Improving Health Care Processes by Smart Glasses – Opportunities and Perils

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Abstract. Smart glasses (SG) are on the verge of entering the mass market. Some physicians are already experimenting with SG in hospital settings. This paper gives a brief description of SG in general. Furthermore, several health-related situations in which SG might have beneficial influence are presented. However, there are perils or different kind and also open issues which need to be addressed.

Keywords. Smart Glasses, Health Care, Future Trends

Introduction

According to Gartner Technology Research smart glasses (SG) will have a major impact in the next years [1]. But nowadays, this transformation is just at a very early stage. Recently (2013) a first edition of Google’s Glass was shipped to early adopters. Physicians already proposed some ideas how SG can support health professionals [2].

1. Methods & Material

Smart glasses constitute a new category of devices, as they imitate regular glasses but are additionally equipped with a head mounted display or (semi-)transparent prism. In comparison with other smart devices like smart phones, a user can still use both of his hands while at the same time he can communicate, receive e-mails or take a picture. Furthermore, useful information such as maps, consumer advice or translations can be displayed to a user in a discreet way without annoying or alerting bystanders.

1.1. Opportunities in Health Care

SG offer a rich set of features and opportunities for mobile and hands-free activities, e.g:

E-Learning & Education: SG-like devices could support staff in their daily routine by showing essential information or step by step advice. Recorded pictures and videos can be instantly shared and discussed with advisers or colleagues.

Compliance & Patient safety: A hands-free quick check of prescribed medication against assigned or already arranged drugs is possible. Thus, erroneous prescriptions can be detected.

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Indoor navigation & Triggers: Providing staff with indoor maps and just-in-time localization of patients. Additionally, devices can display alerts or reminders in case of events which demand special attention, e.g., outbreak of Norovirus at a particular ward.

1.2. Perils & Open Issues

As outlined, SG offer a rich set of opportunities for physicians and nursing staff. However, various technical and social issues arise and need to be discussed:

Distractions: Persons involved in a face-to-face conversation might experience distractions from SG-like devices. For example, a health professional might concentrate solely on his head-mounted display and thus might neglect any eye contact with a patient. Hence, patients might not feel addressed or taken seriously by physicians or nurses as found by [3]. By contrast, smart phones can be put aside easily.

Surveillance: SG might support staff or patients to act compliant to hygiene regulations. Yet, some patients might regard SG as devices for the purpose of surveillance. Without prior consent patients do not always know when a SG-like device takes a picture or records video material. Moreover, such individual and sensitive data should not be transferred to other persons without prior consultation. However, this might pose a barrier for a fluent treatment process.

Sterility: No germs must be transmitted by the device as such, especially if parts have to be touched when navigating through menus or scrolling in a software application, e.g., in a surgery setting. As a consequence, these devices or related software must instead be operable by voice commands or gestures only.

Usability: As for now battery capacity of the Google Glass Explorer Edition is limited to only a few hours when utilized intensely. Yet, we assume that battery life will improve in later editions of this particular SG. From our first field research we discovered that there can be issues with overheating, especially if the built-in camera is used extensively. Moreover light conditions can also be a cause for reduced user experience.

Nevertheless, first field studies of professionals using Google’s Glass in hospitals have been conducted. An early adopter - Dr. Engelen - performed a surgery while his students watched the procedure from an adjacent room in real-time [4].

2. Discussion

In this paper we presented smart glasses as a new group of assistive technology in a health-related context. Despite many promising opportunities, existing risks and technical and social issues must not be neglected. They need to be addressed when integrating SG technology into real-life hospitals. Future research regarding smart devices should include a full evaluation of such aspects.

3. References