ČVUT
ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Application of Spatiotemporal Modeling Used in Robotics for Demand Forecast**
Author's name:	**Kubiš Filip**
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Cybernetics
Thesis reviewer:	Zhi Yan
Reviewer's department:	University of Technology of Belfort-Montbéliard (UTBM)

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment — **extraordinarily challenging**

How demanding was the assigned project?

Please insert your comments here.

Fulfilment of assignment — **fulfilled**

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.

Please insert your comments here.

Methodology — **outstanding**

Comment on the correctness of the approach and/or the solution methods.

Please insert your comments here.

Technical level — **A - excellent.**

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?

Please insert your comments here.

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?

Please insert your comments here.

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?

Please insert your comments here.

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.

Please insert your comments here.

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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.

Demand forecast is very challenging. The thesis applies the spatiotemporal modeling used in robotics to this field, and overcomes the loss of spatial context in the prediction process of existing technologies. In particular, the thesis proposes a new demand prediction method and two new ways to evaluate the quality of various predictive models. For the former, the author proposed a new method of spatiotemporal modeling based on Gaussian mixture models, while for the latter, the author proposed the "random area (RA)" to evaluate models' ability of predicting demand in different areas and the "fleet placement test (FPT)" to evaluate how well the model serves demand in a short time-window. In summary, the assigned tasks are fulfilled, the work done is outstanding, and the expansion work is worthy of recognition.

Based on these excellent works, can the author anticipate (during the defense) whether taxi datasets from different countries will show different results (as far as I know, taxis in China, the United States, and France operate differently), and what would be the (interesting) results if you extend your work to other logistics like trucks, trains, ships, or planes?

Some minor comments: 1) Section 3: It's good to firstly demonstrate how discretization causes loss of valuable information, which makes the reader more aware of the author's research motivation. However, Figures 1 and 2 could have more details, like what those dots represent, and what the left and right graphs represent respectively. 2) It would be better to mention what are the "fundamental issues" you actually addressed in Abstract.

The grade that I award for the thesis is A - excellent.

Date: **05/06/2020**

Signature: