TimeScape: A Time Machine for the Desktop Environment

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ABSTRACT

This paper describes a new desktop metaphor/system called TimeScape. A user of TimeScape can spatially arrange information on the desktop. Any desktop item can be removed at any time, and the system supports time-travel to the past or the future of the desktop. The combination of spatial information arrangement and chronological navigation allows the user to organize and archive electric information without being bothered by document folders or file classification problems.

Keywords

Desktop environment, information organization, chronological navigation, information visualization

INTRODUCTION

We always have trouble with organizing electronic information. We often have difficulty in finding files. It is quite painful and often simply impossible to correctly classify documents into the specific folders (many documents belong to more than one category). Management of digitized data (e.g., phonographs or audio) is even more problematic because there is no easy way to search for them.

Malone et al. observed that people spatially organize documents on their real desktop [1]. Mander et al. proposed a 'Pile' metaphor, where files can be piled on the computer desktop, for casual organization of information [2]. We also observed that many users prefer to place icons directly on the desktop without using document folders. On the other hand, Freeman et al. argued that a time-ordered system (called the "Lifestreams") is a more suitable metaphor for information organization and archiving [3].

We consider that these two solutions are not exclusive, but complementary.   Our primary idea is to take the

advantages of both, by combining a spatial metaphor with a chronological navigation mechanism, in other words, to create a time machine for the desktop environment. This paper briefly introduces our initial design of the time-machine desktop system called *TimeScape*.
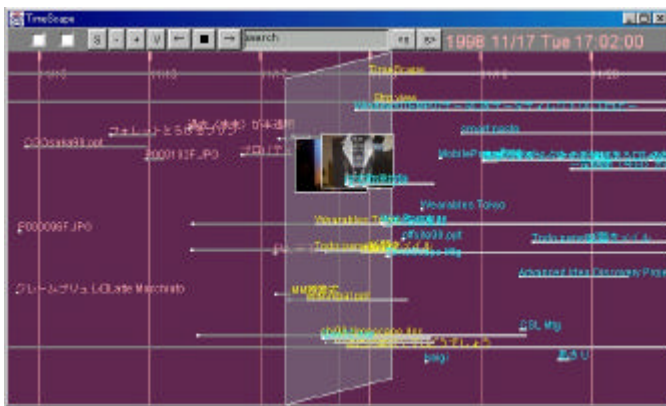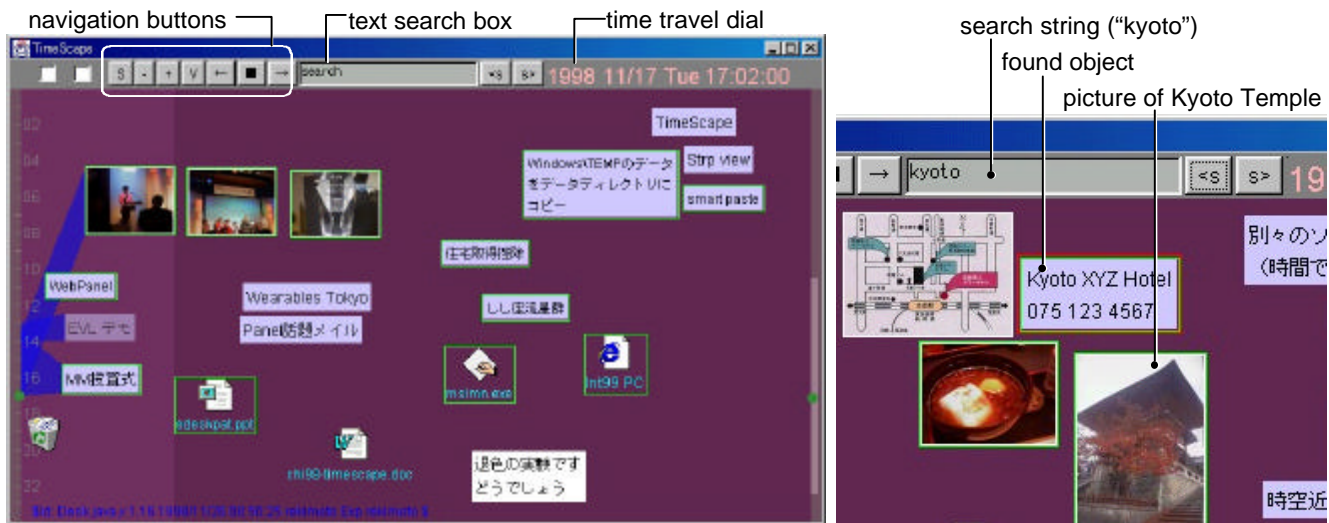
DESKTOP AS A TIME-MACHINE

