



# Review report of a final thesis

**Reviewer:** Ing. David Herel  
**Student:** Bc. Yury Hayeu  
**Thesis title:** Graph neural networks and deep reinforcement learning in job-shop scheduling  
**Branch / specialization:** Knowledge Engineering  
**Created on:** 3 June 2024

## 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

Assignment has been fulfilled in full scope.

### 2. Main written part 90 /100 (A)

The content and scope of the thesis is well-composed, coherent, with natural flow between chapters. The overall logical structure of FT follows the workflow of the assessment well. However, proportionally, the theoretical chapters could be reduced slightly, since they comprise app. 2/3 of the overall content, which would emphasise the novel contributions of the thesis.

Thesis is factually correct, formal notations, as well as quotations and citations are used correctly. The typographic and language aspects of the FT are very high-quality and well done.

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

The supporting code is well written and well organised for potential future reuse, supporting replicability of the experiments. The scope, technology and tools used are adequate to the task.

### 4. Evaluation of results, publication outputs and awards 80 /100 (B)

To my best knowledge, the results could be replicated and used in practice. Minor score decrease is due to the nature of the task, since it is conceptually very niche and specific

to a certain area, with mostly incremental improvement over existing solutions and slightly weaker novelty value.

## **The overall evaluation**

**85** /100 (B)

Overall, the thesis is well-written and introduces and explores the topic in depth and at a high academic level. In my point of view, the main contribution of this work is the comparative approach of existing solutions of DJSSP, with an incremental improvement of existing solutions with slightly limited novelty value.

## **Questions for the defense**

1. What are the core finding to support the potential of DRL methods to solve the DJJSP problem?
2. What are the challenges of experimenting with multiple-objectives reward functions?

## **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.

### **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.