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# SnapAndGrab – Accessing and sharing contextual multi-media content using Bluetooth enabled camera-phones and large situated displays.

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**Abstract**

In this paper we describe a novel interaction technique that allows users to access and share rich multi-media content via a large, situated public display and their own Bluetooth enabled camera phone. The proposed

system differs from other solutions in that it does not require any client software to be installed on the user's device. We believe that our solution provides a practical and holistic approach for device-based interactions with public multi-media information systems.

**Keywords**

Situated displays, mobile phone, Bluetooth, multi-media

**ACM Classification Keywords**

H5.2. [**Information interfaces and presentation**]: User Interfaces – *graphical user interfaces (GUI)*. H5.2 [**Information interfaces and presentation**]: Multimedia Information Systems – *video*.

**Introduction**

Situated public displays are currently ubiquitous features in spaces where dynamic, contextualized information needs to be conveyed to members of the public. At present, however, most of these displays are not interactive and in some cases only display static

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content. More recently, research groups have explored user interaction methods with large, situated public displays in an effort to make these installations more useful.

'Personal device-based' interactivity is one particularly interesting way of interacting with large public displays, wherein users interact with public displays via their mobile phones [1,2]. Device-based interactions have already been noted as being particularly beneficial for two main reasons, namely the growing ubiquity of mobile devices and the user's familiarity with their own device [1].

In this paper we describe a novel and holistic approach to device based interactions with a public information system where accessibility was a major design goal. The resultant SnapAndGrab multi-media system allows user's with any Bluetooth enabled camera-phone to access, create and share multi-media content via a situated public display without the need for any client application to installed on their device.

### **Motivation**

In addition to the two benefits mentioned above, a public information system accessible via device-based interactions offers additional advantages - these are listed and described below.

Firstly, a system such as SnapAndGrab is able to offer the end-user a richer information seeking experience. When considering existing situated display systems it is clear that the availability of display collateral determines the amount of information displayed at any point in time.

Display systems supporting device-based interactions have the potential to utilize the 'private' multi-media features available on the user's device (including the display collateral), thereby extending and enriching the interactive experience.

Secondly, a SnapAndGrab installation provides an interface to multi-media information that is relevant within the immediate area or context. The user is then able to gain access to this information via the personal area networking (PAN) features (e.g. Bluetooth) on his/her mobile device. Such a service is valuable if one considers areas and contexts where mobile network coverage is poor (within a subway, for example).

In some instances users may prefer to utilize the unregulated PAN features available on their device in order to avoid incurring mobile network charges. This feature is important because in some cases a user may be interested in a piece of information but unwilling to pay for it. In another, a user may be interested in a piece of information but unable to afford the mobile network costs.

The latter case is particularly concerning especially within the developing world. Often developing world users will possess a mobile phone but are unable to afford the cost of mobile network access. The SnapAndGrab system therefore provides an alternative, cost effective way of accessing valuable and relevant public information (e.g. health information and job opportunities).

### **System overview**

The SnapAndGrab system [6] consists of four basic components, namely the large situated display, a

Bluetooth access point, server machine and the client device (a Bluetooth enabled camera-phone).

The SnapAndGrab system allows a user to select and download media packages (a collection of various OBEX items) by photographing a visual download key (an image on the display) and sending that photo to the SnapAndGrab system via Bluetooth (see figure 1). The submitted photo is then processed and compared to the key images currently on display. If a match is detected the media package associated with key image is sent back to the user's device.

In addition, the user may also wish to create a media package that he/she wishes to share with other users. In such a case, the user submits a contact card (V-Card) to the system via a Bluetooth OBEX interaction. This action signals to the system that the user wishes to create a media package and subsequently prompts the user to submit an image that will be used as a visual download key. Any additional media submitted by the user will be appended to their media package and will be included in any future downloads of their media package by other users.

A definitive feature of the SnapAndGrab system is that it avoids the need for any client software to be installed

on the user's device. Users interact with the system via the native camera and OBEX features available on their device, thus ensuring that the SnapAndGrab system is accessible to almost any user with a Bluetooth enabled camera-device.

Another noteworthy feature of SnapAndGrab is that it does not rely on any physical interaction with the display when downloading content as was required with the Hermes photo display [3]. The Hermes display [3] allowed users to quickly select content for download via a touch screen input but required users to specify their personal device from a list of nearby Bluetooth devices, again requiring input via the touch screen.

