

Internship proposal

Probabilistic plant detection

About Inria

Inria Grenoble is a research center at the forefront of computer science and digital technology research, driving innovation and breakthroughs in various domains. Our diverse teams of researchers, engineers, and scientists collaborate on projects, spanning artificial intelligence, data science, cybersecurity, and more. With a deep commitment to excellence and a focus on bridging the gap between research and practical applications, Inria Grenoble is dedicated to shaping the future of digital technology and its impact on society.



Internship Overview

Hoeing operation

The agricultural industry is increasingly embracing digital technologies to enhance productivity, manage uncertainties, and adapt to evolving regulatory frameworks. One specific challenge faced by farmers is the need to reduce the use of biocidal products in their production methods. To address the issue of weeds, precision hoeing (mechanical weeding) presents a viable and easily implementable solution. This approach relies on simple equipment, the hoe, coupled to a tractor through a hydraulically shifted support controlled by a camera that detects crop rows.

The objective of this internship is to detect crop rows during the advancement of the hoeing machine to generate commands for controlling the translation cylinder. Specifically, we will adapt a CNN detector (e.g., Yolo) to identify the position of crop rows in images without the need for individual plant detection, and without the need for post processing detection results. The system targets a real-time application in an embedded setting, so much attention must be given to select neural network architectures that can be optimised for fast inference times.

To achieve this goal, you will: (1) conduct a comprehensive review of neural network architectures applicable to our problem, and (2) implement a row detection algorithm by adapting and training a state-of-the-art NN architecture with synthetic images.

If the results are positive, your algorithm may be deployed on a low-power ARM-base single board computer and tested on a farm located in Pontcharra.

Qualifications

- Currently pursuing a M1 or M2 degree in computer science, electrical engineering, robotics, or a related field.
- Good programming skills in Python, C++ or similar
- Familiarity with computer vision, machine learning and neural networks
- Solid understanding of mathematics, especially linear algebra and statistics.
- Strong problem-solving skills and the ability to work both independently and in a collaborative team environment.
- Excellent communication and presentation skills.

What We Offer

- A challenging and rewarding internship experience in a dynamic and innovative environment.
- Mentorship from industry experts with a wealth of knowledge in computer vision and AI.
- Opportunity to work on a real-world application.
- Potential for a future full-time position.
- Great working conditions in our offices located in Montbonnot
- Internship duration and scope adapted to the time allocated by your school.
- Internship stipend.

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How to Apply

Interested candidates are invited to submit their resume, and any relevant work samples (if available) to:

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Stan Borkowski

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