Task Description for Final Thesis (Diplomarbeit or Master thesis)

Degree program:	Informatik
Topic:	**Compatibility analysis methodology for multi-source programming of embedded controllers**

Make embedded systems resilient to supply chain disruptions

Europe is leading in the field of embedded systems. However, the embedded software running the systems is highly specific with respect to the controller used. Transferring the embedded software from one controller to another or developing the embedded software for two interchangeable controllers in parallel, is a hefty effort as it requires two distinct embedded software projects. To reduce development costs, most embedded systems are designed only for one specific controller (**single source**). Consequently, the producer of the embedded system is solely reliant on the continuous long-term availability and affordability of the controller used. In order to ensure continuous availability, affordability and to boost the resilience through their complete life-span embedded systems must be designed for multiple controllers, what in turn enables an efficient **multi-source** software development with no vendor lock-in.

Want to shake up the embedded systems market?

The basis of a multi-source system is the compatibility of the target systems under consideration. As a member of the team, your job is to develop a fully automated tool that checks the given hardware and software of the target systems for compatibility. The result is to create a first database that shows the compatibility of at least 5 different microcontrollers with each other analyzed and evaluated.

Let's get specific

- You will analyze data sheets from various manufacturers and extract technical specifications

- You will analyze the software development kits (SDKs) from different manufacturers and extract global content

- You will transfer your manual procedure into a software methodology for automation

- The compatibility check with other systems is also carried out automatically by the software methodology

- The software tools should preferably be written in Python

- You will explore approaches based on machine learning for extracting knowledge from the SDKs (optional)

Referee:	Prof. Dr.-Ing. Jeronimo Castrillon
Supervisor:	Dr. Steffen Köhler

Prof. Dr.-Ing. Jeronimo Castrillon
(Professor in charge)