Master's Thesis on Autonomous Crop Monitoring in Greenhouses using Mobile Robots:

Scout – plant disease scouting robotic dog

Greenhouses are demanding environments for robots: uneven floors, rails, irrigation lines, high humidity, dense vegetation, and changing lighting conditions. Navigation is difficult, sensors behave unpredictably, and many promising ideas fail once tested in practice. Yet millions of plants need to be monitored regularly for diseases and physiological changes. Mobile robotic systems could provide a scalable solution – if they can operate reliably under these conditions.

This thesis investigates whether **autonomous robots can realistically perform large-scale crop monitoring in operational greenhouse environments**. The work is part of a collaboration between **vGreens Holding GmbH**, an ag-tech startup developing plant physiology sensing technologies, and the **Chair of Robotics, Artificial Intelligence and Real-Time Systems at TUM**.

This is a **hands-on engineering project**. Progress will come from building prototypes, running experiments, identifying failure modes, and iterating. Not everything will work on the first attempt. Curiosity, persistence, and creative problem solving are essential.

Tasks include

- Evaluating robotic platforms suitable for greenhouse environments (rovers, quadrupeds, or other concepts)
- Developing navigation and scanning strategies for narrow crop rows
- Integrating cameras or sensors for plant monitoring
- Running experiments in real greenhouse environments
- Identifying technical limitations and developing practical workarounds

The goal is to **determine an autonomous greenhouse scanning system that is technically feasible and what system architecture would make it viable.**

This project is a good fit if you:

- Enjoy solving difficult engineering problems without predefined solutions
- Are comfortable debugging real hardware and imperfect systems
- Have the patience to run experiments, analyze failures, and try again
- Like building things that must work outside controlled lab environments
- Show resilience when experiments fail and persistence in finding solutions

This project is probably not a good fit if you are looking for a purely theoretical thesis or a predictable development process.

What we offer

- A real robotics problem with practical impact in agriculture
- Access to robotic platforms and greenhouse environments
- Collaboration between robotics researchers and industry engineers
- The opportunity to challenge yourself in a stimulating team environment

Technische Universität München

TUM School of Computation, Information and Technology

Lehrstuhl für Robotik, Künstliche Intelligenz und Echtzeitsysteme

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Supervisor:
Prof. Dr.-Ing. Alois Knoll

Advisor:
vGreens Holding GmbH

Research project:
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Type:
Master's Thesis

Research area:
AI, Robotics

Programming language:
Python, etc.

Required skills:
AI, Robotics

Language:
English or German

For more information please contact us:

E-Mail:
recruitment@v-greens.com

Internet: https://v-greens.com

If you think this might be you and enjoy building systems that must work in the real world, we would love to hear from you. Please send a short application including your CV (feel free to include personal projects). Wed also like to hear about a technical system you built or debugged that initially didnt work: what went wrong, how you approached fixing it, and what you learned in the process.

Send your application to:

recruitment@v-greens.com

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