

## Review of Bachelor's Thesis

**Student:** Otčenáš Matej  
**Title:** Detection, Extraction and Measurement of the Contour and Circumference of the Metacarpal Bones in X-Rays of the Human Hand (id 24207)  
**Reviewer:** Dvořák Michal, Ing., DITS FIT BUT

- 1. Assignment complexity** **average assignment**  
While the assignment itself could be considered fairly straightforward image processing task. The fact that the database consists of heterogeneous real world x-ray images, with only a small number of annotated data samples for reference and the student has included functionalities beyond the assignment, I consider this assignment to be of average difficulty.
- 2. Completeness of assignment requirements** **assignment fulfilled**  
Both the sub-parts and the assignment itself can be considered fulfilled.
- 3. Length of technical report** **in usual extent**  
The length of thesis meets the requirements and is of standard length. While some sections, especial in theoretical section are arguably superficial and could benefit from further elaboration.  
For example, section 2.8.1 Mask Region-based Convolution Neural Network (Mask R-CNN) is very brief considering it then form the basis of the practical application.  
Similarly subsection 2.9.2 Detectron2 lack the more in depth discussion behind the choice of this particular tool, given its importance.  
Despite these shortcomings, it does suffice.
- 4. Presentation level of technical report** **65 p. (D)**  
The presentation level of this report is acceptable. The continuity of individual chapters and sections is done well, however the overuse of subsections brings the clarity and the overall level of the presentation down. The majority of subsections are a single paragraph long and some subsections are only several sentences long such as 2.6.4 - 3 sentences, 2.9.1 - 3 sentences 3.2.1 - 2 sentences an many others. These subsections should have been merged into larger subsections.
- 5. Formal aspects of technical report** **50 p. (E)**  
The level of written English in this thesis is very poor. While comprehensible, the number of grammatical (then/than, missing articles), stylistic and lexical errors (density is **bigger**(higher), the **bigger**(larger) the amount of, use of this **discipline**(field) is broad ) indicates that the work has not been proofread, aside from basic spellchecking.
- 6. Literature usage** **70 p. (C)**  
The number and types of literary sources are adequate for this type of work. Bigger emphasis on existing approaches and technologies would be beneficial, but given the direction student approached this thesis with, it is sufficient.
- 7. Implementation results** **70 p. (C)**  
The practical part of this thesis fulfills the required tasks, but parts could have used a better approach. Especially the minimal length calculation is an inefficient approach to a fairly simple image processing problem. However, given the test set of 2329 images and the achieved results, as indicated in the thesis are very good.  
Documentation is adequate. I appreciate the Read\_me file which provides step by step instruction along with examples.  
The code is sufficiently commented, especially given its short length. The trained and tested networks are the most valuable output of this thesis.
- 8. Utilizability of results**  
The practical part of this thesis is able to perform the task, per the specification of the apparent user. As such, it can be assumed that it will be used in practice, there is however lots of room for improvement.
- 9. Questions for defence**
  - How did you decide, which CNN to use? Did you consider other?
- 10. Total assessment** **69 p. satisfactory (D)**  
The choices for individual algorithms are not discussed sufficiently to justify them as a best/good approach. The bachelor thesis document itself is of uneven quality, when it comes to logical structure, and linguistically is below average. However, the chosen approach to this assignment fulfills the required tasks at a high success rate and

the practical portion is written in a manner that allows further expansion. For these reasons I propose the grade **D**.

In Brno 4 June 2021

Dvořák Michal, Ing.  
reviewer