivation

Modern production systems have evolved rapidly to meet the demands for higher productivity and production quality. The recent research agenda of "Industry 4.0" has provided ever more traction for sophisticated and intelligent systems. AI methods, specifically Deep Learning is one of the hottest and most researched topics for diagnosis and optimisation of industrial processes. Deep learning algorithms are based on the concept of how a human mind works. It learns to perform tasks using only data from the system without the need of expert knowledge about the underlying process. The objective of this master thesis is to implement Deep Learning algorithms on a PLC system of an industrial process.

Task

During the offered master thesis different deep learning algorithms have to be developed in the python framework for easy implementation on the PLC system. The desired goals shall be fault diagnosis, optimisation of process parameters for desired productivity or energy optimisation. The typical scenarios for process monitoring shall be defined according to the process at hand. The linux based PLC environment makes it a suitable candidate for deploying deep learning algorithms using python. The data for training the algorithm can be imported from an OPC server where the process variables are stored. Communication between the linux environment and the PLC environment has to be established for reading and editing the process variables. The test and validation of the system shall underline the applicability of the approach.



<http://www.digitaltrends.com/android/google-deepmind-artificial-intelligence/>



http://www.phytools.com/Kunbus_Revoluti_on_Pi_Industrial_PC_s/1884.htm

Requirements

Eagerness to learn about innovative and modern technologies. Good knowledge about machine learning/industrial communication, in general, will be an advantage. We are looking for master/bachelor students from the South Westphalia University of applied sciences who want to complete their master/bachelor thesis.