Wireless Information System for Ethnography W.I.S.E

A Project Definition for the Postgraduate Course
INF5261: Development of Mobile Information Systems and Services

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1 The Project Definition

1.1 Introduction

With the onset of "mobile technology," a new and different approach, i.e. methodology is emanating as a contender to the more traditional "ways of doing things." What is pertinent in the current climate is that cost-effective technology is now filtering down to the less conspicuous areas of study. A brief survey of the available mobile technology has resulted in one particularly interesting development which has many advantages. In light of the more comprehensive and costly technologies, the radio frequency identification (RFID) technology is a revolution purely in terms of its far-reaching applicability, access and availability. In the world of technology such a phenomenon is called "compliance." However, it is not without its disadvantages. This will be discussed in detail in the chapter on recommendations.

The project is a collective effort and collective vision to develop a mobile information system which will provide location-based "media-on-demand" to mobile devices. A succinct overview of the technological aspects of the project will obviously include an assessment of available RFID technologies. This summary would also include an assessment of the appropriateness of different RFID uses in terms of purposeful prototypes. The import of which will stand testament to the development of an RFID monitoring and management system for tag positioning (and identification), motion statistics, displays and reports. In addition, the system will also serve information (media-on-demand) from any supported mobile device.

The big picture is obviously not the technology in itself but its application. Accordingly, new mobile technology is a means by which ethnography may be applied. In essence, the method, ethnography is part of human-computer interaction research which encompasses the development process as well as the fruits of development. This is a kind of holistic contextuality in research and may simply be described as the observation of people in their cultural context. In this particular context, the cultural setting is one of the historical heritages of Norway; the Viking ships.

1.2 Aims and Objectives

The envisaged mobile information system will monitor the movement of people around historico-cultural sites and exhibitions. The aim in surveillance is to enable location-specific media to be delivered on-demand. For example, close proximity to an archaeological relic will trigger or enable the user to see the video of the excavation on the handheld device. The surveillance serves another purpose; the objective of statistical analysis is of course to track the movement of people with supported mobile devices. One obvious usage of such statistics is the tracking and activity level or "popularity" of individual hot-spots.

1.3 Motivation

The envisaged system would primarily provide content/media in the form of video (with supplementary pictures, graphics, sound, etc.). Unfortunately, this immediately rules out today's mobile phones. Subsequently the target devices will be limited to PDAs. We are currently contemplating the subset of PDAs to target - although the aim is to support both Windows Mobile and Symbian-based PDAs this may not be possible. The main reason is incompatibility with positioning systems.

Accordingly, we envisage a two-tiered mobile information system[1]. The first tier of this system is the delivery of content to the handheld device based on a location provided by the user. The second tier of the system is some kind of movement management system. The bisection or modularization of the system has several advantages. First and foremost, it frees us from commitment in terms of technology which is currently almost monopolized. Once again, this emancipation, particularly from the proprietary positioning engine has several advantages. They are namely:

1. Not platform specific. Both Symbian and Windows Mobile PDAs should be supported
2. No unnecessary financial burden of purchasing an enterprise positioning system
3. No "off-the-shelf" non-compliance issues

Our first objective is therefore to make the content delivery mechanism – the first tier of the envisaged system. Admittedly, this is in itself a very ambitious task, especially considering the scope of this course (the time frame and resources). Furthermore, I myself am bound to another thesis related project and Paulo is in full-time employment. However, we will not exclude collaboration and cooperation beyond this course as it is a vision that is shared and of great interest to Norwegians and cultural tourists alike. We believe that the culmination of technology and such a strong historico-cultural heritage will capture the imagination of people of all ages and therefore raise the level of cultural awareness. The quiddity of which may only be described by Shedroff's Continuum of Understanding (see figure 1). In accordance with Maslow's Hierarchy of Needs (see figure 2), such a system would ultimately serve to transcend historical and cultural identity.

