Dual-angle Wavefront Sensor for Measurements on the Human Eye

Background

Nearsightedness, or myopia, is an increasing a global problem: it is estimated that by the year 2050 half of the World's population will become myopic. However, the underlying mechanisms for myopia onset and development are not fully understood yet. It is believed that the central and off-axis optical parameters of the human eye are related to myopia development. Therefore, we have designed a device capable of measuring optical parameters of central and peripheral (off-axis) vision simultaneously in real-time. The next step is to analyze the performance and capabilities of the developed device in order to use its full potential for studying nearsightedness.

Project description

The purpose of this project is to evaluate and analyze the results from a wavefront sensor capable of simultaneous measurements of central and off-axis optical properties of the human eye. It is part of a larger research project on understanding myopia (nearsightedness). Further into the project this device will be used both to explore the optical factors influencing the development for myopia and to evaluate existing optical corrections of myopia.

The project is intended for **two students** and involves the following steps:

- Literature review on peripheral wavefront sensors
- Designing an adjustable optical eye model
- Measurement and calibration of the eye model in the two channels of the wavefront sensor
- Designing software to process and analyze the results of the measurements
- Evaluating the performance of the system