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IPN Develops Artificial Intelligence to Measure Driving Stress in Urban Areas

• Dr. Amadeo José Argüelles Cruz of the CIC, in collaboration with other institutions, conducts tests in various scenarios to assess situations and improve urban planning

In response to the mobility challenges faced by major metropolitan areas such as Mexico City, researchers from the Instituto Politécnico Nacional (IPN) are developing biometric sensors to identify drivers' behavioral patterns. With the support of artificial intelligence (AI), they aim to determine various factors that influence driving behavior, including stress levels.

Dr. Amadeo José Argüelles Cruz, a researcher at the Centro de Investigación en Computación (CIC) of the IPN, explained that as part of this project, sensors are placed in simulators and controlled environments to analyze drivers' behavior and stress levels, with the goal of improving road safety education in urban areas.

He added that using AI algorithms, IPN experts conduct simulations of different driving and pedestrian scenarios to assess the performance of proposed systems and design safer mobility strategies.

The data collected is used to comprehensively address key issues such as road safety, efficiency of public and private transportation, traffic education, users' health impacts, and the design of appropriate infrastructure.

Dr. Argüelles Cruz, who is also a Level II member of Mexico's National System of Researchers (SNII) under the Secretariat of Science, Humanities, Technology, and Innovation (Secihti), noted that the data obtained from these experiments will help train predictive models that can be integrated into Advanced Driver Assistance Systems (ADAS).

This will make it possible to design strategies for traffic signal placement, modify pedestrian crossings, identify factors behind sudden braking or erratic driving behavior,









and optimize travel routes, among other key elements.

Sensors are being used in simulators and real-world driving environments to analyze steering maneuvers, drivers' reactions to pedestriansespecially on main roads, the presence or absence of traffic lights, types of road signs, and traffic density. This will allow researchers to gather and analyze data that helps understand driver responses to everyday traffic situations and their impact on road safety.

Dr. Argüelles Cruz emphasized the importance of generating scientific and technological knowledge to develop safer, more efficient, and sustainable mobility solutions, especially in large cities.

He noted that over the years, new challenges have emerged, such as the rapid growth of the motorcycle fleet, which now exceeds six million units in Mexico. A large number of these vehicles, he pointed out, operate without complying with current regulations, posing an additional challenge in terms of safety and enforcement.

This project is being developed with the support of the IPN's Network of Experts in Automotive Innovation and the Mexican Institute of Transportation (IMT), both of which are part of the National Laboratory for Intelligent Electromobility (LANCEI) consortium.

For more information, visit <u>www.ipn.mx</u>

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