

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	<b>Inferring Temporal Models of People Presence from Environment Structure</b>
<b>Author's name:</b>	<b>Jan Blaha</b>
<b>Type of thesis :</b>	bachelor
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Department of Cybernetics
<b>Thesis reviewer:</b>	Claudio Coppola
<b>Reviewer's department:</b>	Department of Computer Science, Queen Mary University of London

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>extraordinarily challenging</b>
<i>How demanding was the assigned project?</i>	
<p>The proposed thesis aimed to illustrate the "FrEMen contra COVID" project and to design, implementation and experimental verification of a temporal model for giving useful recommendations on the best time to visit specific places at the time of the COVID lockdown.</p> <p>The presented methods show how data is collected and the temporal modelling of the people's presence in specific locations.</p> <p>The initial part of the work focuses on the software solution that allows collecting the data provided directly from the users. It indeed describes the software design choices and the development of the solutions. The second part describes in the detail the choice of the used temporal model, the experimental procedure and the results.</p> <p>This is a very challenging workload. It encompasses software engineering and mathematical modelling tasks to solve the problem.</p>	
<b>Fulfilment of assignment</b>	<b>fulfilled</b>
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
The tasks have been completely fulfilled.	
<b>Methodology</b>	<b>outstanding</b>
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The approach is novel and mathematically correct. It can be considered for publication with few edits.	

**Technical level**

**C - good.**

*Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?*

While the technical and description of the software are excellent, The final part of the thesis regarding the recommendation algorithm is very hard read and to understand. In particular:

- While having a detailed algorithm gives a detailed look at the steps taken to build the model, It is encouraged to provide some top-down description, possibly using a visual aid, of the pipeline of operations used to build the model from the data and how it is used at execution time.
- The used metrics should be more semantically clear. For example,  $b^{(d,b)}$  and  $r^a$  are very hard to identify semantically. Similarly the output variable in Figure 8 refers to "Average Business [%]" but is not easy to understand to what metric it refers to. This makes it hard to validate how good the results were.

It is encouraged to give more descriptive details about the modelling process and the thought process that led to the definition of the designed temporal model, without assuming a prior knowledge from the reader. Furthermore, the metrics used and their semantical meaning should be described more in detail. This makes the approach much easier to validate and understand.

Finally, if it was correctly interpreted, the amount of crowd in a place has been called `business` through the thesis. That name can be misleading and/or confusing for a reader who has not a prior knowledge on the project. Thus, it is suggested to find an alternative name for it.

**Formal and language level, scope of thesis**

**A - excellent.**

*Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?*

Only minor problems were encountered:

- Some typos are found here and there (e.g. "Sheme" in the caption of Figure 8, "then FreMEen operating over individual..." in page 8).
- If a formula is written as a sequence it should include more than just the first index (Formula 4).

**Selection of sources, citation correctness**

**A - excellent.**

*Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?*

The selection of the papers for the literature good and correctly cited.

**Additional commentary and evaluation (optional)**

*Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.*

I have the following questions/suggestions on the project:

- Do the recommendations manage to get an improvement of the quality of life and/or of the infectivity of the disease on a large scale? If many people use the same recommendations, won't they converge at the same places at the same times?
- For future work, I would consider an evaluation of the effects of the approach using a simulation based on a spatial epidemiological model (e.g. spatial SIR) so to observe the results and the improvements experienced by the agents in terms of chance of being infected while losing less quality of life.

**III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE**

*Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.*

The thesis does a good job in presenting FreMEN CONTRA COVID project and the temporal models present in the state of the art.

However, while the procedure of the experiments and the model itself look sound, it is hard to get an idea of why and how it works. Furthermore, the semantic meaning of the metric used for the evaluation of the model is not very clearly described and giving some visualisation about it could improve the readability of the thesis.

The grade that I award for the thesis is **B - very good**.

Date: **2.6.2020**

Signature:

