WE-BAT: Web Based Application Template for Networked Public Display Applications that Show User Contributed Content

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ABSTRACT

With significant price drops of large LCD panels public displays are "painting" the urban landscape. Up until now these "ads" displays were running locally stored power points, videos, and/or images. However, connected over the Internet they constitute a novel communication medium – networked pubic displays. As reported by previous research creating appealing and fresh content is one of the challenges networked public displays face. A possible solution could come in harvesting content from social networking platforms such as Instagram, Twitter, and Facebook that have a large and steady stream of users that contribute content regularly. In addition, showing user contributed content would also open up this novel communication medium and would allow users to express themselves using well-known channels/platforms. In this paper we describe the WE-BAT application template – a web based networked public display application template that allows easy application development with user contributed content from 3rd party sources.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces – Graphic User Interfaces (GUI), Input Devices and Strategies, Screen Design

General Terms

Design, Human Factors

Keywords

Public display applications, web-based template, user-contributed content

1. INTRODUCTION

Public displays are becoming a ubiquitous resource in the urban environment: we can find them at airports showing flight schedules, in bars and cafes displaying events and menus, or on the streets displaying advertisement. Although most of these displays are singular installations it is not hard to imagine that they will soon be networked, thus constituting a novel and powerful communication medium – networked public displays [1] – a communication channel for the 21st century.

One of the problems networked public displays are facing is creating appealing content that would attract passers-by [9]. In addition to this creating content for public displays is expensive [11]. A possible solution for the two could be in harvesting content from online platforms that support user contributed content, e.g., Instagram, Twitter, and/or Facebook. These platforms represent rich and stable pools of content: in 2012 Business Insider [1] reported that staggering 300 million images are uploaded on Facebook daily! In addition, allowing user contributed content would also "open up" this communication channels to its users and would allow them to express themselves. Also, by piggybacking on these platforms researchers could understand how networked public displays 'fit in' within existing communication technologies [8], which is another obstacle that has to be overcome. The idea of using user contributed content on public displays is hardly novel and numerous previous projects have created networked public display applications that display it [4], [6], [10].

In order to allow easy development of applications that integrate user contributed content from online platforms we have created the WE-BAT: a web-based client-server public display application template that allows easy integration of user contributed content from online platforms such as Instagram, Twitter, and Facebook. We contribute to the current body of knowledge on networked public display frameworks and architectures by designing an application template that allows easy integration of user contributed content. Previous frameworks were used to allow easy scheduling and presentation of multiple applications on a single display [7] and application template that supports user-contributed content in the form of "pins" and "posters" [6].

2. WE-BAT ARCHITECTURE

WE-BAT is a web-based client-server architecture shown in **Figure 1**. The template is based on Java PLAY client-server framework (http://www.playframework.com/). The components are 1) *hooks* to online platforms that allow easy collection and publishing of information, 2) *application server* that provides the main application logic and local database access, and 3) *application client* that runs in a web browser and presets content to viewers.

The hooks allow connection with online platforms that support user contributed content. So far we have created three hooks: (a) Instagram web service hook that is based on "jinstagram" Java library [5] and allows for searching and collecting images tagged with a specific hash tag, (b) Twitter hook is base on "twitter4j"

Java library [13] and allows for searching and obtaining tweets on a specific topic and (c) Facebook hook has been written from scratch allowing for searching and receiving updates, images, and events.
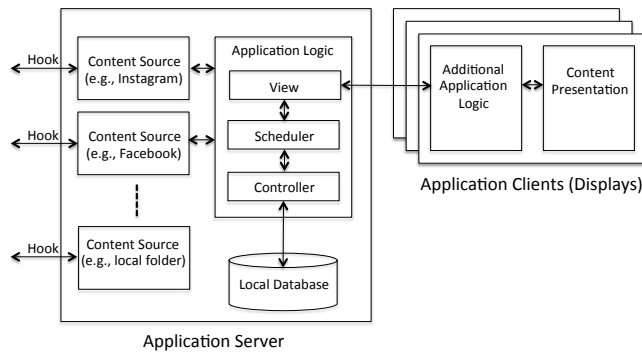

Figure 1 - Web-based client-server public display application architecture

Application server has three functions. First, it provides access to online platforms through content hooks developed in Java. Content in the form of text and images is automatically pulled from online platforms (Tweeter, Facebook, and Instagram) and stored in the local database. A dedicated content scheduler automatically and periodically checks for new content items. The refresh period is fixed but can be adjusted to balance the amount of requests/traffic and responsiveness of the application. Second, when a new content item becomes available online the application logic stores it together with the associated metadata in a local database for sorting and future retrieval. Third, each new content item is sent to the clients over a web socket connection for presentation. All the communication between the client and the server is achieved through JSON messages.

Each **application client** has a unique id allowing content distribution to a single client, a group of clients, or all of them (broadcast mode). Application clients receive messages or new content items form the server. They also provide additional application logic that supports interactivity through inputs from local sensors (e.g., touch events, or local camera feed), and they also layout content presentation on a display. The clients run in a standard web browser that supports web socket connection. The web browser is divided into several screen regions (e.g., main screen, sidebar, and tickertape) that applications can access. The client consists of HTML, JavaScript, and CSS.

The WE-BAT template was used to create three applications where two of them use Instagram and Twitter as content sources, while the third publishes and pulls information from Facebook.

3. CONCLUSIONS AND FUTURE WORK

In this paper we have described WE-BAT, a web based application template for networked public display applications that show user contributed content from online platforms such as Instagram, Twitter, and Facebook. The application template is available online at https://github.com/elhart/HelloWorld. In future work we plan to create multiple applications in order to provide insights into issues of scheduling multiple applications and content on networked public displays [3].

4. ACKNOWLEDGMENTS

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