

Supervisor's Review of Master Thesis

Author: Bc. Anna Žigajkova
Title: Estimation of the Laser Beam Parameters
Faculty, depart.: Faculty of Electrical Engineering, Department of Cybernetics
Study program: Cybernetics and Robotics

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Affiliation: CTU in Prague, CIIRC
department: Robotics and machine perception (RMP)

The thesis deals with the practical issue of laser beam parameters estimation. The parameters are measured in the production process of laser micro-modules. The main goal of the thesis is to develop and experimentally verify an algorithm for the estimation of the focal point of the laser beam and its inclination angle. The estimation is based on the evaluation of a sequence of images, which are captured perpendicularly to the direction of the laser beam at different distances from the laser source. The developed algorithm starts with the approximation of the intensity in the images by the two-dimensional Gaussian function. The laser beam parameters are evaluated from the Gaussian function parameters in the image sequence. Different methods for approximation and evaluation were developed and successfully tested. An important part of the work is also a well-prepared theoretical analysis of the problem.

The thesis is written in English. It is well structured and the assigned topic is described clearly and comprehensibly. The typography and written form of the thesis have a very good level. The author worked with sources actively and searched relevant literature independently. The result of it is an excellent theoretical introduction. The author cited all relevant sources correctly.

Bc. Anna Žigajková demonstrated her ability to work on engineering problems and to obtain a successful solution independently. She is able to search, read and analyze relevant literature. She implemented her own algorithm for the estimation of laser beam parameters successfully. She also cooperated with colleagues and programmers of customer effectively.

The assignment is practically oriented. The high complexity of the assignment is given by the need for the perfect functionality of the proposed algorithms with real inputs. In my opinion, the author fulfilled the assignment of the thesis. The thesis satisfies all demands for a master thesis. Based on the above facts, I **recommend** the thesis to the defense. My final evaluation is **A (excellent)**.

In Prague 30. 5. 2022

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Ing. Pavel Krsek, Ph.D.
Supervisor