



ROMANIA  
MINISTRY OF EDUCATION  
UNIVERSITY OF PITEȘTI

# HABILITATION THESIS SUMMARY

## INNOVATIVE AUTOMOTIVE TECHNOLOGIES FOR ADVANCED DRIVER ASSISTANCE SYSTEMS

Domain: Aerospace, Automotive and Transportation Engineering

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This thesis outlines the achievements of the candidate in researching innovative technologies used for Advanced Driver Assistance Systems. A whole series of studies are structured in a single work that reveals the research done by the author after obtaining his doctorate degree, at Transylvania University in Brasov. The vast majority of these researches were carried out at the Institute for Research and Development of the University, an initiative built on an investment of approximately 20 million euros which were partly non-reimbursable European funds. This has enabled the author to use state-of-the-art equipment, thus contributing to raising the quality of research.

The part B of this thesis is structured in 3 sections. The section B1 – "Scientific, Professional and Academic Achievements" is the most intense, being structured in 5 chapters. At the beginning of each starting page of a chapter, the original sources of the content are presented, using references to the studies made by the author and listed in the bibliography section, as well as references to projects that have entirely or partially funded the research of the author. Chapter 1 presents two key studies underlying the project NAVIEYES ('Intelligent car navigation assistant for mobile devices based on eye gaze tracking and head pose') and the mobile application built during its timeframe. Chapter 2 presents two studies related to the detection of the eye gaze of the user and provides different solutions for the use of the data obtained, in certain user interfaces. Chapter 3 considers using multiple inputs to interact with various systems, such as gestures or corneal-retinal potential. This approach has the capability of improving the interaction with support sub-systems. Chapter 4 deals with the use of augmented reality for an improved driving experience based on the use of head-up displays, while Chapter 5 proposes the use of artificial intelligence to calculate collision-free trajectories in environments with fixed and dynamic obstacles.

The section B2 titled 'Career Presentation and Development Plans' outlines both the previous achievements of the author and the directions to follow in the years to come. The results obtained, the main and secondary objectives, as well as the ways in which the author wishes to achieve these, are also structured in this section.

The last section contains the bibliographic references associated with this thesis.