

The Effects of Life-Likeness on Persuasion and Attention-Drawing in a Mobile Digital Signage

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Abstract. In this paper, we examined the effects of life-like movements on persuasion and attention-drawing in a Mobile Digital Signage (MDS). The study employed a one-factor three-level between-participants design where we manipulated the life-likeness of movement of the MDS (life-like movement vs. simple movement vs. no-movement). We set up the three versions of the MDS at our department building for eight days in rotation, and collected the data of the number of users and the percentage of the users who answered YES at the end of the interactions. As the results of our analysis on the data of the number of users, we found that there was a main effect in the movements of MDS and the MDS with life-like movement had higher than the MDS with no movement. In addition, the analysis on the percentage of the users who answered Yes showed that there were statistically significant differences between the MDS with life-like movements and the MDS with simple movement, and the MDS with life-like movement and the MDS with no movement. The results indicated that the power of persuasion and attention drawing increased when the MDS performed life-like movement.

Keywords: Digital signage · Persuasive technology · Attention-drawing · Life-likeness

1 Introduction

Recently, many studies have examined interactivity in digital signage to attract audiences' attention. For example, Chen, Q. et al. proposed a digital signage that can be interact by using hand gestures of passengers instead of using input devices such as a keyboard and a touch screen [1]. And also, there was introduced a digital signage that is use of a smartphone to control the contents of digital signage [5]. But in such approaches, the digital signage cannot attract passengers' attention who do not have any interest in the contents of the digital signage in the first place because some actions are needed which from a passenger to the digital signage. Therefore, Mobile Digital Signages (MDSs) suggest a new direction of advertisement and information delivery in public spaces, introducing autonomously-controlled mobility and interactivity in digital signage. However, although it is well-known that the perception of social existence can be a key

factor to design persuasive computers [2], little is empirically studied on the effects of concrete strategies on persuasion by MDSs.

The present study conducted a field experiment in which we examined the effects of life-like movements on persuasion and attention-drawing in a MDS.

2 Method

In this section, we will describe our MDS system and our experiment.

2.1 System Overview

Figure 1(a) shows the outline of the MDS that offers passengers daily horoscopes. The system consists of a Kinect for Windows, a Roomba, a display (iPad), and a control PC (Surface Pro 3).

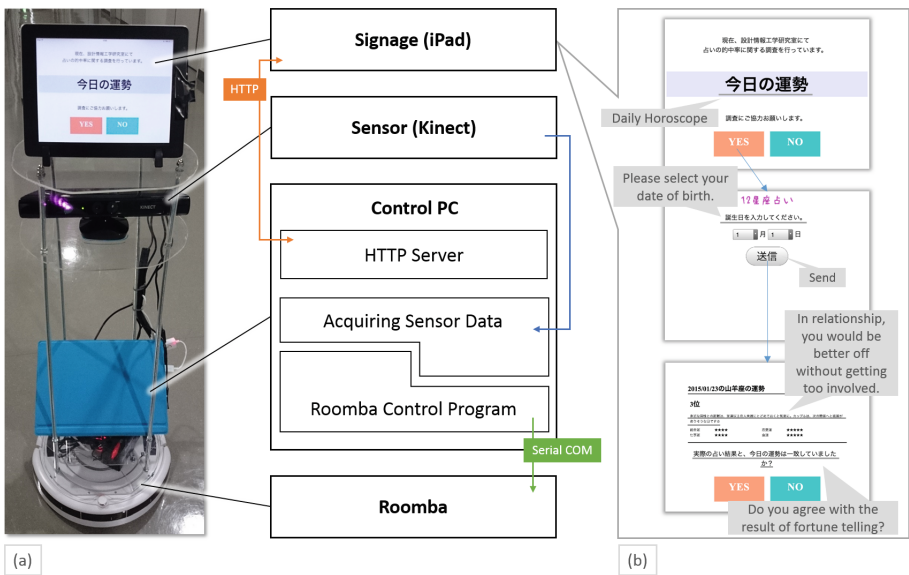


Fig. 1. System Overview (a) and Contents of the MDS (b)

And, we programmed that the MDS waits for a user to enter his/her date of birth, then it displays a result of horoscope, and at the end of the interaction it asks whether he/she will agree with the result of fortune telling presenting YES/NO buttons (Fig. 1(b)). The daily horoscope, the content of the MDS, is running on the HTTP server in the control PC, and programmed with PHP and HTML5. The iPad displays this daily horoscope as a signage by using a built-in web browser. Furthermore, the MDS is placed on the Roomba. The Roomba is controlled by a program which processes sensor data of the Kinect written in C# with .NET Framework 4.5 and Kinect for Windows SDK v1.8.

2.2 Design

The study employed a one-factor three-level between-participants design. The three conditions in which we manipulated the life-likeness of movement of the MDS, and described these conditions below.

C1: Life-like movement condition

The MDS rotates to find passengers in every 3 s. When it found a passenger, it approaches the passenger for five seconds, and waits for the input.

C2: Simple movement condition

The MDS repeats to move forward and back in every three seconds.

