

PHOTONICS - EUROPHOTONICS MASTER COURSE

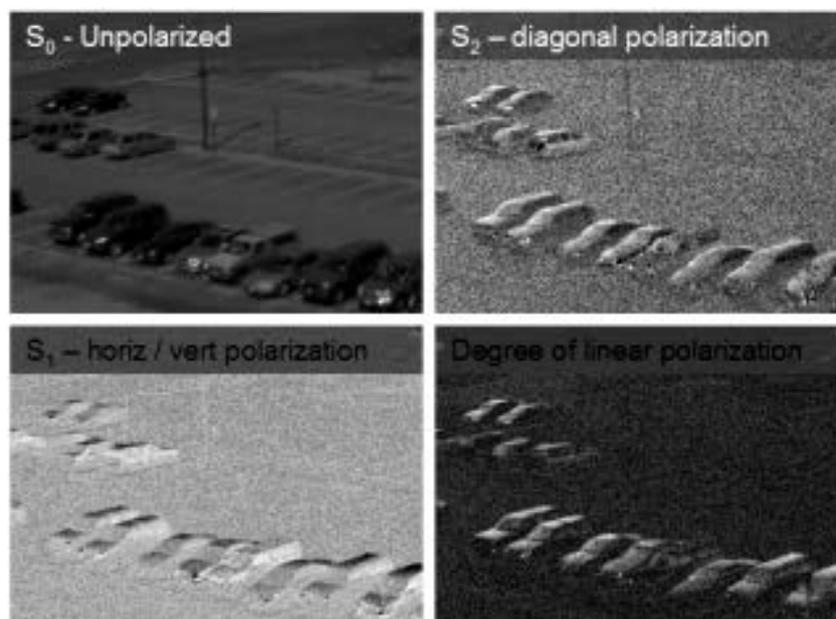
PROPOSAL FOR A MASTER THESIS

Dates : April 1st, 2019 – September 31st, 2019

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

Title of the master thesis :

Evaluation of polarimetric imaging modes for scene classification



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Summary of the subject (maximum 1 page):

Polarimetric imaging has been proposed as a means to compensate for the effects of turbid media in light propagation. It is however, also a method for very efficient scene classification, a problem which is becoming more relevant as more data needs to be fed for processing large neural networks in AI training procedures. Polarization imaging has a large set of potential imaging modes, including the effects of circular polarization, horizontal and vertical imagers, the degree of linear polarization and different ratios among them, and selecting the most adequate for each problem is not obvious.

The student in this work will work in the identification of the most relevant imaging modes available using polarimetry starting from an focal plane division camera, and to investigate the different features of real-world scenes highlighted in practice for each of the available imaging modes. A simple acquisition environment for performing tests within LabView will be developed to enable a fast interchange of the different imaging modes within a given scene, and simple image processing procedures will be developed. A theoretical interpretation of the results will be obtained.

Keywords : 3D imaging, lidar, polarimetric imaging, optical metrology, AI training

Additional information :

* Amount of the monthly allowance (if it is the case):

To be discussed depending on the value of candidate.

* Required skills :

Interest in application-driven experimental work for solving real-world problems.

Basic concepts in optical metrology and optical engineering

Programming (C++, MatLab) and use of scientific software packages (Zemax, Labview...)

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, optics, mechatronics, and electronics.

Possibility of joining the Centre for a PhD/Project Manager career in case of common interest.

Early incorporation welcome.