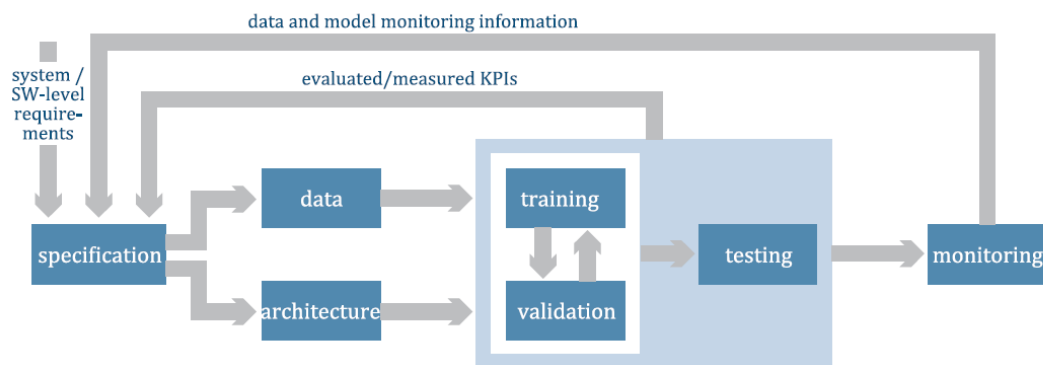


Safety for autonomous systems with Machine Learning

Machine learning based algorithms with their capability of successfully addressing complex problems are more and more used in the industry. In the automotive, but also in the agricultural field, they are seen as the most promising candidates for the development of autonomous vehicles and machines: ML algorithms will take driving decisions on the base of the interpretation of the surrounding environment.

However, the malfunctioning behavior of such systems is a possible origin of injuries and deaths, therefore they are safety-related subcomponents of the whole autonomous vehicles and machines. In this case they have to be designed, developed and tested according to relevant safety standards. As stated in ISO/TR 4804:2020 one of the challenges is that *“Compared to currently used algorithms in safety-related components, there is an additional effort involved, and new validation methods are considered to ensure overall system safety (e.g. based on the non-deterministic behaviour of machine learning algorithms). Machine-learning-based (sub)systems and components cannot be decomposed and are tested as a whole, which increases testing efforts.”*



ML lifecycle (from ISO/TR 4804:2020)

The goal of this internship/thesis is to study the safety lifecycle for safety-related systems using a machine learning algorithm on a specific example use case. The main outcome will be the assessment of the feasibility of employing a single 3D-camera in a ML-based safety use case. In particular, the system under study will be used for people detection and collision avoidance in a controlled environment.

Learning target: you will learn about

- Safety Standards and their application for automated systems;
- Machine learning algorithms implementation , training and testing
- Impact of ML on the development of system safety

Profile student

Bachelor degree in computer science, electronic, control or mechatronic engineering;

- Knowledge of AI modelling and Programming experience in Python, C/C++.
- Passionate by research and new technologies with focus on applications for machines or mechatronic systems of the companies;
- Result oriented, responsible and proactive;
- A good communicator, able to communicate in English;
- Eager to learn and a team player.

Practical data

Internship: The assignment is for an internship of min. 4 to maximum 6 months and takes place at the offices of Flanders Make located in Kortrijk or Leuven Belgium.

Thesis: This assignment is also a possible topic for a master thesis.

Additional information:

Internship:

Only EEA or Swiss nationals can be accepted for internships due to work permit regulations.

All software and hardware needed for the execution of the project will be provided by Flanders Make.

Thesis: This assignment can only be executed by a thesis student from a Belgian university.

About Flanders Make:

Towards a digitally transformed, sustainable and competitive industry

Flanders Make is a fast-growing research centre that performs research to support companies from various sectors in their sustainable innovation processes. From our establishments in Lommel, Leuven, Kortrijk and Sint-Truiden and labs within the 5 Flemish universities, we stimulate open innovation through excellent research.

Because of our unique position as a bridge between industry and research, our teams combine application and system proficiency with technological and scientific knowledge. Academic partners and more than 150 companies are part of the innovative circular ecosystem of Flanders Make.

Our strategy based on industrial needs and long-term trends ensures a close link with the industry and its challenges. With our programmed research, we create impact in companies.

Sustainability, climate and workability have a high priority in our research. We want to help companies in developing sustainable, green, smart and connected products and production systems, with a special focus on people and their interaction with machines.

Interested ?

Go to <http://jobs.flandersmake.be>.

Please fill in the online application form and upload a motivation letter and cv.