современным технологиям и материалом является выполнимым. На данный момент проект находится на стадии проектирования и разработки технологии изготовления транспортного средства.

Основными конкурентными преимуществами проекта можно назвать следующие:

1) разработка является инновационной в данном регионе;

2) транспортное средство будет иметь техническое зрение, что позволит уменьшить риски при эксплуатации;

3) процессы внедрения и эксплуатации являются достаточно дешевыми; система безопасна и удобна в использовании.

В дальнейшем также планируется проведение анализа актуальности внедрения проекта в другие учреждения, у которых есть необходимость решения проблемы передвижения; поиск источников финансирования проекта, а также внедрение «ТСП01-18» в тестовом режиме.

Внедрение транспортного средства возможно не только на территории Tsinghua University, но и в других учреждениях, где время, затрачиваемое на передвижение, и поток людей также высок. А в результате реализации проекта «ТСП01-18» будет не только увеличена эффективность построения процесса работы, но и устранены различные риски, связанные с передвижением.

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A CONCEPT OF EVALUATING THE DRIVER'S READINESS TO TAKE OVER CONTROL FROM AN AUTONOMOUSLY DRIVING VEHICLE

Dubovsky V. A., Savchenko V. V.
The Joint Institute of Mechanical Engineering of the National Academy of Sciences of Belarus (Minsk, Belarus)
vdubovsky.email@gmail.com

Annotation. In a highly automated vehicle, the driver can transfer the vehicle control to the autonomous driving system, and can be engaged in non-driving activities, such as reading or watching a video, but in emergency situations, the driver should take over control. In this case, the driver may not be able to perform the driving task safely. Currently, this problem is addressed based on monitoring of the driver functional state and issuing a take-over request, however, due to its complex interdisciplinary nature, it has not yet been finally solved. The aim of this paper was to propose a new concept

of evaluating the vehicle driver's readiness to take over control based on taking into account the driver's individual characteristics. The proposed concept can be used as a framework to develop a research project aimed to mitigate safety risks during the transition from automated to manual driving.

1. Introduction.

Currently, there is a trend of increasing the level of driving automation towards self-driving vehicles [1]. Evidence of this is reflected in the standard, SAE J 3016, developed by the Society of Automotive Engineers (SAE International) [2], which defines the levels of driving automation from 0 (no driving automation) to 5 (full driving automation). In a highly automated vehicle (HAV), the driver can transfer the vehicle control to the autonomous driving system (ADS), and can be engaged in non-driving activities, such as reading or watching a video, but in emergency situations, the driver should take over control. In this case, the driver may not be able to perform the driving task safely because of lack of situation awareness (SA) and sudden changes in workload [3]. Currently, this problem is addressed based on monitoring of the driver functional state (DFS) and issuing a take-over request, however, due to its complex interdisciplinary nature, it has not yet been finally solved. The aim of the paper is to propose a new concept of evaluating the vehicle driver's readiness to take over control based on taking into account the driver's individual characteristics (DIC).

2. Concept.

The proposed concept involves an estimation of the DFS based on video and EDA data during automated driving, an estimation of the DIC during manual driving, and taking into account DIC during transition of control. This concept is illustrated in the diagram (fig. 1) and can serve as a framework for developing a research project aimed to mitigate safety risks during the transition from automated to manual driving. The main tasks to be undertaken in the implementation of such a project are:

– development of a new approach to determining the driver's readiness to take over control of a HAV based on an assessment of the DFS by using EDA and video data obtained during automated driving (advantages of using the EDA indicators for this purpose can be seen from [4]), and on taking into account the DIC;

– development of a new approach to determining the indicators of DIC by using the driver, vehicle and environmental states data obtained during manual driving;

– development of an experimental methodology for obtaining a new knowledge about the regularities and features of the relationship of indicators of EDA, DIC, SA and DFS in different road situations and their impact on driver readiness to take over control of a HAV;

– carrying out experimental studies of the process of taking over vehicle control by the driver on the basis of the developed methodology using a simulator;

– analyzing and summarizing of the results of experimental studies.

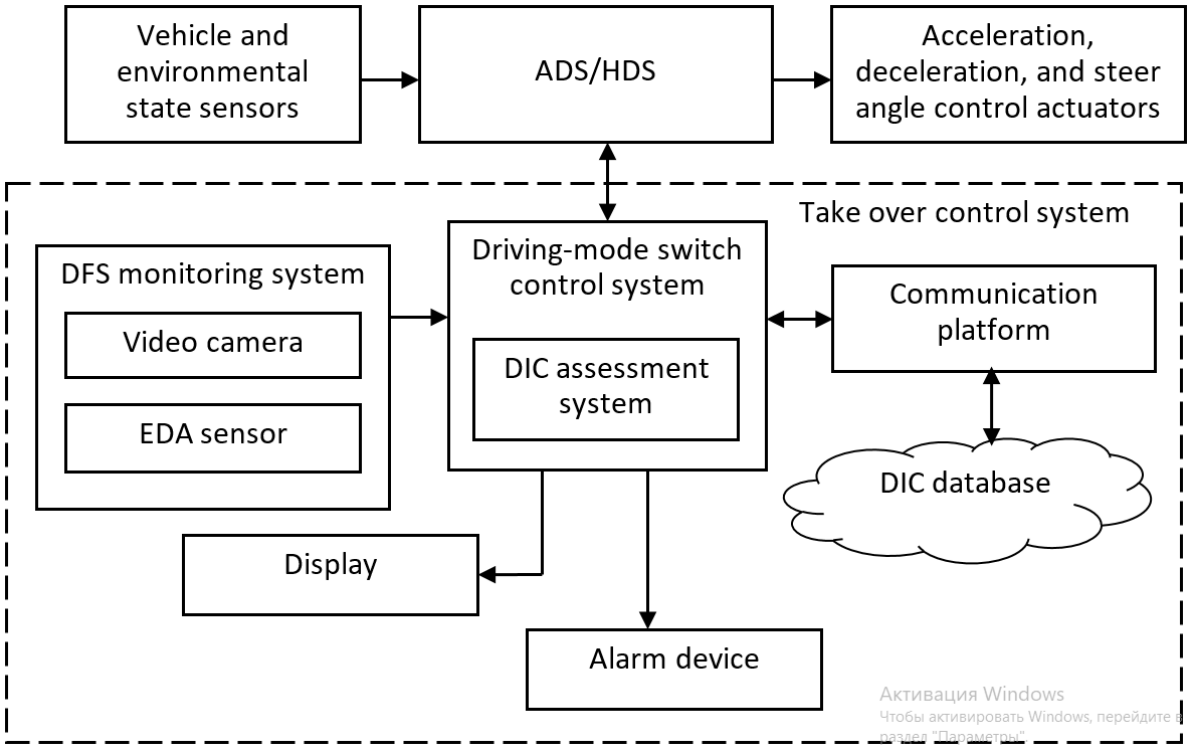

Figure 1 – Take over control system general structure (HDS – human driving system)

The main result of the project will be a method of monitoring the driver's readiness to take over control of a HAV that allows to improve road safety during the transition from automated to manual driving.

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