PHOTONICS - EUROPHOTONICS MASTER COURSE

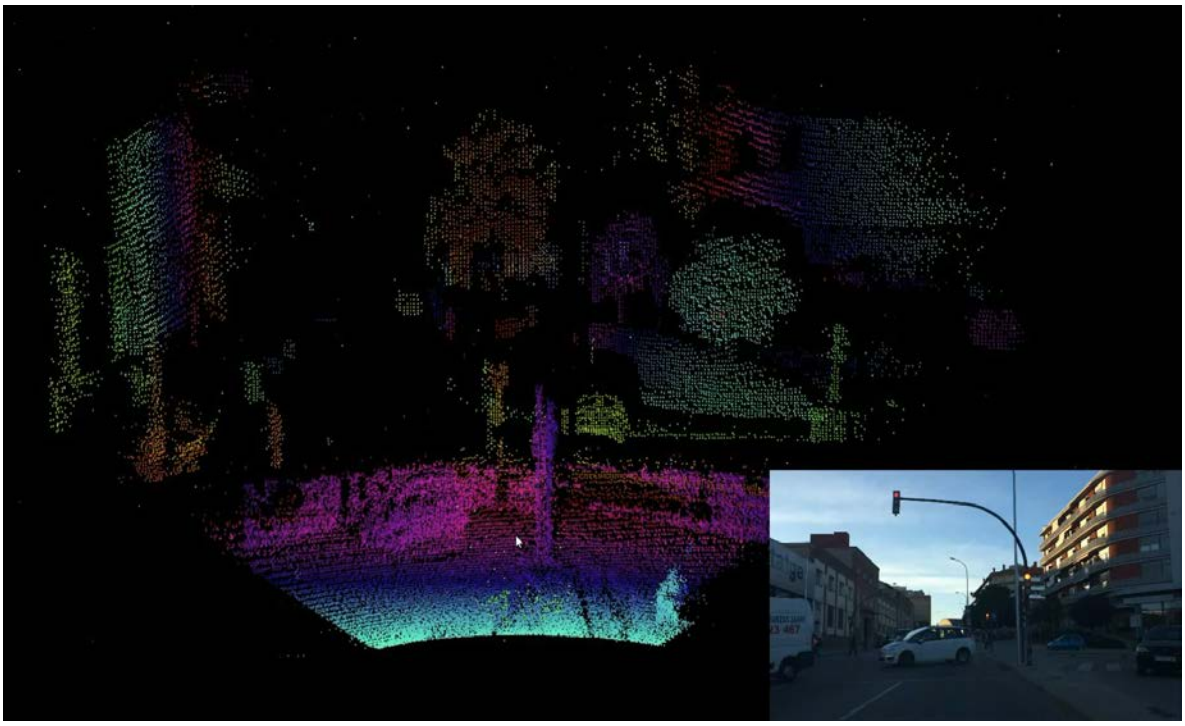
PROPOSAL FOR A MASTER THESIS

Dates : April 1st, 2018 – September 31th, 2018

Laboratory : Centre for Sensors, Instrumentation and systems Development (UPC-CD6)
City, Country : Terrassa, Spain

Title of the master thesis :

Data fusion of lidar and RGB cameras



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Summary of the subject (maximum 1 page):

Lidar imaging is a powerful measurement technique where a laser pulse is shone onto an object and the beam reflected back is recovered at some solid-state detector. The time elapsed is counted so an automated measurement of the distance to the target is obtained, without any further calculation. The concept is also referred to as ladar or time of-flight imaging. Most popular recent applications involve landing aids, object recognition, self-guided vehicles and safety and security applications in transport.

In most applications, the system includes more than one imaging modality, to combine the information in both modalities using some data fusion approach for`further processing. Such different modalities include usually some combination of time of flight, RGB, polarimetric and/or range gated images. Overlaying those image is usually referred to as “registering” the images.

The student in charge of this project will implement registering strategies based on time-of-fight and CMOS-based RGB imaging. This involves analyzing different strategies for registering, the design and construction of some registering setup, and the implementation and optimization of such a setup in the shape of a code.

Experience in programming in C++/C sharp is recommended, but not mandatory..

Keywords : lidar cameras**,** calibration, time-of-flight, 3D imaging, registering, calibration, data fusion

Additional information :

* Amount of the monthly allowance (if it is the case):
Grant scheme available. Amount to be discussed depending on the value of candidate.
Thesis within a collaboration project with a spin-off company.

* Required skills :
Interest in application-driven experimental work for solving real-world problems.
Basic concepts in optical metrology and optical engineering
Programming in Matlab and C++/C sharp
Search of resources, both scientific and technical
Self-motivated, objective-driven, capable of autonomous working within a multidisciplinary team.

* Miscellaneous :
This thesis contents will be considered confidential due to its closeness to market.
International team with several years of experience in the topic proposed.
Multidisciplinary environment with electronics and mechanics workshops, and specialists and technicians in metrology, software, optics, mechatronics, and electronics.
Possibility of joining the Centre for a PhD/Project Manager career in case of common interest.
Early incorporation welcome.