ROS2, Turtlebot robot, Behavior trees, C++, Python.

The use of robots as in the agricultural sector is increasingly becoming a necessity. Partly this because of a lack of manpower in this sector where robots can take over task. There is also a driver for robots from a sustainability perspective. Multiple compact robots might take over the tasks of one large machine, which saves soil compaction. Robots driving might also enable electrical driven vehicles working on renewable energy. Furthermore, robots might ensure greater operational reliability: if one robot fails, other robots can take over tasks. The robots must work well together.

The starting point of your assignment is an already defined software architecture, which is described in terms of autonomous software processes

called "agents". Two types of agents exist: the Vehicle Operating Agent (VOA) and a Cooperatively Agent (CA). The VOA is added to each individual robot to enable collaboration with other robots. The CA communicates with all VOAs to ensure that routes are redistributed if a robot goes down and to ensure that robots do not collide on shared route segments. The CA runs on a central server. The implementation of the multi-agent system goes via the Robot Operating System (ROS2). In ROS2, agents are implemented as communicating nodes which communicate synchronous (services) or asynchronous (topics) or hybrid (actions). The behavior of the agents is specified via behavior trees (BT). This infrastructure is developed by the Fontys ICT HTES research group and is applied in the DurableCase project: https://specials.han.nl/sites/automotive-research/about-han-a.r/nieuws/behavior-tree-gebaseerde/index.xml (Links to an external site.).

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Context of use: Education
Level of education: Bachelor

Technology Impact Cycle Tool

ROS2, Turtlebot robot, Behavior trees, C++, Python.

Impact on society

What impact is expected from your technology?

This category has not been filled yet.

Technology Impact Cycle Tool

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Hateful and criminal actors
What can bad actors do with your technology?

This category has not been filled yet.

Technology Impact Cycle Tool

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Privacy

Are you considering the privacy & personal data of the users of your technology?

This category has not been filled yet.

Technology Impact Cycle Tool

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Human values

How does the technology affect your human values?

This category has not been filled yet.

Technology Impact Cycle Tool

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Stakeholders
Have you considered all stakeholders?

This category has not been filled yet.

Technology Impact Cycle Tool

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Data

Is data in your technology properly used?

This category has not been filled yet.

Technology Impact Cycle Tool

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Inclusivity
Is your technology fair for everyone?

This category has not been filled yet.

Technology Impact Cycle Tool

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Transparency

Are you transparent about how your technology works?

This category has not been filled yet.

Technology Impact Cycle Tool

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Sustainability

Is your technology environmentally sustainable?

This category has not been filled yet.

Technology Impact Cycle Tool

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Future

Did you consider future impact?

This category has not been filled yet.