Figure 1 shows a typical screenshot of the TimeScape desktop. There are no *folders* in this environment. All the items (file icons, application icons, PostIt notes, and digital images) are directly placed on the desktop. The user can launch applications or open documents by double-clicking them. Desktop items can be spatially arranged to organize information (e.g., place related objects closer to form a group). Note that PostIt notes gradually fade over time, to subtlety indicate their duration.

In addition to these basic functions, TimeScape supports the *time-travel* of the desktop. By manipulating a time-travel dial (top-right part of the screen), the user can change the time of the desktop. The system restores the state of the desktop according to the designated time. The system also provides "go back" and "go forward" buttons (appear as arrow buttons on the toolbar) for event-based navigation. For example, pressing the "go back" button brings a user to the most recent time when any desktop change has occurred (item creation, deletion, etc.). The user can also select a desktop object and go to the time when that object was created or deleted.

When the user feels some documents are not immediately necessary, the user simply can remove them from the desktop by dragging them to the trashcan. Since all the information is permanently maintained, the user can always retrieve removed data by travelling to the "past" of the desktop. This capability supports the effective usage of the desktop real estate; the user can keep the number of desktop objects organized, by removing unnecessary objects.   This feature is particularly suitable for maintaining "To-do" items on the desktop.

The user can also travel to the "future" to make a schedule. It becomes a reminder; because scheduled objects automatically appear on the desktop at the arrival of the appointed time.

navigation buttons — text search box — time travel dial

TimeScape — 1998 11/17 Tue 17:02:00

search string ("kyoto")
found object
picture of Kyoto Temple

kyoto

Kyoto XYZ Hotel
075 123 4567

Figure 2: A timeline view of the desktop

To support travelling over time, the system provides a "timeline" view (Figure 2). In this view, the current desktop is represented as a semi-transparent slanted rectangle on the middle of the screen, and the left and right parts visualize the "past" and "future" of the desktop. The desktop and timeline views are switched with animated transition to show the connection between them. The user can change the timeline scale to browse what is happening during a day, a week, or any time in the user's entire lifetime.

Information search over time and space

Combining the above features, TimeScape can be seen as a space-time continuum of the user's activities. To search information from this continuum, the user enters keywords in the text entry box and presses a "search forward" or a "search backward" button. The system travels over time to the past or to the future until finding an object. Then, the user looks at nearby objects (in terms of space and time) by switching desktop and timeline views. Figure 3 shows the result of the search "kyoto". Thanks to the attached PostIt note containing "Kyoto", the user can find a picture of the temple, even though the system does not understand image contents.

CURRENT STATUS AND FUTURE DIRECTIONS

The current version of TimeScape is written in Java and supports drag-and-drop objects to and from native environments such as Windows 98. This version has been used for about three month by our group, and the initial responses were quite positive. We are currently preparing more formal usability evaluations.

Aside from the information management system for office workers, TimeScape should also be quite suitable for home users. TimeScape displays on the wall in the living room or on the refrigerator's door could be used to keep daily housekeeping information as well as the family's history.

There are many ways to extend TimeScape's concept. We are planning to combine external time-ordered information sources, such as news or weather information on the World Wide Web. We are also considering a facility of synchronizing information among different devices (such as PDAs or voice note devices) and TimeScape desktops, using time as a primary key.

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