# THESIS SUPERVISOR'S REPORT

## I. IDENTIFICATION DATA

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|---|---|
| **Thesis title:** | **Virtual Commissioning of Robotic Flexible Line with Conveyor System** |
| **Author's name:** | **Jan Šťastný** |
| **Type of thesis :** | bachelor |
| **Faculty/Institute:** | Faculty of Electrical Engineering (FEE) |
| **Department:** | Department of Cybernetics |
| **Thesis reviewer:** | Ing. Tomáš Jochman |
| **Reviewer's department:** | Czech Institute of Informatics, Robotics and Cybernetics |

## II. EVALUATION OF INDIVIDUAL CRITERIA

| **Assignment** | **ordinarily challenging** |
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*How demanding was the assigned project?*

This bachelor's thesis presented a great challenge, mainly due to the time requirements for completing the thesis as well as the student's practical and theoretical knowledge.

| **Fulfillment of assignment** | **fulfilled** |
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*How well does the thesis fulfill the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.*

The submitted bachelor thesis fulfills all the points of the assignment. The main tasks have been fulfilled and, in addition, they have been extended with additional software components, which the student correctly identified as necessary and discovered these shortcomings himself.

| **Activity and independence when creating the final thesis** | **B - very good.** |
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*Assess whether the student had a positive approach, whether the time limits were met, whether the conception was regularly consulted, and whether the student was well prepared for the consultations. Assess the student's ability to work independently.*

The student was reasonably active in the preparation of the thesis and participated in consultations at regular intervals. Here I would highlight the independence of the work, especially in the implementation of the proposed solution. During the creation of the bachelor's thesis itself, I had minor complaints about the structure of the thesis, which the student subsequently incorporated.

| **Technical level** | **A - excellent.** |
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*Is the thesis technically sound? How well did the student employ expertise in his/her field of study? Does the student explain clearly what he/she has done?*

The bachelor's thesis represents a major technical challenge that many companies face nowadays. The presented solution is efficient and functional. The student has made good use of his existing knowledge and extended it with new insights in the creation of this thesis. He has used knowledge of robotics, programming, automatic control, and fundamentals of computer vision. In addition, it was also necessary to familiarize himself with the hardware and software used.

| **Formal level and language level, the scope of the thesis** | **A - excellent.** |
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*Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?*

Appropriate technical terms are used in the bachelor thesis. The level of English is good. The scope of the thesis meets and exceeds the requirements as it is a large topic. The structure of the thesis, clarity, and continuity of the chapters is very good. The result of the work is supported by a video recording of the virtual production line operation.

| **Selection of sources, citation correctness** | **B - very good.** |
|---|---|

*Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?*

The thesis cites relevant sources from the topic, which are listed and properly cited at the beginning of the thesis. The student's work is sufficiently differentiated from related work as it uses an innovative approach to solving a problem that has not been presented. The results of the thesis are applicable in both academia and industry and can inspire further work.

**Additional commentary and evaluation (optional)**

*Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.*

I am satisfied with the overall quality of the work, especially with the student's approach to finding the flaws in the system's functionality and presenting unique solutions to eliminate them. The solution demonstrates the flexibility of the proposed system, which was one of the main requirements during the development of the thesis.

**III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE**

*The result of the work meets the assignment and the stated requirements and I have no reservations about the results. I would like to ask the following questions:*

*Is it possible to extend the current virtual commissioning to a digital twin, i.e. a connection to a real line, and if so, how?*

*Is it possible to collect data from individual devices in the current version of the virtual commissioning?*

The grade that I award for the thesis is **A - excellent.**

Date: **30.5.2024**                                Signature: