Evaluating Experience around Public Interfaces

An analysis of User Experience while using a gesture-controlled interface on a large public façade

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Introduction

The purpose of this project was to find out the influence of the environment on User Experience (UX) while using an interactive façade. Previous research has shown that experiential qualities can vary depending on spatial positioning while interacting with the façade.

To investigate those differences in UX systematically, our study design is based on the AttrakDiff questionnaire, which measures pragmatic and hedonic qualities as well as overall attractiveness.

Research Questions

R1: Is there a significant difference in User Experience rating if an interaction task is completed at different spatial sampling points?

R2: Is there a significant difference in User Experience rating if an interaction task is completed at different built environments with similar spatial configuration?

R3: Does repeated testing influence the participant's ratings on the questionnaire?

Interaction Technique

The interaction technique used for both studies was gesture control. Two pilot studies were conducted to test out the smartphone and Nintendo Wii Remote, although they were found to be innacurate. For the final study the WiiGee program was to be used, which made use of the Wii Remote sensor data. As Gesture recognition proved promising, the system was developed further.

The WiiGee program was trained with five directional gestures. Trained movement actions were then subsequently sent via OSC messaging to a Processing sketch running the user interface.

Figure 3: Overview of the gesture system.

These movements were mapped to the control of a red square on a 2D interface. Using the directional movements the user's task was to select the yellow dot and then move the dot to the other side of the screen.

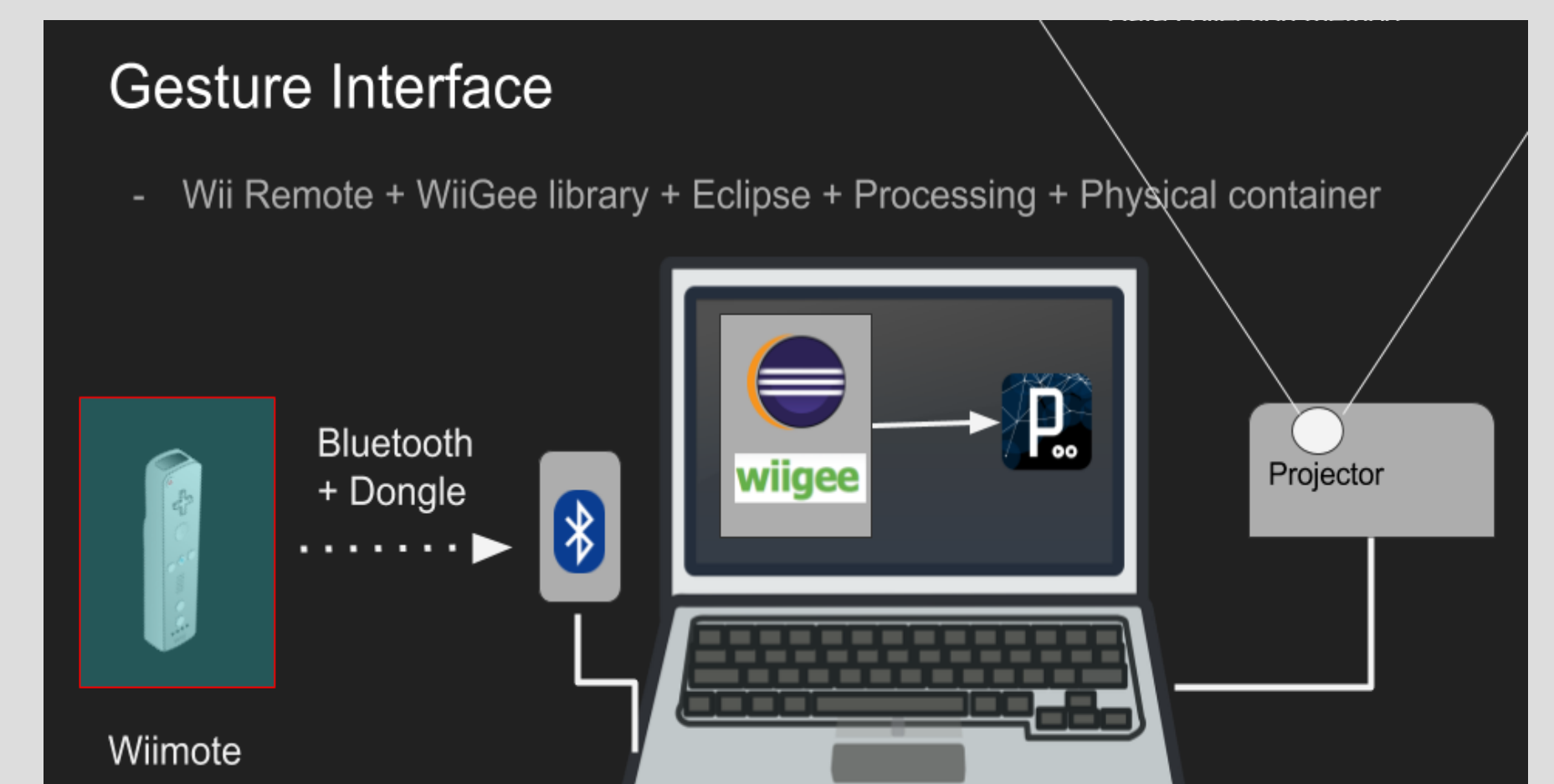Due to lack of gesture training data the Wizard of Oz technique was used instead for both studies.

Figure 4: Interaction device with Nintendo Wii Remote.
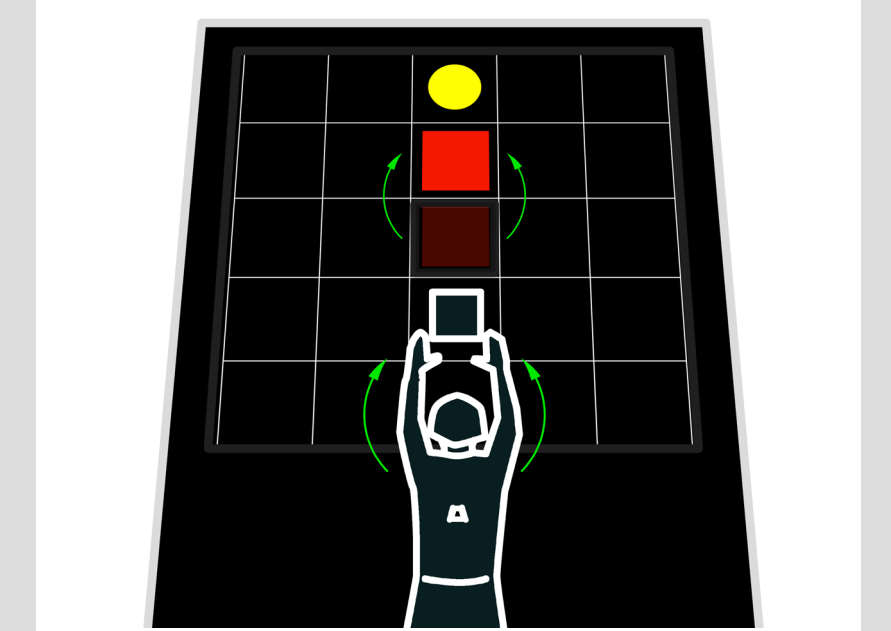

Figure 5: Demonstration of gesture movement and interface movement.

