



# Review report of a final thesis

**Reviewer:** Ing. Karel Klouda, Ph.D.  
**Student:** Bc. Martin Kostrubanič  
**Thesis title:** Football outcomes prediction with tensor completion embeddings  
**Branch / specialization:** Knowledge Engineering  
**Created on:** 6 June 2023

## 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

All the points of the assignment were completely fulfilled. Some of them were completed very well, especially the research part (point (1)).

### 2. Main written part

94 /100 (A)

The thesis is written in good English, which is easy to read. The text is slightly unusually structured. The long introduction (chapter 1) contains a research section. The presentation of the methods is also supplemented by references to the literature where the methods have appeared. However, this unusual structuring is certainly not a disadvantage; on the contrary, in some cases, it has made the text easier to follow. I have a minor complaint that it has led to a repetition of some information: for example, results from work [17] are presented in similar wording on pages 8 and 19.

Presenting some classical methods (e.g., logistic regression) is perhaps unnecessary. However, I appreciate that the author was not afraid of formulas and, moreover, got them formally and factually correct (only on page 13 is there an error in the formula for the softmax function). The explanation in section 2.3 is too dense for the unfamiliar (e.g., the author of this review), but such stuff is probably hard to explain in a thesis.

I appreciate the very clear presentation of the experimental results, although these were not entirely straightforward.

### **3. Non-written part, attachments**

92 /100 (A)

The attachment contains Python scripts and Jupyter Notebooks that do all the work with the data: from processing to applying the models. The breakdown into 62 notebooks is unusual. I believe it would be possible to incorporate dataset selection into the notebook at least so that the number of files could be reduced by a factor of five.

### **4. Evaluation of results, publication outputs and awards**

93 /100 (A)

The use of Tensor Completion in the prediction of sports results is an interesting idea, and the results show that it has the potential to be a real improvement. The experiments that confirm this are well-conducted and methodologically sound.

## **The overall evaluation**

93 /100 (A)

I consider the thesis to be very well written and worked, and I propose to grade it with A.

## **Questions for the defense**

- 1) Would it be possible to modify the tensor completion method to work with more dimensional information than just win/loss/loss information?
- 2) On page 32, you write that fans contribute significantly to home advantage. Do you have any evidence for this?
- 3) Since only a few goals are usually scored in football, the result is often heavily influenced by luck. Wouldn't it be better to work with statistics measuring the quality of chances created (xG, xPts) instead of the match result?

## **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.