**FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE**

Supervisor's statement of a final thesis

Supervisor: Mgr. Alexander Kovalenko, Ph.D.
Student: Bc. Jan Šefčík
Thesis title: Machine Learning for Wafer Bin Map Defect Pattern Classification
Branch / specialization: Knowledge Engineering
Created on: 24 May 2022

Evaluation criteria

1. Fulfillment of the assignment

▶ [1] **assignment fulfilled**
  [2] assignment fulfilled with minor objections
  [3] assignment fulfilled with major objections
  [4] assignment not fulfilled

The aim of this thesis was to develop an efficient ML method for wafer bin map defect pattern classification, which is an important problem for efficient semiconductor microchip production. The student fulfilled the assignment by applying supervised, semi-supervised and self-supervised approaches to the problem. The latter approaches are of the utmost importance as real-life datasets are not labeled.

2. Main written part   95 /100 (A)

The main part is well written and comprehensive. Relevant sources, such as literature and software are properly used, quoted, and cited. However, an overall graphical comparison of the three approaches (supervised, semi-supervised, and self-supervised) could be useful for the reader.

3. Non-written part, attachments   95 /100 (A)

The source code is stored on gitlab, as all the training and evaluation were done on open-sourced dataset the results can be easily reproduced.

4. Evaluation of results, publication outputs and awards   90 /100 (A)

This work is an extent to the already published/known results, however, applied in a specific domain.

5. Activity of the student

▸ **[1] excellent activity**
  [2] very good activity
  [3] average activity
  [4] weaker, but still sufficient activity
  [5] insufficient activity

6. Self-reliance of the student

▸ **[1] excellent self-reliance**
  [2] very good self-reliance
  [3] average self-reliance
  [4] weaker, but still sufficient self-reliance
  [5] insufficient self-reliance

The overall evaluation   93 /100 (A)

Overall solid work dealing with an important task. The proof of concept described in this work can be directly applied to the production for the integrated circuit manufacturing optimization.

Instructions

Fulfillment of the assignment

Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.

Main written part

Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies?

Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 52/2021, Art. 3.

Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.

Non-written part, attachments

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

Evaluation of results, publication outputs and awards

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

Activity of the student

From your experience with the course of the work on the thesis and its outcome, review the student's activity while working on the thesis, his/her punctuality when meeting the deadlines and whether he/she consulted you as he/she went along and also, whether he/she was well prepared for these consultations.

Self-reliance of the student

From your experience with the course of the work on the thesis and its outcome, assess the student's ability to develop independent creative work.

The overall evaluation

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.