SnapAndGrab avoids any physical interactions in two ways. Firstly, the user submits a photo of the desired display item instead of touching the screen. Secondly, the user does not need to specify his/her device by name. The SnapAndGrab system addresses this problem by extracting the client device's Bluetooth ID from the submitted photo. This approach has the added benefit of not only simplifying the overall interaction but eliminates any Bluecasting [5] and avoids the need for device pairing.

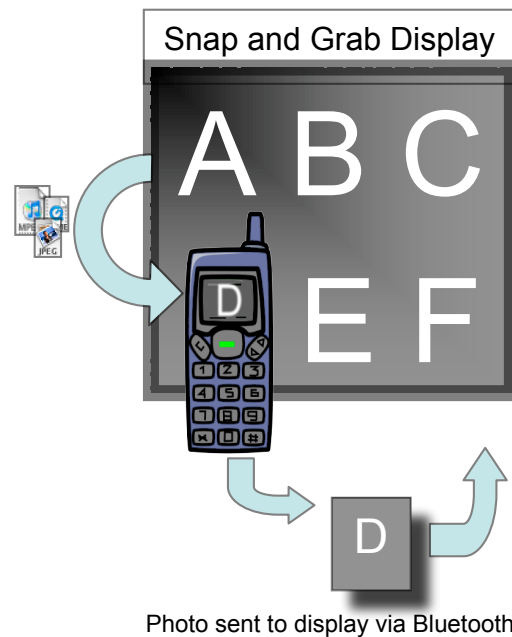


Photo sent to display via Bluetooth.

**figure 1:** The user is interested in item 'D' and takes a photo of it. The photo is sent to the SnapAndGrab display. The system then sends back the media objects, via Bluetooth, that relate to media package 'D'.

### System Usage

An envisioned usage scenario is presented below:

Mike is the manager of a local library. His SnapAndGrab installation allows him to advertise any new library stock that arrives, for example books, CD's and DVD's. He does this by creating eye-catching display images and rich media packages, which he adds to the SnapAndGrab system. Mike is able to utilize a full range of audio, video, photos,

calendar entries and text objects depending on his requirements.

Should a display image catch the attention of a library member, the associated information is only a photograph away. The user simply uses his/her camera phone to take a clear photograph of the display image of interest and sends it, via Bluetooth, to the SnapAndGrab system. The submitted photo is processed and the media package associated with the photographed image is then returned to the user's mobile device. The user is then able to consume the media and will hopefully inquire about the associated book, CD or DVD.

In addition to Mike's new stock advertising campaign, he also allows library members to create their own media packages for display. In one particular example John, a local musician, wishes to advertise his band's next performance. To do this he submits his contact card (V-Card) to the SnapAndGrab system thereby initiating media package creation. Following that he adds a photo of his band (this will act as the display image), a calendar entry containing the date and time of his performance and finally, an audio clip of his music. Once completed, John's media package is shared with other library members and is accessible in the same way as Mike's stock advertisements.

### Target Users

The SnapAndGrab system provides an interface to multi-media content that can be closely associated with the context of the display and thus any user desiring dynamic, up-to-date, contextual information may

attempt an interaction provided they have access to a Bluetooth enabled camera-phone.

Within a developing world context, the target users may include those who do not possess the necessary skills or funds to access information via personal computers or the Internet. A SnapAndGrab installation provides an alternate interface to public information that is practical, simple and free to use.

### Relevance to CHI community

The CHI community has always been supportive of novel HCI research that is relevant to the people and world around us. The SnapAndGrab system meets this criterion in two ways. Firstly, the SnapAndGrab system demonstrates a practical and holistic approach to device-based interactions with public information systems. Secondly, when considering issues relating to international development and the digital divide, the SnapAndGrab system shows how cutting edge developed world HCI can produce solutions that are applicable within the developing world. The SnapAndGrab system design achieves this by:

- Focusing on technologies that are ubiquitous within the developing world, such as mobile phones.
- Ensuring accessibility for a wide user group.
- Minimizing any cost incurred by the end-user when interacting with the system.
- Minimizing the learning curve associated with first-time system usage.

### Commercial status

Several commercial opportunities have been envisioned for SnapAndGrab due to its viability as an alternative

multi-media channel. An example opportunity would be to allow companies to purchase display collateral and prepare rich, customized media packages as part of an advertising or marketing campaign.

At present a US patent protects the SnapAndGrab concept.

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