
SPARSH: Passing Data using the Body as a Medium

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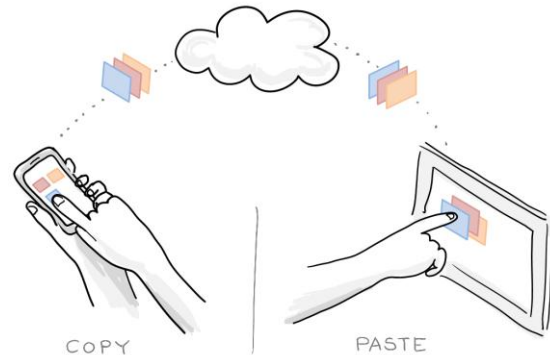


Figure 1. SPARSH – Touch to Copy, Touch to Paste

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Abstract

SPARSH explores a novel interaction method to seamlessly transfer data among multiple users and devices in a fun and intuitive way. The user touches a data item they wish to copy from a device, conceptually saving in the user's body. Next, the user touches the other device they want to paste/pass the saved content. SPARSH uses touch-based interactions as indications for what to copy and where to pass it. Technically, the actual transfer of media happens via the information cloud.

Keywords

Copy and Paste, Touch-based Interaction, Data Sharing
Intuitive Interfaces

ACM Classification Keywords

H.5.2 [Information interfaces and presentation]: User Interfaces. – Input devices and strategies; Interaction Styles

General Terms

Design, Human Factors

Introduction

In Hinduism, people often create a colored mark called Tilaka¹ on forehead by simply touching a colored

¹ <http://en.wikipedia.org/wiki/Tilaka>

powder in a container and touching their forehead. In SPARSH, we explore this metaphor to “copy and paste” data between personal digital devices, and devices belonging to different users, using similar touch based interaction. The problem of moving digital media between common digital devices such as notebook computers, PDAs, smartphones, digital white boards and others has been well studied [2]. USB drives, external hard disks or online storage services such as Dropbox [1] are some of the common ways to move files or media between a user’s personal devices or share among multiple users. In addition, there have been attempts to make the transfer of digital media more tangible and interactive [3, 5]. However, these interactions are not as simple and intuitive as making a Tilaka.

Our digital devices are now increasingly relying upon the cloud, the cloud of information. In addition, touch is becoming a more common way to interact with these devices. SPARSH combines these features to offer an intuitive way to transfer data. With SPARSH we introduce a novel technique of transferring data among multiple users and devices by simple touch gestures. One simply touches the data they wish to “copy” from a device, and touches another device to “pass” the copied data. The actual data is stored in the cloud when the user performs the “copy” and it gets retrieved to the second device from the cloud when the user performs “paste” (Figure 1).

SPARSH Interactions

Here we present a few examples of individual and collaborative interactions that the current SPARSH prototype supports.

Scenario A

Imagine you received a text message on your mobile phone from a friend with the address you are meeting him at. You touch the address and it gets conceptually copied in you. Now you pass that address to the search bar of Google Maps in a web browser of your computer by simply touching it (Figure 2).



Figure 2. Transferring an address received in an SMS from a mobile phone to Google Maps on a computer.

Scenario B

You want to contact a person whose contact information was found while browsing a website on your computer. You touch the phone number on the screen; now rather than manually typing that phone number, you can simply touch your mobile phone dial pad (Figure 3).



Figure 3. Copying a phone number from a computer to a mobile phone.

Scenario C

Want to get a copy of the pictures your friend took during a party using his mobile phone camera? Simple, touch the pictures you want to copy and when you are home, you can paste the photos to your tablet computer by touching its screen (Figure 4).



Figure 4. Copying pictures from a phone to a tablet computer.

Scenario D

You see a video posted on Facebook on your phone. You want to watch the video with your friends on a larger screen. Touch the link, and pass it to a larger screen by touching and enjoy the video (Figure 5).



Figure 5. Moving a video link from a mobile screen to a larger digital display.

As presented in the scenarios above, SPARSH proposes a novel way of data transfer between personal digital devices of a single user as well as between users. However, in the case where multiple users share a device or a user wants to pass data from their personal device to another user's personal device, the question of user identity arises. SPARSH lets users share and pass data using their credentials of a cloud based storage spaces such as Dropbox. This way SPARSH can distinguish one user's copy-and-paste from another user's copy-and-paste act.



Figure 6. Identifying user by using a unique gestural sign.

Implementation

The current SPARSH prototype is set up on two mobile phones, tablet PC and a touch screen display. We use Dropbox [1] to store the data in a temporary folder. The user runs SPARSH on their devices, and signs-in using their Dropbox credentials. Typically, a user stays "signed in". Other users can temporarily sign-in using their Dropbox credentials. Once signed in, the user has to perform only two acts, a copy and a paste to transfer data between devices. In SPARSH mode, if a user touches a data item (such as a picture, video link and text), it gets uploaded to the user's SPARSH folder on Dropbox. If the user touches a paste-able area on the screen (such as a search bar or blank space in a folder), the corresponding data is retrieved from the user's Dropbox. We also implemented an alternative to the Dropbox approach where the user can authenticate by drawing a unique pattern on screen (Figure 6). This is implemented using a "\$1 recognizer" [4] and FTP data storage.

It is possible that users might touch data and empty spaces on touchscreen devices for a variety of other reasons. The current SPARSH implementation uses an on-off mode to differentiate SPARSH-ing from other touch-based interactions. An icon on the top right of the screen indicates active SPARSH mode. Users can also copy multiple items by touching them in sequence. When pasting, data is reproduced in the same order as they were copied. Although interaction supported by SPARSH is best suited for touchscreen devices, users can access data from their Dropbox application installed on regular non-touchscreen devices or through Dropbox's web interface as well.

Conclusion

SPARSH explores a novel interaction method to seamlessly transfer data between digital devices in a fun and intuitive way. Users can conceptually copy data onto their body from one device and pass it to another using natural touch interactions.

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