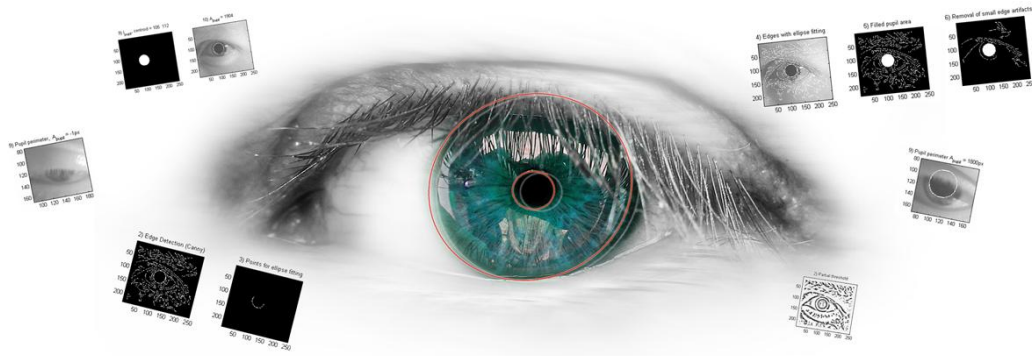


# Automated Pupillometry

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## INTRODUCTION

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Various applications use pupillometry (dynamic assessment of pupil behavior) mainly to evaluate the function of autonomous nervous system in response to various stimuli such as drugs, cognitive load, light, etc. This work shortly reviews the existing literature on physiological aspects as well as the biomedical engineering side of the pupillometry. Also a report is provided on a development of pupil detection algorithm implemented on MATLAB based on edge detection.

Chapter 2 serves as a small introduction to what the concept of pupillometry actually consists of with the short review of the measurement of pupillary fatigue waves that can be used for human alertness measurements. Chapter 3 consists of a review of the measurement setup in pupillometric assessment including the used illumination, cameras, and signal transfer, and pupil detection algorithm types. As the focus of this work is more on the algorithmic side of the pupillometry, the pupil detection algorithm side is slightly emphasized. Chapter 4 discusses the setup used during the development of the pupil detection algorithm, and the basic principles of the algorithm developed. Given that the hardware blocks of the pupil measurement chain were clearly suboptimal, some small hardware changes are also discussed briefly.

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