Soutenance de **thèse** : mercredi **9 décembre 2016**

14h

Bât. 660, Shannon Digiteo LABS, Rue Noetzlin 91190 Gif-sur-Yvette, Campus Paris-Sud

Étude et quantification de la contribution des systèmes de perception multimodale assistés par des informations de contexte pour la détection et le suivi d'objets dynamiques

Egor SATTAROV

Abstract :

This thesis project will investigate and quantify the contribution of context-aided multimodal perception for tracking moving objects. This research study will be applied to the recognition of relevant objects in road traffic environments for Intelligent Vehicles (IV). The results to be obtained will allow us to transpose the proposed concept to a wide range of state-of-the-art sensors and object classes by means of an integrative system approach involving learning methods. In particular, such learning methods will investigate how the embedding into an embodied system providing a multitude of different data sources, can be harnessed to learn 1) without, or with reduced, explicit supervision by exploiting correlations 2) incrementally, by adding to existing knowledge instead of complete retraining every time new data arrive 3) collectively, each learning instance in the system being trained in a way that ensures approximately optimal fusion. Concretely, a tight coupling between object classifiers in multiple modalities as well as geometric scene context extraction will be studied, first in theory, then in the context of road traffic. The novelty of the envisioned integration approach lies in the tight coupling between system components such as object segmentation, object tracking, scene geometry estimation and object categorization based on a probabilistic inference strategy. Such a strategy characterizes systems where all perception components broadcast and receive distributions of multiple possible results together with a probabilistic belief score. In this way, each processing component can take into account the results of other components at a much earlier stage (as compared to just combining final results), thus hugely increasing its computation power, while the application of Bayesian inference techniques will ensure that implausible inputs do not cause negative effects..

Jury :

Rapporteur : Philippe Martinet , IRCCYN Nantes

Rapporteur : Franz Kummert, Universität Bielefeld

Examinateur : Véronique Cherfaoui, Heudiasyc, Compiègne

Examinateur : David Filliat, ENSTA ParisTech

Examinateur : Javier Ibanez-Guzman, Renault

Directeur de thèse : Roger Reynaud

Co-encadrant : Sergio Rodriguez

Co-encadrant : Alexander Gepperth