Department of Computer Science

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OLeNSE - Optometric Learning and Natural Simulation Environment

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What is OLeNSE?

OLeNSE is an Android based augmented reality application used to simulate a variety of eye disorders on mobile devices. By making use of Google's Cardboard VR API, the application is compatible with a wide range of mobile devices, making it an excellent application for individuals who may wish to learn more about specific eye disorders.

With modifiable parameters for each of the included simulations, OLeNSE allows for individuals to simulate eye disorders of different severity, making it an extremely versatile application.

Purpose

The purpose behind the development of the OLeNSE application was to improve on the existing learning resources available to Optometry students. Since the majority of these students rely on text based resources, the idea was to create an interactive resource which was both cheap and easily accessible.

By producing an Android based application, a large majority of these students will be able to make use of the application. Furthermore, unlike similar existing application, OLeNSE makes use of augmented reality in order to produce simulations helping to make them as realistic as possible. Since this augmented reality features makes use of Google Cardboard, the headset required to use OLeNSE will be extremely cheap, making it affordable to student users.

Furthermore, in order to create simulations which could be comparable to real life eye disorders, each of the simulations were based on scientific studies and results. As a result, unlike existing applications which simply mimic common eye disorders, OLeNSE has a basis within science, making it an excellent learning companion for students. In addition to this, OLeNSE can also be used by individuals who may wish to learn more about a particular eye disorder a family member or friend may be suffering from.

References

World Health Organization [1] - *http://www.who.int/blindness/causes/priority/en/index1.html*

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Degree programme

BSc Computer Science

Which simulations are included?

The following simulations can be found within the OLeNSE application:

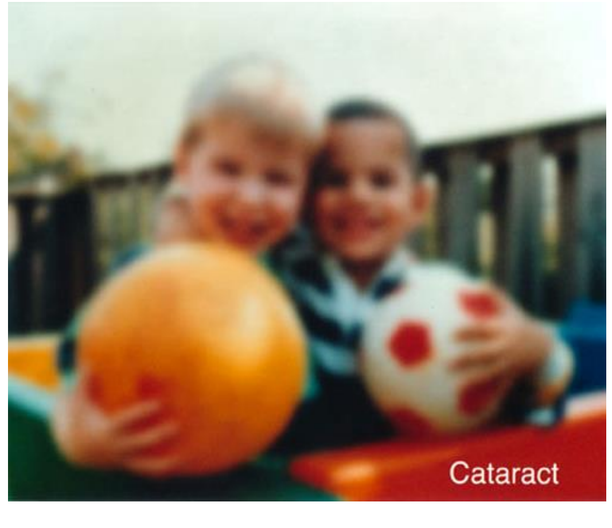
Age Related Macular Degeneration

- Affects the central part of the retina called the macula.
- Two types exist and they are caused by build up of a material called “Drusen”

Glaucoma

- Affects the peripheral vision and can eventually lead to peripheral vision loss.
- Glaucoma is caused by excessive pressure on the optic nerve.

Cataract



- Cataract cases are primarily found in the elderly, and result in blurred or hazy vision.
- Cataract is the most common eye disorder world according to the World Health Organization [1].

Diabetic Retinopathy

- Diabetic Retinopathy is caused by damage to retinal cells as a result of hyperglycemia.
- Diabetic Retinopathy symptoms are characterised by large black spots in vision..