Environments
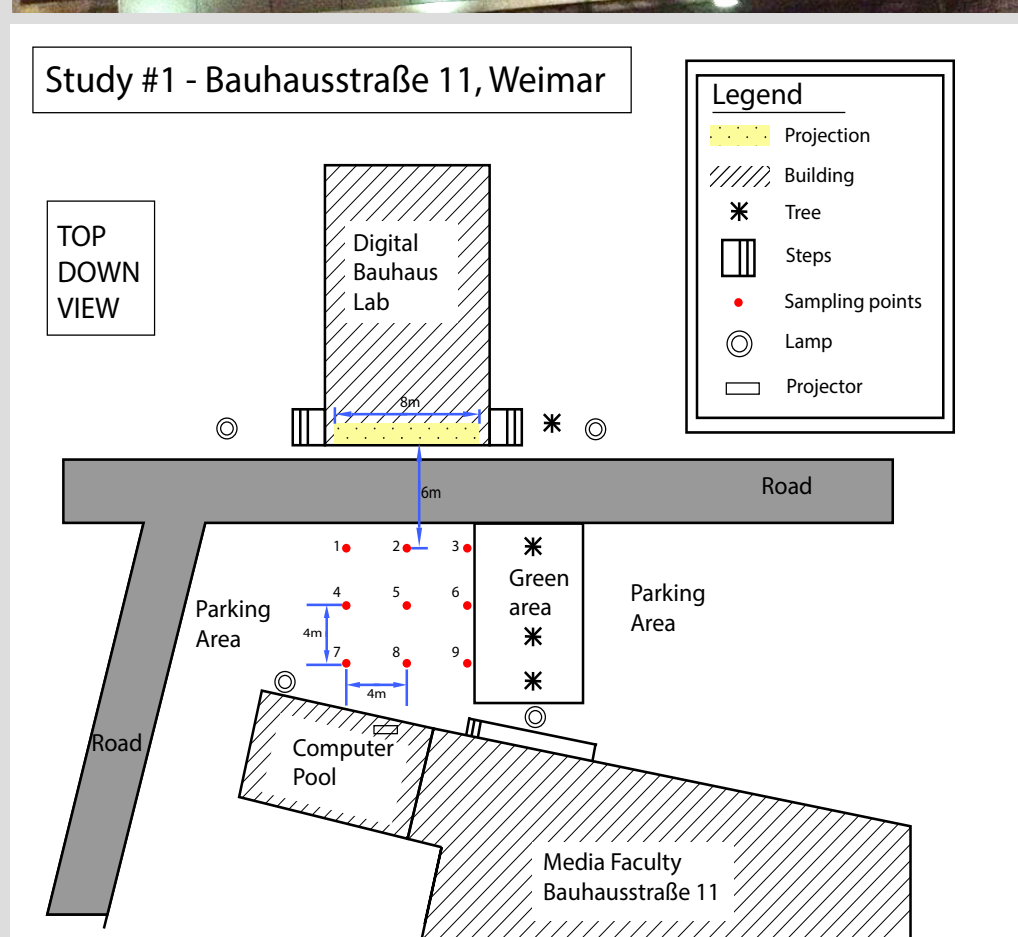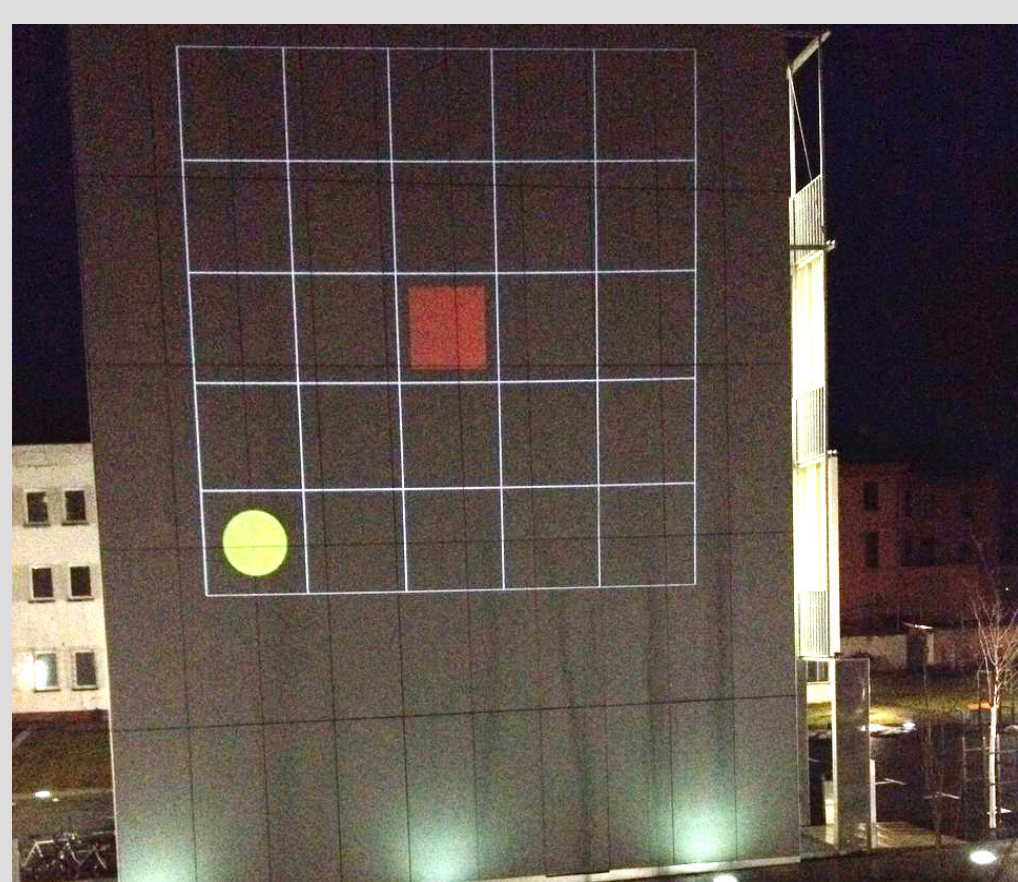

