Association for Information Systems
AIS Electronic Library (AISeL)

SIGHCI 2018 Proceedings

Special Interest Group on Human-Computer Interaction

12-13-2018

Enhancing Joint Attention in Collaborative Information Dashboards with Shared Gaze Awareness - Poster

Peyman Toreini
Karlsruhe Institute of Technology, peyman.toreini@kit.edu

Ivo Benke
Karlsruhe Institute of Technology, ivo.benke@kit.edu

Moritz Langner
Karlsruhe Institute of Technology, moritz.langner@student.kit.edu

Sebastian Schaumann
Karlsruhe Institute of Technology, sebastian.schaumann@student.kit.edu

Jonathan Schwarzenbach
Karlsruhe Institute of Technology, jonathan.schwarzenboeck@student.kit.edu

See next page for additional authors

Authors
Peyman Toreini, Ivo Benke, Moritz Langner, Sebastian Schaumann, Jonathan Schwarzenbach, Christoph Bamberger, and Alexander Maedche

Enhancing Joint Attention in Collaborative Information Dashboards with Shared Gaze Awareness

Peyman Toreini[1], Ivo Benke[1], Moritz Langner[2], Sebastian Schaumann[2], Jonathan Schwarzenboeck[2], Christoph Bamberger[2], Alexander Maedche[1]
[1]Institute of Information Systems and Marketing, Karlsruhe Institute of Technology, Germany
[1]{prename.surname}@kit.edu, [2]{prename.surname}@student.kit.edu

INTRODUCTION

The usage of information dashboards, a graphical interface for presenting analytical information, has become an important element in meetings. In global organizations, many meetings take place virtually using collaboration technologies. A major requirement for successful collaboration is allocating joint attention. A lack of joint attention leads to misunderstandings or inefficient virtual team work. Eye-gaze is already successfully used as a tool to coordinate communication, e.g. in gaming or software development. However, usage of such technology has not been applied to coordinate communication in collaborative information dashboards so far. Therefore, designing attentive information dashboards to support remote collaboration by sharing the gaze position of the user is suggested in this study to overcome the lack of joint attention. For that, we present a prototype and a pilot evaluation study to explore the effect of sharing gaze in a dyadic collaboration with an information dashboard.

PROTOTYPE SYSTEM

The attentive information dashboard was implemented with Tobii 4C eye-trackers and connected via peer-to-peer (P2P) communication network (Figure 1). The participants of a meeting using the collaborative information dashboard are classified into a sender, who talks about the information presented on the dashboard, and the listener, who follows the discussion.

By integrating eye-tracking, the dashboard is sensitive to the attention allocation of the user. It consistently transfers the gaze position of the sender to the listener and this information is used to trigger feedback elements that have the goal to increase joint attention. For increasing joint attention, two feedback types are designed: shadow highlighting and animation (Figure 2). Shadow highlighting attracts attention by highlighting shadow on the border of graphs. The animation adds movements to the graph in order to attract the attention. The purpose of the feedback is to coordinate and align the attention of the listeners with the sender. To reach this goal, the system first checks the joint attention status; then, if there is lack of joint attention, the feedback component activates the feedback to improve the communication.

Figure 1: System for the attentive collaborative dashboard

Figure 2: Two types of feedback to support joint attention: (a) shadow highlighting (b) animation

EXPERIMENTAL DESIGN AND PRELIMINARY RESULTS

The prototype was tested in a within-subject design with three conditions (two feedback types, no feedback). Three tasks on a demo dashboard were defined in which users had to select a role (sender or listener) and collaborate remotely. In total 14 participants in 7 pairs (10 male/4 female) between 21 and 25 years (M (n=14) = 24, SD = 1.24) participated in the pilot study. The conditions (shadow, animation, no feedback) were randomly assigned to each task and the percentage with shared gaze was measured as the dependent variable. Moreover, the survey responses for the items of the Technology Acceptance Model and the User Experience Questionnaire (UEQ) were analyzed. Highest mean percentage of time with shared gaze was with the animation highlighting (M (n=7) = 47%, SD = 0.12), while the no feedback condition had the lowest value, though the results were not significant ($F(2, 18) = 1.14$, $p = 0.34$), which we assume is because of low sample size. The shadow highlighting (M (n=7) = 5.69, SD = 0.77) was perceived as more useful than the animation highlighting (M (n=7) = 3.88, SD = 1.29) with significance on one percent level. For the measure of perceived ease of use, the same can be observed. UEQ unveiled that the shadow was regarded as more positive than animation highlighting. However, the animation feature was evaluated worse for all dimensions except novelty.