

SOUTENANCE DE THÈSE

M. Shriram Jugade

Soutiendra sa thèse de **Doctorat** sur le sujet :

Shared control authority between human and autonomous system for intelligent vehicles

Dans l'Unité de Recherche :

HEUDIASYC UMR CNRS 7253

Vendredi 20 septembre 2019 à 10h
à l'UTC, bâtiment du GI Blaise Pascal, salle GI42

devant le jury composé de :

M. Jean-Christophe Popieul, professeur des universités, université polytechnique Hauts-de-France

M. Aldo Sorniotti, professor, university of Surrey, Grande Bretagne

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The field of ADAS has been continuously evolving for the better and safer driving experience. Currently, the road map for the future developments is targeted to have fully autonomous/self-driving vehicles. Human drivers are still going to play an important part from an overall performance aspect. One important issue still exist i.e. How will the transition between manual driving mode and autonomous driving mode take place? Also, the autonomous driving encounter various driving issues and need to be resolved with the help of human driver. One of the approach to address these issues is shared driving control authority.

A shared control authority methodology is developed through the fusion of the driving inputs of both the drivers. The use of fusion system approach removes the need of direct interaction between human and autonomous driving system. Fusion is achieved by resolving the conflict between the two drivers using non-cooperative game theory and is based on features like driving decision admissibility, future predictions of driving profiles, individual driving intentions comparison (based on a similarity measure) etc. A two player non-cooperative game is defined incorporating the driving decision admissibility and intentions. Conflict resolution is achieved through an optimal bargaining solution given by Nash Equilibrium. The final driving command for the vehicle is derived from the bargaining solution. The relevant information is fed back to the human driver from the fusion system to avoid any confusion. The validation is carried out on a test rig integrated with the software like IPG CarMaker and Simulink. Various features of the fusion system such as collision avoidance, human centric etc are analyzed in the validation process.