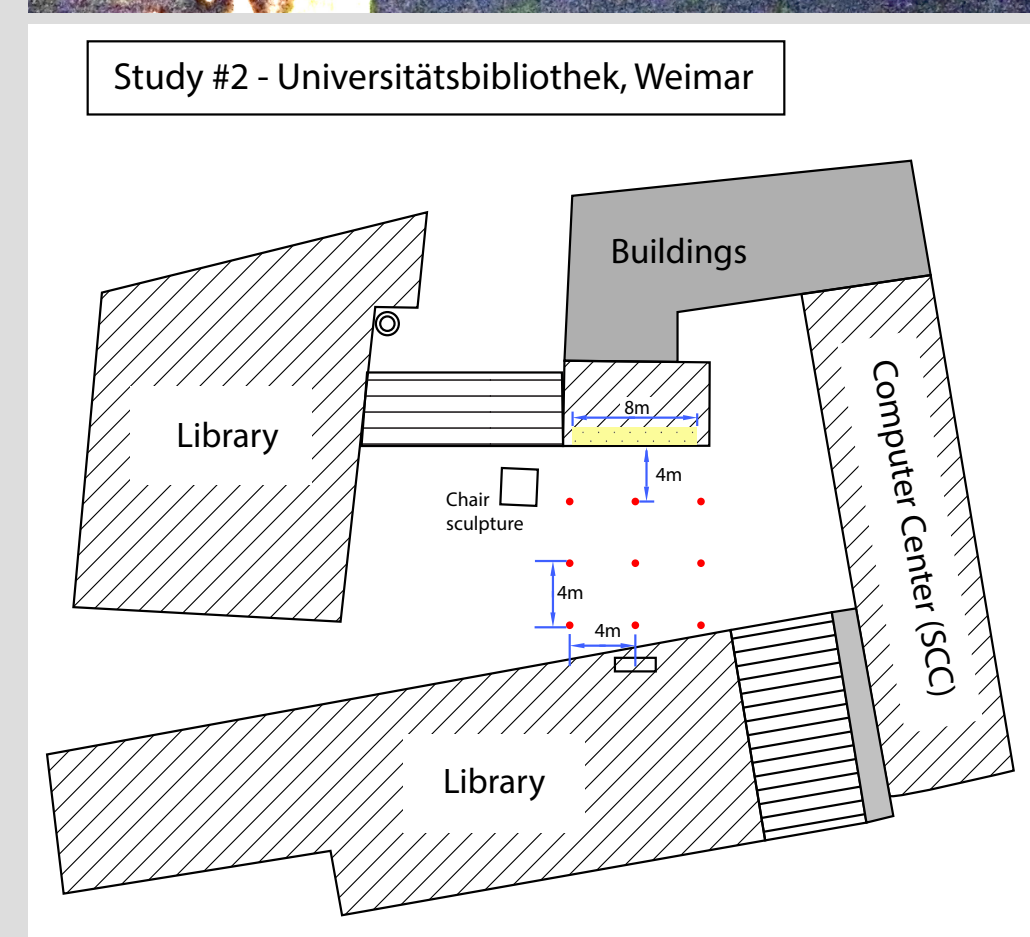