
Subject

3D model registration to merge virtual reality and SLAM

Key words: embedded vision systems, real time processing, localization, mapping, 3D modeling, registration, augmented reality, SLAM, navigation

Description :

This thesis aims to address the challenge to provide a fully automated real-time fusion of data acquired by sensors (camera, lidar,...) with a virtual 3D model of indoor or outdoor buildings.

The key issue is that both acquired sensor data and 3D models contain erroneous data and moreover do not store the same information (geometric, texture, semantic,...). We will investigate the most suitable way to represent the data and its adequation to the registration method in order to reach real-time processing. Power consumption will also be taken into account, as the developed method is dedicated to be run on embedded systems.

The expected results will be presented in several domains: augmented reality, autonomous navigation, 3D modeling.

National and International Collaboration : The doctorant will be a member of the IRSTV and he/she will interact with IRSTV partners in the outdoor application context.

The doctorant will also interact with the ADAPT project international partners. We also expect to collaborate with University of Auckland, a long-time partner of the Vaader Team on embedded vision systems.

Localisation

Team VAADER of IETR, Rennes, on the INSA Rennes site.

Supervision

PhD director : Luce Morin

Co-supervisor : Muriel Pressigout

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Contract

3-years contract on the basis of a monthly gross income of 1 760 euros approximatively. Part-time teaching can be considered.

Start in autumn 2018.

Skills

Degree: Research master or engineer degree in computer/ image processing /computer vision /math

Desired competencies :

- Experience/knowledge with image processing / optimization methods
- Experience/knowledge with Oriented-Object Programming
- Experience/knowledge with OpenCV, PCL, GPU can also help