TECHNISCHE UNIVERSITÄT DRESDEN

IFA LS-AT

Fakultät Elektrotechnik und Informationstechnik ● Institut für Automatisierungstechnik

AUFGABENSTELLUNG FÜR DIE DIPLOMARBEIT

Für: # TBD Matrikelnr.: # TBD
Studiengang: # TBD
Thema: **Development of a Test Concept for an AI Development Framework**

Navigation in mobile robotics on small scholar system bodies includes both the determination of the position and orientation of a mobile robot and the determination of an environment map.

An essential subarea to determining an environment map is the detection of obstacles in 2D images using AI algorithms, such as artificial neural networks (ANN). State-of-the-art ANNs are already available for certain application cases or specific application scenarios. For the development of certain ANNs, the institute developed an AI Development Framework (AIDF).

This diploma thesis aims to analyze, develop, and implement a test concept for the AIDF. Further, the thesis shall analyze the state of the art for different framework architectures and relevant design patterns to restructure relevant components of the AIDF. The institute will provide an existing ANN for semantic segmentation of obstacles in high-resolution grayscale 2D image data to validate the implementations as a case study.

The following tasks shall be accomplished:

1. State-of-the-art research for important aspects, architectures, and design patterns of frameworks,
2. State-of-the-art research for test concepts for frameworks,
3. Structured requirements definition for the AIDF,
4. UML-based system design of the AIDF, including a presentation of possible and selection of suitable design variants for the AIDF software implementations in Python 3 and TensorFlow 2,
5. Development and software implementation of a test concept for the AIDF (verification) and realization of a case study (validation),
6. Detailed documentation of the results.

The relevant results of other works that will be used in the diploma thesis shall be clearly and fully stated in the written part using appropriate citations. The guidelines of the institute for scientific and student works shall be followed.

The diploma thesis will be written in English.

Betreuer: Dipl.-Ing. Patrick Suwinski, Dipl.-Ing. Alexander Liesch
1. Prüfer: PD Dr.-Ing. Annerose Braune 2. Prüfer: Prof. Dr. techn. Klaus Janschek
Ausgehändigt: # TBD Einzureichen: # TBD

Prof. Dr.-Ing. habil. Martin Wollschlaeger	PD Dr.-Ing. Annerose Braune	# TBD
Vorsitzender des Prüfungsausschusses Informationssystemtechnik	Verantwortlicher Hochschullehrer	Student