

REVIEW OF THE DISSERTATION THESIS

Doctoral student: MSc. Marjana Čubranić-Dobrodolac

Dissertation title: A decision-making model for explaining driver behavior

This review of the dissertation thesis was prepared based on the appointment letter of the dean of the Faculty of Transport Engineering, University of Pardubice doc. Ing. Libor Švadlenka, Ph.D. and on a proposal from the Subject Advisory Board of the doctoral branch of study „Technologie a management v dopravě a telekomunikacích“, from 15th February 2021.

The Ph.D. dissertation is processed on 133 pages of text, supplemented very appropriately by 11 appendices. The text part is supplemented by pictures and tables, which clarify and explain the relationship between phenomena, achieved solutions and results. The dissertation is divided into parts, which logically follow each other. Bibliographic data from abroad are proof of the study of the issue and its correct understanding. The presented results in the dissertation are original and are the work of the doctoral student, which is unique in this form and has not been published to this extent.

Recency of the dissertation

Road safety is a global problem in which human behavior plays a major role. Every day, accidents occur due to the unpredictability of human actions. The theme of the dissertation is highly topical. Comparing many international types of research, the human factor is the most common cause of road traffic accidents.

The author examined the behavior of drivers to find out what kind of human activities would lead to an increased probability of an accident. The author made a detailed analysis of approaches to the issue at home and abroad, thus confirming the need to solve many problems. Based on research, the author underlines the great influence of the psychological traits of drivers.

The research methods

The methodology and research methods used to meet the goal of the dissertation, including sub-goals, are chosen correctly. Methodology and research methods are given in part 4 of the presented work. General and specific scientific methods were used. I agree with the submitted procedures for solving this dissertation.

Fulfilling the goal of the dissertation

The aim of the dissertation, defined on page 38, can be considered fulfilled. The work is focused on the propose and methodology for modeling driver behavior based on the investigation of current methods of explaining driver behavior. This modeling was based on assessing the propensity for road

traffic accidents by knowing the personality traits of a driver. The main goal of the work was properly supported by examining which psychological instruments should be used for this assessment. The author assessed relevant research methods that are applicable for this purpose.

Dissertation results, contribution to practice or development of science

The contribution of the dissertation from the point of view of a theory is a detailed review of the literature, a summary of knowledge from the world together with a detailed analysis of suggestions of foreign authors. The author's processing obtained the data that were collected by four questionnaires related to the psychological traits of drivers and one general questionnaire concerning demographic issues and driving history. The doctoral student applied two general approaches - the first relates to statistics and the second in modeling of driver behavior performed by testing various Fuzzy Inference Systems.

The contribution of the work is optimization by the proposed bee colony optimization algorithm. The practical benefit is the possibility of implementing the proposed decision-making tool that may have significant positive implications in the scope of traffic safety, not only in saving lives but also in saving costs. The practical implication is in the design of training and education processes for candidates applying for a driving license and programs for the prevention of accidents.

Questions for the defense

1. When defending, please state the results of your research, the so-called external influences on the aggressiveness of drivers' driving: traffic restrictions, traffic signs, speed limits, violations of regulations by other drivers.
2. Have you discussed the possibilities of expanding your outputs in practice? Indicate exactly how your work results could be specifically used, for example in driving schools.

Scope and quality of published works on the issue of the dissertation

The publication outputs of the doctoral student are excellent, interesting and fully devoted to the problem. I recommend the author to further develop this area, build on the foundations of this work and present the university abroad.

This dissertation is processed at a very good level in terms of scientific and professional approach. It meets the requirements for this type of work. Based on the study of the thesis and all the submitted documents of the doctoral student and after a successful defense, I propose to award Ms MSc. Marjana Čubranić - Dobrodolac a "Ph.D." degree in the doctoral branch of study „Technologie a management v dopravě a telekomunikacích“.

Žilina, 4th March 2021

doc. Ing. Eva Nedeliaková, PhD.
reviewer