Mgr inż. Stanisław Nader

Summary

ANALYSIS AND EVALUATION OF THE CONTROLLING EFFECTS OF VEHICLES BY DRIVERS WITH THE USE OF VIRTUAL REALITY DRIVING SIMULATOR

The paper presents basic information about car driving simulators and a review of exemplary solutions. Existing technical solutions were analyzed, and their most important features were indicated. The paper presents author proposal to build a research stand based on the use of VR technology potential. The functional model of the stand was presented, and the potential of using the proposed method was indicated. In addition, a model of signal and information flow was built, which allowed to specify the elements of the structure of the simulator, the choice of measured signals and the method of parameter registration. Signals were classified and the method of analysis was indicated. The method of performing tests and the principle of selecting the studied population have been described. At the end an exemplary result of pilot studies obtained during the research was presented. For this purpose, EEG signals were tested. A characteristic relation was found between the situation on the road, the driver's reaction, the correction of the situation, and the metering of changes introduced by the driver.

This paper also presents selected results of tests, carried out on a selected group of people using a car driving simulator based on the VR technology. For the prepared test scenario, tests were conducted for a group of 31 people, different in terms of sex and age. In order to analyze the reaction, the behavior of the participants under study using the camera was recorded, and the activity of selected areas of the brain was evaluated using the BCI interface. The analyzed population of people was analyzed for the presence of behavioral analytics during the conducted research, and the reactions of electrical activity in the form of registered brain waves were done. Additionally, questionnaire research was carried out among the respondents, allowing to determine the suitability of the VR technology used in the aspect of realism of the observed sensations and reactions of the subjects.

23.IX.2019