C3: No movement condition

The MDS does not move at all.

To check our control of conditions, we took a nine item questionnaire with a five-point likert scale (1–5) where 30 participants watched video clips of the MDS in each conditions, then rated perceived life-likeness (3 items), intentionality (3 items), and human-likeness (3 items) of the MDSs. The control check study employed a one-factor three-level within-participants design. And the order of video presentation was in a counter-balanced random sequence. The results showed that there were significant differences between categories and conditions in all categories (Fig. 2).

2.3 Procedure and Hypothesis

The experiment took place at the 3rd and 5th floors of our department building. First of all, to avoid the novelty effect [3,4], we put the MDSs with C1 and C3

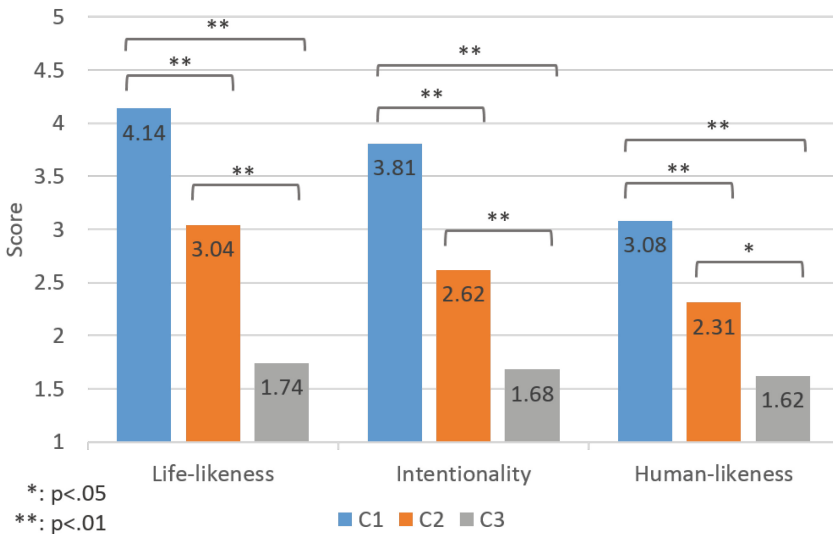


Fig. 2. The perception of MDSs in each conditions (5-point scale)

conditions for four days as the preliminary experiment. After that, we tested the three conditions for eight days for each and collected the data of the number of users and the number of the users who answered YES at the end of the interactions.

We hypothesized that the MDS in C1 condition has more persuasive and attention-drawing effects than the MDSs in other conditions.

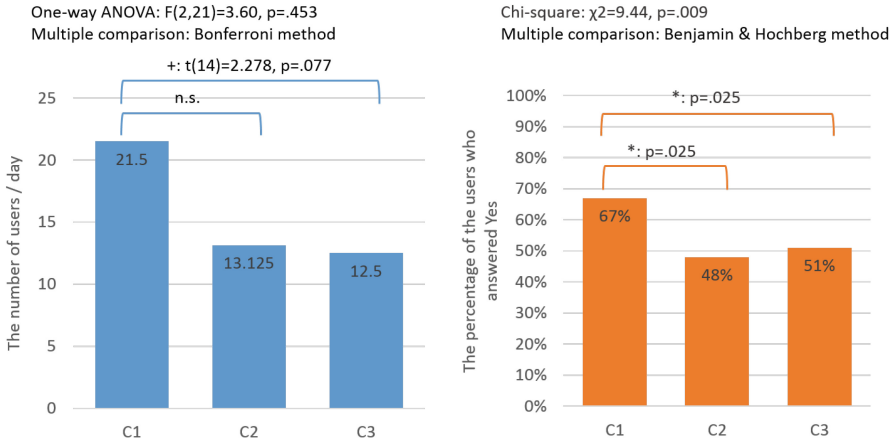


Fig. 3. The number of users per day and the percentage of the users who answered Yes

3 Results

Figure 3 shows the results of the experiment. As the results of our analysis on the data of the number of users, we found that there was a main effect in the movements of MDS ($F(2,21)=3.357, p=.05$) and C1 had higher than C3 (Bonferroni, $t(14)=2.278, p=.077$). In addition, the analysis on the percentage of the users who answered Yes showed that there were statistically significant differences between C1 (67%) and C2 (48%, $p=.025$), and C1 and C3 (51%, $p=.025$).

4 Discussion and Conclusions

We examined the effects of life-likeness on persuasion and attention-drawing in a Mobile Digital Signage (MDS). The study employed three conditions (life-like movement vs. simple movement vs. no movement) in which we manipulated the life-likeness of movement of the MDS. We run the three versions of the MDS in the our department building for 8 days for each. As the results, there was a main effect found in movements of the MDS, and the MDS with life-like movement has higher than one with no movement. In addition, there was statistically significant differences of the percentae of the users who answered YES between the MDS with life-like movement and the MDS with simple movement, and between the

MDS with life-like movement and the MDS with no movement. In conclusion, the results indicated that the power of persuasion and attention drawing increased when the MDS performed life-like movement.

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