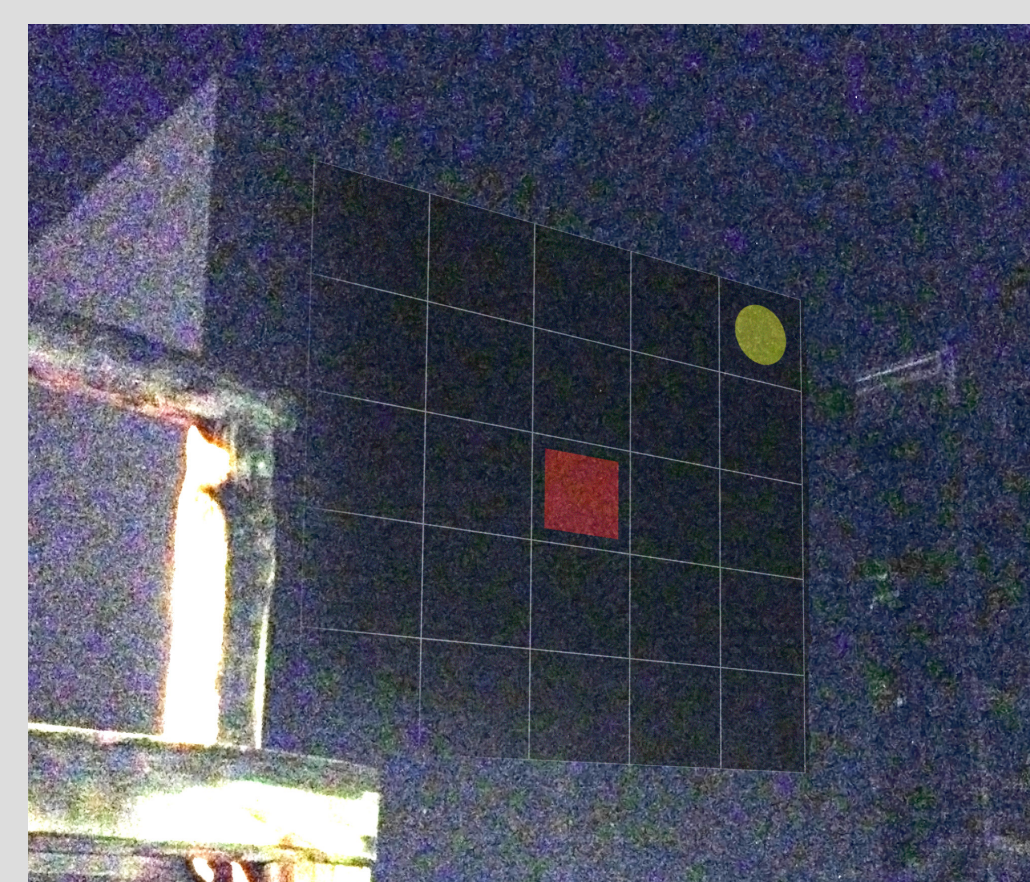Figure 1: Study environment #1

