mSpace Mobile: a UI Gestalt to Support On-the-Go Info-Interaction

m.c. schraefel

IAM Research Group
School of Electronics and
Computer Science
University of Southampton
Southampton, SO17 1BJ
mc+inter@ecs.soton.ac.uk

Max Wilson

IAM Research Group
School of Electronics and
Computer Science
University of Southampton
Southampton, SO17 1BJ
mw1@ecs.soton.ac.uk

Alistair Russell

IAM Research Group
School of Electronics and
Computer Science
University of Southampton
Southampton, SO17 1BJ
ar5@ecs.soton.ac.uk

Daniel A. Smith

IAM Research Group
School of Electronics and
Computer Science
University of Southampton
Southampton, SO17 1BJ
das05r@ecs.soton.ac.uk
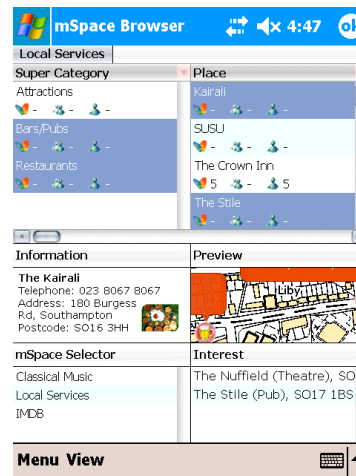
Abstract

mSpace Mobile Interaction presents a UI gestalt of 7 techniques for mobile/on-the-move information retrieval and assessment that enables multiple views of the information within a persistent focus+context viewer. It uses the web but breaks the web page paradigm to support effective rapid triage.

Keywords

Mobile interfaces, mobile and pervasive computing.

ACM Classification Keywords

H.5.2 User Interfaces, Graphical user interfaces.

Introduction

Our work addresses a problem that is particularly galling in mobile UIs: multiple searches are required to support a single compound query. Current technology based on keyword search insists on single queries at a time: someone wishing to know if there's a Japanese restaurant near a theater showing a film they wish to see which is within walking distance of their current location would need to perform several queries AND jump back and forth between list of locations and descriptions of locales AND then find a place to write down any information they wish to keep for reference.
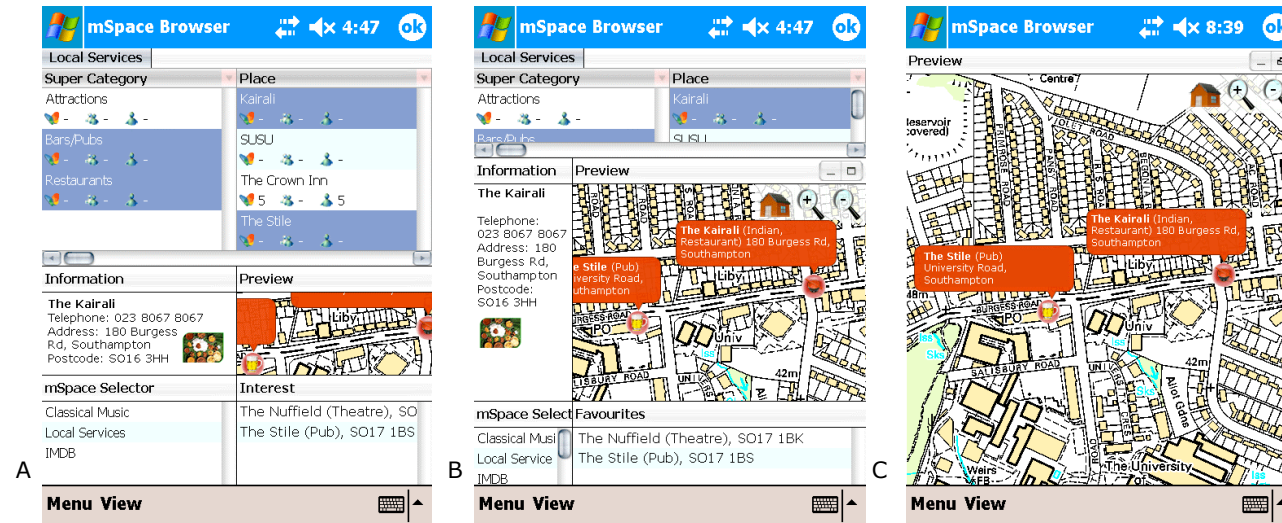
Figure 1: The mSpace Mobile interface: A – Recommendations are visible for the entities in each column. Blue shows selected entities. The information pane shows details about the selection, and the Interest pane shows items that have previously been identified for later perusal. B – The map view, showing the location of the two selected entities, is expanded. C – The map pane fully expanded. The user determines degree of context visible, but context is persistently recoverable.

