Kinect Web Kiosk

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Abstract. In this paper we present a kiosk system designed for presentation purposes which bases on Kinect sensor technology as an input. The general idea is to create a platform for deploying presentations in predefined format for public screenings. The interaction with such system is crucial and is implemented with use of Microsoft Kinect sensor. While most kiosk systems are customized for end user purposes and need custom made content, we aim to create an uniform format of content packages that could be exchanged between different setups of presented system. Such packaging format also allows users to easily adapt the content of each individual system by only updating the web-pages included in the package. In presented system users can interact with content with gestures that are recognized by our system. Simple navigational gestures allow users to browse the content in nonlinear way, which results in better user experience.

Keywords: HCI, Kinect, interactive kiosk presentation, interactivity, interaction framework

1 Introduction

Using sensor technologies such as Microsoft Kinect[1], Nintendo Wii[2] or LeapMotion[3] as an interaction interface with user, has become very popular in recent years. While mouse, keyboard and gamepads are still most popular interaction interfaces, touch-less technologies are gaining the market share. This is even more true in cases of public displays, where touchless technologies offer a novel, interesting and fun way to interact with presented content. A very popular scenarios are interactive commercial displays in shopping centers, interactive experiments in museums or interactive art installations.

There were several touchless systems developed in the recent years [3, 5–8]. Some use Kinect sensor, while others have own implementation of input system. Previous work on Kinect Web Kiosk is presented in [2]. In recent years more attention was also given to evaluation of touchless interfaces [1, 4].

[1] http://www.microsoft.com/en-us/kinectforwindows/
[2] http://www.nintendo.com/wii
[3] https://www.leapmotion.com/

2 Kinect Web Kiosk

The web platform has been proven as a popular and adaptive technology for defining and distributing the content in various scenarios for business, mobile applications and for online education. Those were the reasons for choosing the web platform as basis for Kinect Web Kiosk. The system consists of several parts as is shown in Figure 1, which also displays the integration of parts in the Kinect Web Kiosk.

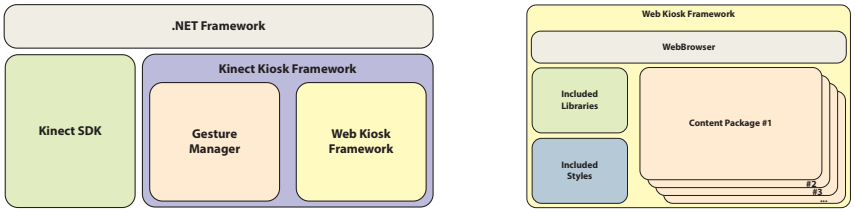

Fig. 1. Structure of the system is presented in the left image. Structure of the Web Kiosk Framework is presented in the right image

The implementation of the system is done in C# with the .NET Framework[4]. We use the `WebBrowser` class from .NET Framework for displaying the content of content packages. Interaction is implemented in Javascript in the browser component. Javascript is also used for augmenting the content with animated elements as well as for achieving a more attractive look and feel. We leave the support for additional Javascript libraries to content creators, but provide the general interaction functions and support in the framework. System also allows use of external libraries such as jQuery[5] and similar. Their use is encouraged to create a pleasant and appealing content.

The presented system was used in a kiosk presentation system. The system consists of a Kinect sensor, PC and display. Kinect is used for capturing the user input. On PC, the Kinect SDK takes care of tracking the motion of joints, while the Gesture Manager (see Figure 1) performs hand tracking and gesture recognition and sends the interaction data to the Web Kiosk Framework. The Web Kiosk Framework changes the displayed content according to incoming gesture messages and displays the requested content. The user gets immediate feedback of his actions on the display.

3 User Experience Evaluation

The testing of Kinect Web Kiosk was evaluated in use case scenario presented in [2]. A case study was conducted at SIRikt 2013[6] conference. Users were high

[4] http://www.microsoft.com/net
[5] http://jquery.com/
[6] http://www.sirikt.si/

school teachers of different age and background. The actual setup consisted of large scale television with diagonal of 42" and screen resolution of 1280 by 720 pixels. System was used at distance of 2.5 meters. Testing conditions were real-life like due to numerous people grouping around the set-up and trying interacting with the system.

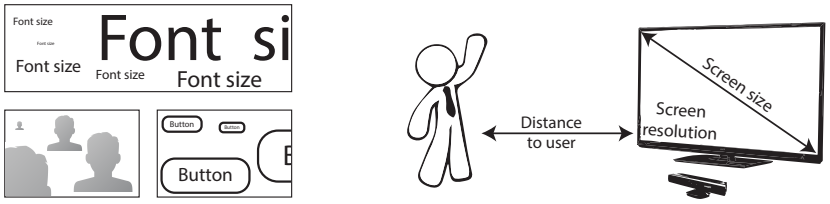

Fig. 2. Selected user interface parameters and relevant system properties.

The main evaluation goal was to determine the values for previously mentioned set of user interface parameters. We have obtained feedback from 21 users. Some users have skipped some parts of testing for various reasons (such as lack of time, lack of interest, etc.). Users also performed tests in various order, some even repeated the individual steps of evaluation.

Assessing the optimal values of parameters led us to development of dedicated assessment system. We have designed a system in form of nonlinear wizard, presented in Figure 2, where user can decide which parameter to optimize next. The system records users values for individual parameter in a file. After completing all the tasks (or just few of them) user, can conclude his selection and allow new users to assess the user interface. More on evaluation can be found in [1].

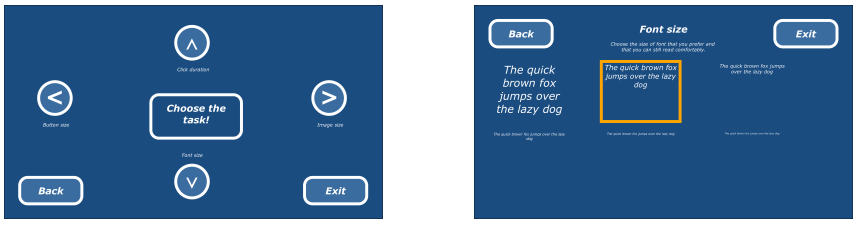

Fig. 3. Assessment system interface and example of font size parameter selection.

4 Conclusion and Future Work

We have presented the Kinect Web Kiosk system and the evaluation of user experience of the system that was conducted on a group of high school teachers. As presented such system can be used as knowledge discovery platform for individual users or as presentation kiosk for galleries, museums or information points. Presented system could be used in many different scenarios and its content could be easily altered by exchanging the content packages.

There are many possible improvements and adaptations of presented system. The system could be adapted for personalisation by storing individual profiles and settings. System could also include on-the-fly adaptation for best user experience according to user inputs.

While currently system only supports single hand interaction we are planning on adding two hands interaction as well as better background removal of other passers-by that are looking at the content but are not interacting with it.

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