Light as a Possible Guidance in the Toilet Room from the View of Dementia Experts

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Abstract. Digital assistants and guidance systems may support persons with dementia (PwD) during the independent use of the toilet room. The paper investigates the possible use of different light sources to provide visual stimuli for guidance. Demonstrators were presented to dementia experts to gather their views. While there is no evidence yet, it can be concluded that light stimuli in the toilet environment could be a (maybe only additional) option for guidance to be further investigated. The different methods must be always adapted to the local situation and the individual user characteristics.

Keywords. dementia, guidance, Ambient Assisted Living, AAL

1. Introduction

The DIANA consortium has developed an innovative AI-based guidance system able to recognize the user’s behavior and to provide stimuli to the persons with dementia (PwD) in order to support and guide them during their visit to the toilet [1] [2]. Part of this work on stimuli was the investigation of light stimuli in addition to content displayed on a screen. Due to a lack of relevant literature, some demonstrators for possible light stimuli within the toilet environment were built and feedback from dementia experts was gathered. The basic idea of using light stimuli is to draw attention to some location and to provide hints and motivation to move forward. This could support PwD around the toilet when the lights are controlled by the behavior detection unit.

In the following sections, a collection of options for using different light sources as a guide for PwD is first presented, followed by feedback from experts and conclusions.

2. Prototyped Options for Using Light Sources as Guide for PwD

Five options were prototyped as examples to provide guidance:

- Single focus light in toilet seat or by spot projecting on the toilet seat (Opt.1)
- Single symbol projected on the floor by spot (Opt.2)
- (Free) symbols on floor by beamer (Opt.3) or by LED matrix on wall (Opt.4)
- RGB LED strip in the corner to the floor or on the wall (Opt.5)

The collection of options (see Figure 1) for using different light sources to guide PwD was then presented to experts and practitioners from 5 organizations from the field...
of dementia (from research organizations, nursing homes, daycare centers, care providers and the Faculty of Architecture). The aim was to find out which of the options should be tried out further as a guide from the point of view of the experts (and which do not appear promising) and to collect further ideas and suggestions.

3. Feedback from Experts and Conclusion

A great deal of feedback was given, and a lot referred to standard lighting and contrast practices. In general, the idea to use stimuli by light was seen as worthwhile to be tested. A selection of the most important feedback is reproduced below:

- Ideally, there should be a solution that can be customized, as people may or may not find certain colors (or sudden stimuli) creepy. The type and stage of dementia may also be important.
- Experts and nursing staff agreed that the initial situation (the toilet cannot be found) is already a significant problem.
- A well-lit toilet with good contrast is definitely important for PwD, there should be no shadows so that PwD can correctly assess the height of the ceramic.
- The more advanced, the more likely PwD have problems with perception – e.g. assign shadows or icons; Height or depth can no longer be recognized either.

Overall, from demonstrations and resulting expert feedback, it can be concluded that light stimuli in the toilet environment could be a (maybe only additional) option for guidance. The different methods must be always adapted to the local situation and the individual user characteristics. Some methods, like the spots with fixed symbols, are rather inflexible, while others allow variations of what is used, how and where a stimulus is shown and how installation can be done. Control of the options is just on/off for spots, in the case of the more flexible solutions (projector, LED matrix and LED strips) advanced control can additionally influence symbols, patterns and timing. Further studies in real-life settings would be required as there is little expert knowledge in this field.

References


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