The mSpace Mobile interface allows concurrent visualization of these kinds of queries, while also presenting options for selection, and information about any object of current interest, while enabling a quick gesture to add a chosen item to a list for future reference. It is also possible to see ratings by friends or trusted peers of any items in view. With GPS ghost, there are also reminders available about places one may have visited previously. The persistent, concurrent availability of relevant related information reduces cognitive load and memory overload by enabling recognition rather than recall:

The 7 Technique Gestalt of mSpace Mobile

The heart of mSpace Mobile interaction is the mSpace interaction model [4] for exploratory search with facetted browsing [2]: this model imagines information as a high dimensional space. High dimensional spaces are hard to visualize, so mSpace imagines a projection onto the space, flattening it to create a series of slices on the space. These slices create, effectively, a temporary hierarchy of the subset of dimensions in the domain. The dimensional slice is represented as a multi-column viewer, where selections of the elements (or facets) in the left column act as filters on elements in the right column. As mSpace Mobile is location sensitive, a map is used for the preview cue mechanism. The mSpace Mobile interface version of the mSpace interaction model is designed to support users of small screen devices carry out three main activities: (1) the querying of large information spaces through direct manipulation; (2) the rapid assessment of those spaces for information of value; and (3) the ready capture of information for later assessment. Cathy Marshall calls such rapid assessment "information triage" [3]. Abigail Sellen points out that this kind of

information gathering and assessment activity takes up a higher percentage than any other Web-based knowledge worker activity, and yet is the least supported in browsers [5]. Problems on the desktop with assessing and then keeping track of information assessed over pages of clicks is only amplified on limited screen devices. To support information triage on small devices, mSpace Mobile combines 7 interaction techniques, getting significant benefit over any one of these techniques used alone: These are: ZedPanes, Dimension selection, PaneSlider, TriageSpace, Annotator/Recommender, Non-contiguous multiple selection and GPS Ghost. Each is described in turn, following.

ZedPanes
ZedPanes is a modified fisheye lens type zoomable, multipane spatial interface specifically designed to support persistent focus+context interaction in mobile devices. The ZedPanes interface builds on Bederson's DateLens [1]. It uses the same kind of fisheye zoom effect to enable peripheral, legible views of information while enabling focus areas to be enlarged. While ZedPanes also provides 3 levels of zoom like DateLens it has a unique reusable component architecture for the zooming interface that does not restrict the developer to basic table layouts. In the mSpace Mobile application while the screen shown has been divided into 5 specific zoomable areas, these areas can be easily changed around and reorganized on demand; additional panes can also be added. The ZedPanes approach in the case of mSpace Mobile supports the persistent availability of (a) an information selection space; (b) an information view for more detailed information on selected items; (c) a map view for locating the selections; (d) a triage area to track what has already been identified for

further investigation; and (e) a selector area for shifting to related domains of information relevant to the current selection (see Figure 1). In mSpace Mobile, we combine Zedpanes' zooming with mSpace's rapid reorganization/selection of areas of interest (described below) to support persistent context for rapid information triage in mobile contexts.

Dimension Selection, PaneSlider and Multiple Selection
Dimension Selection enables alternative dimensions to be added or dimensions currently in the slice to be removed. For instance, a person may be looking at Events, Artists, Places in the top view (called a slice). They might decide remove Artists and replace it with Producers /production companies to support different interests (who is putting on the latest run of Guys and Dolls? Are they doing any other shows in town?). Similar to Dimension selection, PaneSlider enables dimensions to be moved around within the slice. This manipulation means that people can control how they wish to frame a hierarchy of interest in the information view. One may wish to view a space by Actors then Films rather than Films then Actors, as a simple example. Dimension selector and PaneSlider enable easy reconfiguration of slices with available dimensions. mSpace Mobile also enables people to select more than one entity at a time, thus enabling compound queries: "show me the restaurants and theaters that are near by". These will both be displayed in the infobox and on the map view context. This simple but powerful query technique is not yet possible in Google maps.

Triage Space
As people find elements of interest – such as a restaurant, a film, a CD or a gallery – they can tap and hold to add them into the Interest pane. The list of

entities in the Interest pane enables real time monitoring of interest space growth, as well as an easy ability to keep elements of interest in one place, persistently in view. Selecting an entity in the list populates the info view pane with the information about that selection.

Annotator/Recommender and *GPS Ghost*
How does one choose from a possible array of alternatives? mSpace Mobile incorporates a lightweight means to view several levels of ratings from buddies, trusted community and third party sources. Icons show averages of these sources. If one is interested in interrogating a review further, they can click on the icon to explore the reviews for that entity. Likewise, a tap gesture brings up the rating/annotating box to enable rapid assignment of a rating. A person can then make a further annotation in text if they wish, either then, or later at their soonest convenience. *GPS ghost* is a reminder service, especially for those on the go who may not recall if they have visited a particular locale before. The GPS ghost symbol shows up on items that have been visited previously. The user can set the length of time at a site that determines a "visit." Ghosts can be collected in their own view to put together an ad-hoc diary for later annotation of locations visited.

Conclusions

In this paper we have presented the mSpace Mobile interaction gestalt of 7 techniques, combined in novel ways to support rapid triage for people exploring information spaces on the go. The above suite of interaction tools has been deployed using the mSpace Software Framework [4] using a combination of Semantic Web technologies and open information sources, such as OpenGuides and Wikipedia. More information can be found at http://mspace.fm/projects/mobile/. Early field trials with the prototype in London have proven highly successful against other mobile information interfaces, particularly when the person is using the interface in motion [6]. We look forward to running a larger field trial in the near future.

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