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The stick-e document: a framework for creating context-aware applications

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SUMMARY

There is increasing interest in computer applications that are aware of the user's context. Currently these applications are normally hand-crafted. A lot of them consist of presenting information to users as they enter a given context, for example a tourist nearing a site within a city or a visitor moving round a building. The paper presents a new form of document, and the supporting software, which allows such applications to be created simply by building a new document. The motivation is to make the creation and use of these applications as easy as creating and using web pages.

KEY WORDS Document; Context-aware; PDA; HTML; Stick-e

1 INTRODUCTION

This paper presents a new form of document, called a *stick-e document*, which is aimed at context-aware applications. It encompasses a metaphor whose purpose is to make such applications easier to create and understand. It covers a wide range of context-aware applications, but certainly not all, and removes the requirement that the creator of such applications needs to have computing skills; instead authorship just involves creating a stick-e document.

Although different in purpose, stick-e documents share a number of similarities with WWW documents, and with hyperdocuments in general. In particular, a body of WWW information, which we will call a WWW document (though some authors call this a WWW *presentation* and use the word `document' to mean a page) is built out of a number of smaller components, the WWW *pages*. Similarly a stick-e document is built out of smaller components, which are called *stick-e notes*. Each stick-e note consists of two parts:

- the content, as is normal for any document.
- the context.

We begin by explaining the motivation for stick-e notes, and the metaphor that underlies them.

A good place to start is an application where the user carries a computer that knows where it is located. We shall assume that the computer is a PDA (Personal Digital Assistant), like the current products of Psion, Hewlett-Packard (HP100, HP200, OmniGo), Apple (Newton MessagePad), etc. There are several current technologies for sensing position:

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- the Olivetti active badge system [?], and the Xerox PARCTab [?], which are suitable for use inside buildings that have been appropriately wired.
- Global Positioning System (GPS) receivers, which sense their position anywhere on earth, provided they are outdoors.
- other schemes based on beacons, cellphone cells or even relatively humble bar-codes that are distributed round a building and are read by scanners carried by users.

If any of these devices is attached to a PDA, the PDA knows where it is. The metaphor that is the subject of this paper is that the user can then employ the electronic equivalent of a Post-it note: the user can, on the PDA, place a message in their current position (or indeed in any other specified position); whenever the user returns to the same position the message is *triggered* and the PDA brings the message to the user's attention. Thus the user has a personal equivalent of a Post-it note, which can be posted in any position in the space covered by the location-sensing technology, and which the user sees every time she visits that position. This electronic Post-it note is what we call a stick-e note: the content part of the stick-e note is the message, and the context is the current position. In practice the note will be attached to a rectangular or circular area, depending on the nature and granularity of the location-sensing system, rather than a single point. Stick-e notes can be used for exactly the same purposes as Post-it notes. They are personal in the sense that the only people who see them are the bearers of the computers that contain them. They can, however, be exchanged, published or broadcast, say over a wireless network, if it is desired to make them available to a wide audience.

2 GENERALISATION