

Display of a portable visual aid – New approach

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Three out of ten individuals older than 75 years are affected by an eye disease, called the age-related macular degeneration (AMD), which causes irreversible damage to the retina. AMD is marked by the degeneration of photoreceptors in the macular region of the retina (center of the visual field) leading to opacities, distortions, scotomas and may even finally result in blindness. Since the disease is currently untreatable, research is conducted towards a visual aid within the scope of the VoiSee® project. This electronic visual aid will considerably disburden the everyday life of AMD patients.

Background

The sense of sight affects a large portion of our extrasensory perception. Various diseases of the retina and the nerve fibers, that significantly impair the sense of sight such as age-related macular degeneration (AMD), are currently not treatable. In these cases, one can attempt to compensate the visual impairment by technical means (e.g. by visual aids). The goal of magnifying visual aids is to compensate the vision loss by an appropriate enlargement to re-enable reading of texts.

Within the scope of the VoiSee® project, research is conducted towards a novel, portable visual aid, which will considerably disburden the everyday life of AMD affected individuals by means of a large field of view to restore their ability to perform general tasks more independently as well as to read smaller writings outside their

homes (as for example product inscriptions in supermarkets or departure boards in railway stations). In addition to the large field of view, a comfortable viewing must be achieved, while the dimensions of the device ought to remain acceptable. Both properties (optical and ergonomic) represent an important presupposition for the acceptance of the future VoiSee® vision aid, which thus distinguishes itself from already existing yet much more restricted portable visual aids.

Project scope

During the present thesis a new approach for the display of a portable VoiSee® visual aid had been reviewed with regard to feasibility and was thereupon implemented. During a subsequent patient study, the newly developed display was compared to two already existing optical VoiSee® displays,

which had also been optimized during this thesis. For the evaluation of the study, optical, ergonomic and economic criteria were considered for selecting the optimal display type.

Results

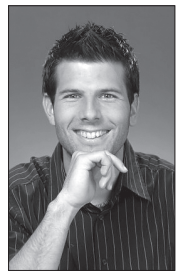
The newly developed display increases the maximum visual angle from 48.9° to 68° compared to the previous display types. Moreover, the new optics substantially improves the viewing comfort.

The statistical significance of the benefits of the newly developed display was shown by a systematic study. 22 of 25 questioned AMD affected individuals preferred the newly developed display which was also the only one of the presented display types judged to be acceptable in everyday life.

Additionally, essential knowledge for further development of the VoiSee® vision aid could be gained during the study.

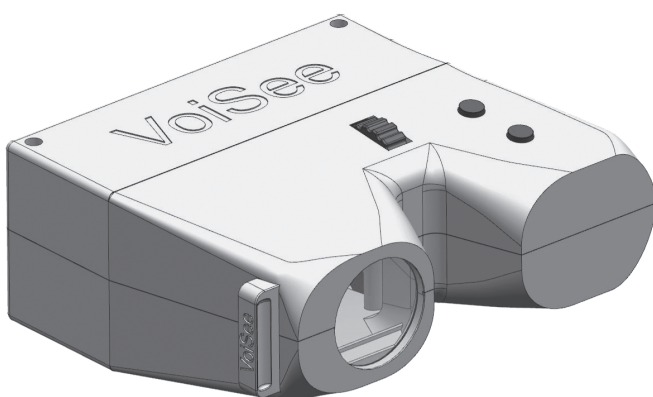
Discussion

The best possible display technology (display-hardware with appropriate optics) could be selected by study results. The chosen display type will be implemented into the first complete VoiSee® prototype in a future project. Therefore, a big leap could be taken towards an optimal portable electronic vision aid.



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The newly developed display