

## Research topics for graduate students for 2025

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Acceptable course(s)

- Master's Degree
- Doctoral Degree



#### Research Topics

The main topics of research are the elemental technologies of intelligent mobilities, such as recognition systems of surrounding driving environment, digital maps systems, motion control systems, and their integrations. Following are a few research topics.



#### 1. Adaptive motion control based on data-driven risk map

To prevent traffic accidents on community roads, we developed proactive braking intervention systems. Further, to make such systems more adaptive, we developed a new algorithm for the evaluations of risk around non-signalized intersections with poor visibility, and an adaptive motion control algorithm based on such data-driven risk map [1].

#### 2. Recognition systems of surrounding driving environments on community roads

To realize advanced driver assistance systems on community roads, we developed various recognition systems of surrounding driving environments where various road marks are damaged and lane marks does not exist, by combining the information from onboard sensors with the information from digital maps [2].



#### 3. Motion control systems using stochastic localization information

To prevent collisions in the non-signalized occluded intersection on community roads, we developed connected collision avoidance systems based on stochastic localization information utilizing information from sparsely placed roadside sensors [3].

#### Articles Related to Research Topics

[1] Ito, T. et al., Evaluation of Acceptability of Adaptive Proactive Braking Intervention System Based on Risk Map for Elderly Drivers, *Int. J. of Automotive Eng.*, 11(2), pp. 40-48, 2020. [DOI: 10.20485/jsaeijae.11.2\_40]

[2] Furuse, W. et al., Lateral Localization via LIDAR-Based Road Boundary Extraction on Community Roads, *Int. J. of Automotive Eng.*, 11(3), pp. 116-123, 2020. [DOI: 10.20485/jsaeijae.11.3\_116]

[3] Ito, T., Connected Collision Avoidance System via Stochastic Localization on Community Roads, *Int. J. of Automotive Eng.*, 16(1), pp. 1-11, 2025. [DOI: 10.20485/jsaeijae.16.1\_1]

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