FACULTY OF INFORMATION TECHNOLOGY CTU IN PRAGUE

Review report of a final thesis

Reviewer:	Ing. Petr Kasalický
Student:	Ondřej Herman
Thesis title:	Machine Learning-Based Prediction of Football Match Statistics
Branch / specialization:	Knowledge Engineering
Created on:	12 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 tasks of the assignment were fulfilled. Moreover, task 4) requires at least four baseline models, and the student evaluated his approach using nine baseline models.

2. Main written part 99 / 100 (A)

The length and structure of the thesis correspond to the standards of bachelor theses. The work is written in clear English with a minimum of errors and with wording appropriate to a scientific article.
The author assumes no knowledge on the reader's part and explains everything needed to understand the work, including football, and the motivation for why the problem of predicting football statistics is worth dealing with. In Chapter 2 (Literature Reviews), all methods and approaches are cited correctly. In Section 3.2.5 discussing MLP as one of the baseline models, the author mentions Adam optimizer, but the citation is missing.

3. Non-written part, attachments 98 / 100 (A)

The thesis includes the datasets collected by the author from two different sources and combined with non-trivial modifications as described in Section 4.1. The attached code is clear and demonstrates good engineering practice, including the use of typing to make the code easier to understand. A bonus is that the code is capable of parallel computation of individual datasets. For easier replicability, I would appreciate a file describing the packages used (e.g. requirements.txt, or environment.yaml), especially since the packages used in the work are non-standard (tensortools, tensorly, t3f).

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

The author conducted a thorough research of existing solutions, superior to most of the bachelor theses. The reader will clearly understand how the proposed method differs from existing solutions. The design of the proposed method takes into account real-world use cases and constraints on when data is available (i.e., it does not use data from the future). The thesis works as proof-of-concept that the proposed method works and it can maybe even stand up even among state-of-the-art methods. The work has publication potential, although for publication the method would need to be extended and compared with more advanced approaches.

The overall evaluation 99/100 (A)

The bachelor's thesis is of excellent quality with a few very minor flaws. I recommend the thesis for defense with a grade of A.

Questions for the defense

Could your approach also be used to predict the expected goals (xG) metric? What would need to be changed to make this possible?
During preprocessing the data, did you have to consider the COVID-19 pandemic, where many games were postponed or canceled?

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.