

DrawerBrowser: Practical Picture Browser for Finding Items in Drawers

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ABSTRACT

We propose a practical picture browser for finding items in drawers, DrawerBrowser, which is designed through observations of daily activities.

Author Keywords

Storage box, picture browser, drawer, visual marker

ACM Classification Keywords

H.5.2. Information interfaces and presentation: User Interfaces

General Terms

Design and Human Factor

INTRODUCTION

Storage boxes are widely used in our daily lives, as they can be used to neatly store many small items. However, people often find it difficult to remember and locate items stored in boxes, especially in shared offices or laboratories. To solve this problem, we had proposed a search technique called DrawerFinder [3] to help users find items stored in boxes on a shelf.

DrawerFinder

The capture system of DrawerFinder basically consists of storage boxes with visual markers on a shelf, two web cameras attached above the shelf, and a small PC (Fig. 1). When the camera detects a visual marker, the second camera automatically takes a picture. The main program calculates the position and size of the target box and extracts a picture of the box (the box picture) from the initial picture (the surrounding picture). The main program then uploads both the box picture and the surrounding picture to an online database with the box ID and timestamp. Thus, DrawerFinder can automatically take both box pictures and surrounding pictures without any special operations.

However, the browsing system of DrawerFinder was too primitive – tiling box pictures on the web page according to their location on the shelf – for efficient browsing. To solve this problem, we propose a practical picture browser called DrawerBrowser for finding items in drawers, which is designed through observations of daily activities.

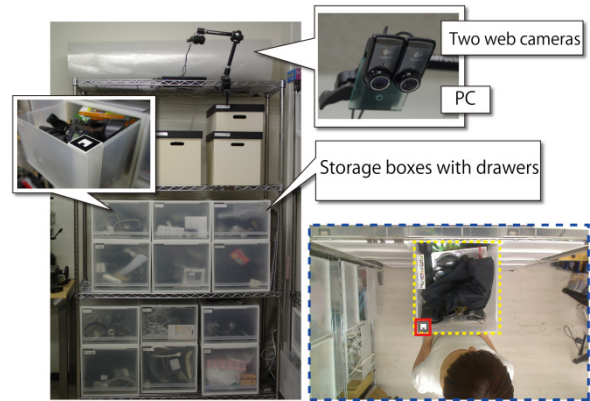
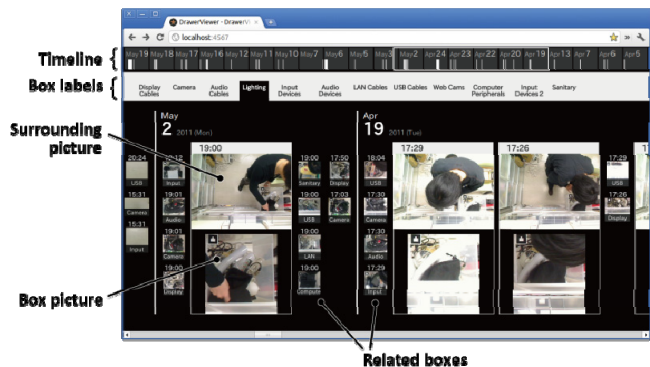


Figure 1. The basic concept of the DrawerFinder system [3]

Figure 2. A screenshot from the DrawerBrowser



DRAWERBROWSER

Here, we consider two techniques for searching for items in storage boxes: (1) box search and (2) timeline search. First, the user searches for a target item in a specified box when they can remember/guess the location of the item and the box. For example, a user can easily guess a pair of scissors is stored in the stationary box or the user may remember that he/she put a similar cable into the audio box several days ago. Second, the user searches for a target item in all the boxes for a certain period when they do not know the box in which the target item was put, though they can remember the period of use. Moreover, they may want to browse all boxes over a specific timeline when they have no idea where the target item is usually stored in the boxes.

Based on these considerations, we designed the DrawerBrowser system as shown in Fig. 2. The main features of DrawerBrowser are as follows:

- Simultaneous browsing of box and surrounding pictures
- Browsing both timeline and specified boxes easily
- Linking other boxes related to the current box
- Creating animations from continuous pictures.
- Running as a web-based application

First, DrawerBrowser shows box pictures and surrounding pictures simultaneously to help users easily browse either the person who might have opened the box or the box or item that was used at that time.

Second, DrawerBrowser provides both a timeline viewer and a box viewer. The timeline viewer shows the frequency of use of all boxes over a long period. The box viewer shows pairs of box/surrounding pictures in time order. Users can easily access both the total timeline and pictures of a specified box.

Third, the system shows links to related boxes that were opened around the same period (Fig. 3). When a user clicks the links, he/she can quickly browse pictures of the box. We think the relationships between boxes may become keys to finding items or persons since the same person or the same item are possibly involved; i.e., an item may be misplaced between boxes when someone took an item from one box, used it for a while, and then returned it to another box.

Fourth, the system automatically creates animations when box/surrounding pictures are continuously taken (within 10 seconds). This function may help users understand more quickly what is happening in front of a storage box; i.e., is the person putting something away, taking something out, or searching for something.

Fifth, we developed the DrawerBrowser system as a web-based application using JavaScript. Users can access our system on various devices, including a PC, a tablet computer, or a smartphone equipped with a common web browser. Users can also access our system remotely via the Internet.

RELATED WORKS

Time Machine Computing [1] enables users to browse various information in desktop environments using a timeline metaphor. LensBar [5] helps users browse large amounts of information (e.g., dictionaries) with simple operations using zooming techniques. Although these browsing techniques focused on GUI environments, our system focused on browsing techniques for storage boxes in the real world. Smart Filing System [4] provides a combination of digital and physical interfaces to an augmented filing cabinet. It can manage printed documents in cabinets effectively by utilizing a digital pen and visual markers. Whereas Smart Filing

System is only applied to printed data in cabinets, our system deals with a variety of items in storage boxes.

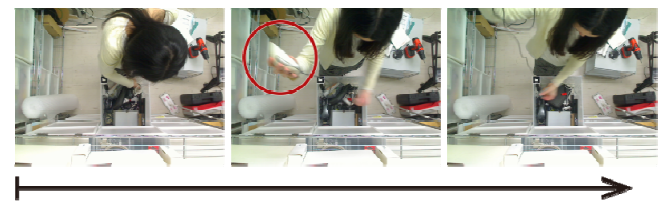
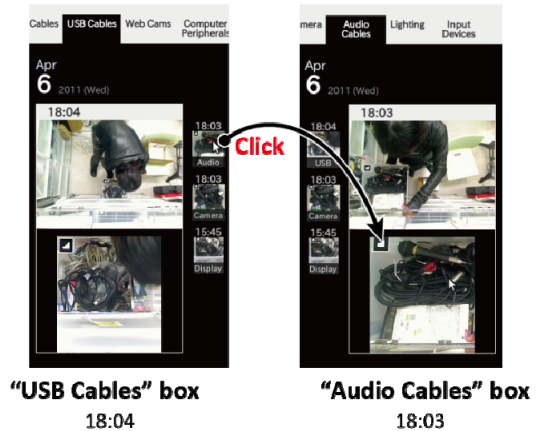


Figure3. Links to related boxes opened around the same time.

Figure 4. Animations generated from continuous pictures.

CONCLUSION AND FUTURE WORK

We proposed a practical picture browser for finding items in drawers, DrawerBrowser, which was designed through observations of daily activities. We are planning to install this system in various environments other than our laboratory and perform long term evaluations.

ACKNOWLEDGEMENT

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