



MASTER IN PHOTONICS – PHOTONICS BCN EUROPHOTONICS-POESII MASTER COURSE

PROPOSAL FOR A MASTER THESIS

Starting full time from April 2024
Presentation at the end of July or beginning of September 2024

Laboratory: Center for Sensors, Instruments and Systems Development (CD6)
Institution: Universitat Politècnica de Catalunya
City, Country: Terrassa

Title of the master thesis: Improvement in the processing of aberrometric measurements of a Hartmann-Shack sensor for accommodation estimation

Name of the master thesis supervisor and co-supervisor: Mikel Aldaba, Carlos Enrique García, Aina Turull

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Keywords: accommodation, refraction, aberrometry

Summary of the subject:

Subjective refraction is a common task in the clinical practice of optician to quantify and correct myopia and other refractive errors (hyperopia, astigmatism, and presbyopia) that may affect the eye. The goal of this procedure is to find the combination of lenses that provides the best vision in patients in the absence of accommodation (capacity of the eye to focus objects at different distances). Sometimes, mainly in children and young adults, accommodation is involuntary activated without being noticed. When this occurs, the refractive error might be incorrectly quantified and, consequently, wrongly corrected.

A compact system that allows monitoring accommodation during the subjective refraction has been developed in the Centre for Sensors, Instruments and Systems Development (CD6). The implemented prototype, which is based on a Hartmann-Shack aberrometer and works coupled to a phoropter, has been used to successfully obtain the accommodation response for the subjective refraction in patients with accommodation

capacity. Our final goal is to develop a system that could be used as a supporting tool providing information about the true state of accommodation in those clinical procedures in which accommodation plays an important role.

This master thesis will consist in enhance the processing of the aberrometric measurements. This will include finding a method to discard unusable images and to measure the pupil size in real time.

Additional information:

It is desirable that the student has the following knowledge/skills in :

1. Data processing.
2. Use of Matlab.