Figure 2: Study environment #2

Study Design

Two user studies were carried out in two separate built environments with similar spatial configurations. Nine equally spaced sampling points were established in front of the façades (Fig. 1, Fig. 2). The participant's UX was captured at six of nine sampling points by utilizing a standardized UX questionnaire called AttrakDiff. While typically used for website and product evaluation, the AttrakDiff has been used to evaluate façade interfaces in the past.

At each point, the participant completed a "selection task" using the device and interaction technique and then filled the questionnaire. To supplement the quantiative data, the users were asked about their personal impressions after the test.

Results

R1 Result: The Skillings-Mack test was run across all AttrakDiff dimensions and sampling points in Study 1 and 2 to find a significant difference between any two points. A significant different was found in the Pragmatic dimension for Study 1. In order to find out which point was most significant, a dot plot with confidence (Fig. 6) was created. From this it was found that only Point 8 was significant in the Pragmatic dimension. We assume that this is due to it's direct viewing position and that the sampled populations in both locations were different.

R2 Result: The Mann-Whitney U test was run to test for significance between the two studies. At each sampling point the ratings for each dimension were compared across two studies. It was found that sampling point 4 was significantly different in the Hedonic and Attractiveness dimensions. We assume that this is due to both a visual distractor noticed in Study 2.

R3 Result: In order to show whether there is a significant difference among participant's rating over time, a comparison was done using the non-parametric Friedman test on Study 1 and Study 2. It showed no significant difference between participant ratings at the beginning, middle and at the end of the test for both studies.
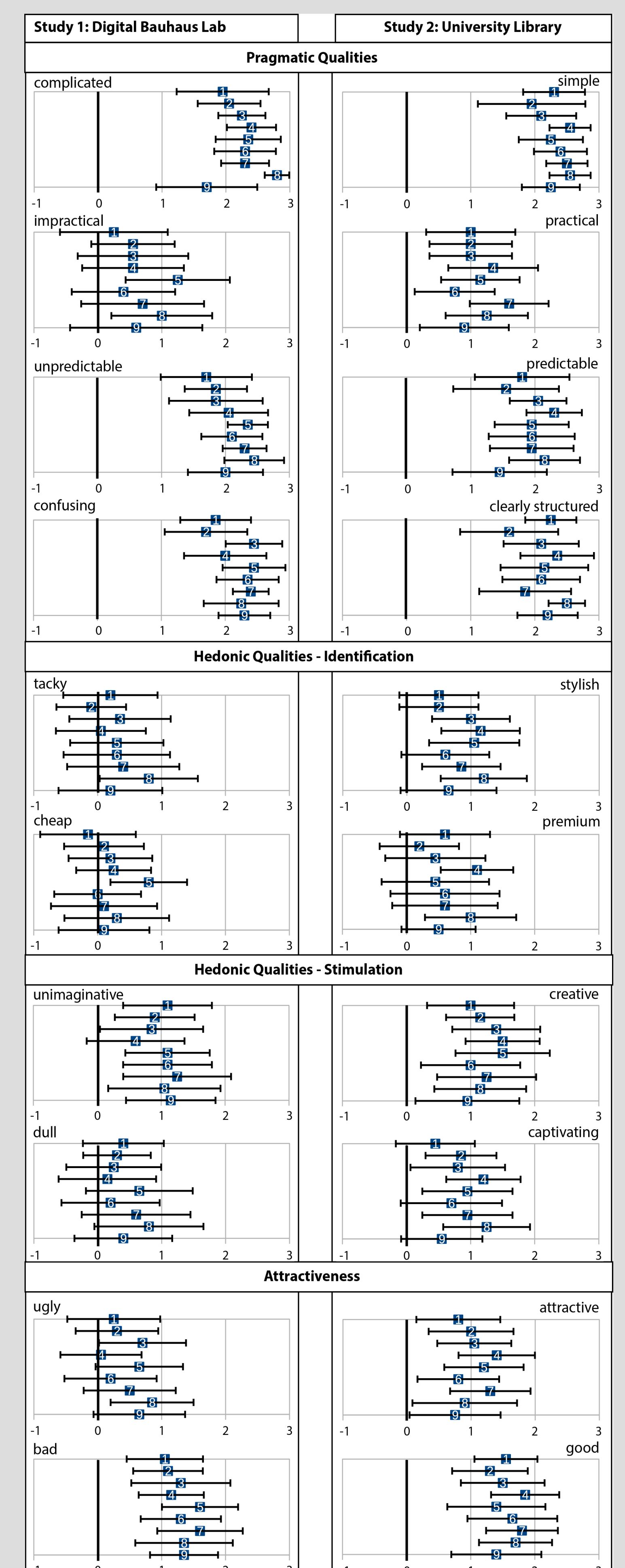

Figure 6: Average values per semantic differential.