Diploma thesis evaluation
"Fiducial Marker-Based Multiple Camera Localisation System"

Author: Jiří Ulrich   Supervisor: Tomáš Krajník

The presented thesis aims to design, implement, and experimentally evaluate a multi-camera system capable of precise localisation of fiducial markers. The system's primary purpose is to support (multi-)robotic experiments.

The assignment was somewhat challenging, mainly due to the extended experimental evaluation and the necessity to implement a system capable of reliably operating in real-world conditions. The student was able to get quickly acquainted with the state-of-the-art methods and identify their essential properties. He set up a clear and realistic work plan and performed the individual steps rigorously and autonomously. He quickly selected the method to base his system on and designed and implemented the improvements required to integrate it into a multi-camera setup. During his work, he frequently consulted the properties of the system with potential users from agriculture, industry and academia. Due to the quality of the system he implemented, its components are being deployed in research institutes and high-tech companies in several European countries.

The thesis is well structured, and its technical and language quality is high. The overview of the state of the art is extensive, providing the reader with a clear explanation of the theoretical methods used and a clear view of why the system is important and potentially useful for its users. The principles the system is based on and their implementations are described clearly and thoroughly. The experimental evaluation clearly shows that the implemented multi-camera system significantly outperforms its single-camera counterparts in terms of localisation accuracy and area coverage while achieving real-time performance.

During the implementation of the method, he was able to publish and present partial results of the thesis at an international conference [1], and contributed to a scientific journal article [2]. Moreover, based on the presentation at [1], he was invited to publish an extended version of his paper in a scientific journal published by the Association of Computing Machinery (ACM). Therefore, I consider the implemented system and the thesis of high quality and propose to classify it as

A - excellent.

Kralupy nad Vltavou, Czechia,   Tomáš Krajník
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Reference

[1] Jiří Ulrich et al., "Towards fast fiducial marker with full 6 dof pose estimation," in *Proceedings of the 37th ACM/SIGAPP Symposium on Applied Computing*, 2022, pp. 723–730.

[2] Seongin Na et al., "Bio-inspired artificial pheromone system for swarm robotics applications," *Adaptive Behavior*, 2021.