Poster

How to Present Physical Activity Feedback on a Point Light Bracelet

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Introduction

In the last years, everyday wearable devices such as smart watches and fitness wristbands became widespread. Some of these devices present information via abstract point light displays. These should integrate easily and unobtrusively into everyday life. So far, research is missing that investigates the everyday life suitability and effectiveness of these light displays. In this work, we addressed the question how information on physical activity behaviour should be presented on a point light bracelet with respect to everyday life suitability and a mapping that is easy to understand.

Methods of inquiry

We built a light bracelet which consisted of a digital RGB LED stripe with a waterproof casing that we curved to the form of a bracelet. The bracelet provided six visible LEDs that were covered with semi-transparent film to diffuse the light. We controlled the lights with a LilyPad Arduino microcontroller, that we sewed on an additional armlet, together with a battery power supply and a button to activate the lights.

To investigate the question how the information should be presented on the point light bracelet, we conducted a user study with seven volunteers. First, each participant designed light patterns that represent information about their recent physical activity behavior. The activity information that had to be mapped to light patterns were the overall daily progress, the time elapsed since the last activity, the current performance compared to that of the week before, and the challenge to move. For the light design the participant could vary the light parameters colour and brightness, which

included blinking patterns. After the design session, we programmed the light bracelet with the participant's light patterns. Then, the participant was instructed to wear the bracelet, testing the light patterns in their daily life for three days. In a post-hoc interview we asked about the overall experience and acceptance of the bracelet and light patterns.

Main findings of the study

Overall, the light bracelet was accepted for various everyday situations. Each participant followed an overall principle when designing the light patterns for the different types of information. We assume this was done to facilitate the learning of the information mapping. Participants preferred to use colours to represent different levels of information. Although many participants used a traffic light pattern (red, yellow, green) to encode rating information, they in general wished for customizable colours. Blinking was chosen only to present information of urgent or important character that really needs to arrest the user's attention. The parameter brightness was found to be unsuitable to encode information, as participants were not able to distinguish different brightness levels by daylight. From the study results, we derived central implications for the design of light patterns on a wrist-worn point light display.

In future work, we will upgrade the bracelet by integrating a light sensor to automatically adjust the point lights' brightness to ambient lighting conditions. We will investigate in how far the everyday suitability and user acceptance can be improved by using a context-sensitive light design.