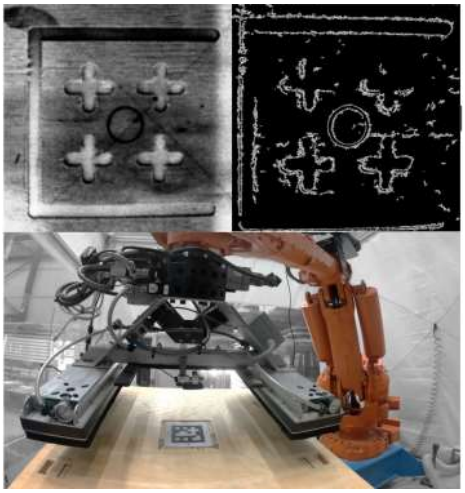
School of Architecture,
Civil and Environmental Engineering
Laboratory for timber constructions

Semester Project – Call for applications

3D pose estimation of wooden building elements from image recognition of engraved markers



The laboratory for timber constructions, IBOIS, is doing research on the automation of timber construction. This project focuses on the precise spatial localization of wooden building elements using computer vision in order to automate their assembly with a 6-axis robotic arm. As wood is a natural material, high discrepancies can occur between models and prototypes. Therefore, visual feedback loops are required to adjust the position of the robot to the deformation of the timber pieces. The current solution relies on the visual detection of ArUco Markers combined with time of flight sensors. This semester project aims at proposing an improved workflow using custom markers that are directly engraved in the wood.

Objective

Developing an algorithmic framework to get the relative position of wooden elements by taking pictures of engraved markers. Performing full-scale tests with the robot to assess the performance of the method.

Skills

Computer programming, computer vision, image processing, machine learning.

Facility

The student will have the opportunity to work in a dynamic interdisciplinary environment inside IBOIS laboratory. In addition, he will benefit from the resources of the Structural Engineering Group testing facility (6-axis robot, 5-axis CNC…)

Planning

Week 3: Work plan based on state of the art techniques

Week 8: Intermediate presentation

Week 14: Report and final presentation

Evaluation

The project will be evaluated on the basis of the presentations, the report, as well as the involvement of the student during the semester. Main criteria will be quantity, quality and originality of the work performed during the semester.

Interested students can send an e-mail to nicolas.rogeau@epfl.ch for further information.

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