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[1] Actually, the envisaged system has four parts considering the "server-side" and "client-side" of both tiers. That is, the content provision and content presentation of the first tier, and the "positioning engine" and "tracking application" or management of the second tier.
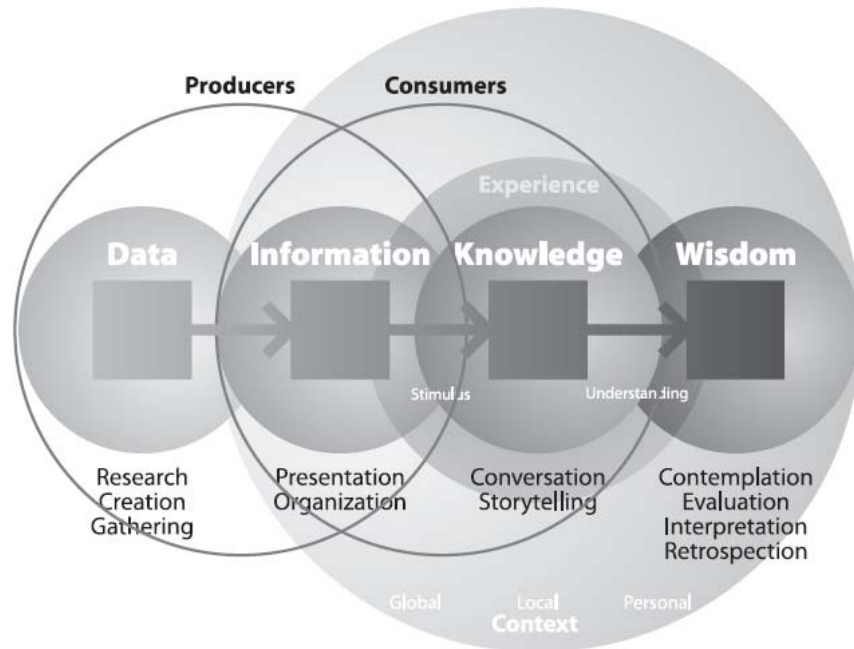
Figure 1. The Continuum of Understanding.

Figure 2. Maslow's Hierarchy of Needs.

2   The Prototype

The system as a whole will not be realized as part of a master's course. The scope of such a project is beyond the time and resource capacity of INF5261. Furthermore, the second tier is technology dependent. To rephrase a more famous expression, "nothing comes from nothing." That is, in order to development a tracking and management system, certain technological requirements must be met. As it is beyond the reckoning of the authors, we suggest that the first tier of such a system will suffice in partly meeting the user requirements. As previously mentioned the first tier of the envisaged system is independent of the available technology[2]. The delivery mechanism will use the local wireless network (wLAN) to stream content to the web-based interface on the handheld device. We believe that a web-based interface will provide platform-independent compatibility for handheld users. In addition, future devices that support this type of content should also be supported. As such the prototype will be a dichotomy of a web-based graphical user interface (GUI) (see figure 3) and the web server.

Figure 3. The envisioned user interface (without navigation controls).

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[2] Assuming that there is a wireless network with five or more access points (for positioning purposes – not required for the first tier) and a few mobile devices available for testing purposes.

The web server is aptly named the "W.I.S.E." server and will comprise of a normal PC which will interface with the database and wireless network.

3 Analogue and Analysis

The following section of this article is a technical assessment in terms of technology and functionality. However, to highlight the realm or bound of such a system we will first emphasize the similarities between the purely technical aspects and ethnology and ethnography.

3.1 Synonymy

Our vision of a WISE system and a top-down approach to development is indeed a broad and inclusive methodology. This holistic perspective may be construed as contextual, as opposed to the compositional bottom-up approach. In the same way as objects and text are compositional in terms of qualitative research in cultural history and action is contextual. This holistic contextuality is therefore a kind of emancipation of design and the cultural historical understanding of design in research processes.

> "…history, in its traditional form, undertook to 'memorize' the *monuments* of the past, transform them into *documents*, and lend speech to those traces which, in themselves, are often not verbal, or which say in silence something other than what they actually say; in our time, history is that which transforms *documents* into *monuments*."
> Foucault, 1969.

3.2 Requirements Specification

- On-site 802.11 based wireless network. The more bandwidth available the better (802.11a/g) as streaming video simultaneously to several clients will require a large amount of bandwidth.
- On-site content database
- Mobile device(s) that are to be supported. Preferably both a Windows Mobile and Symbian device in order to provide maximum compatibility
- A standard PC to act as a server for content delivery
- All server software will be open source, and thus be freely available

PocketPC user | Wireless access point | Web/application/ streaming media server | Content server
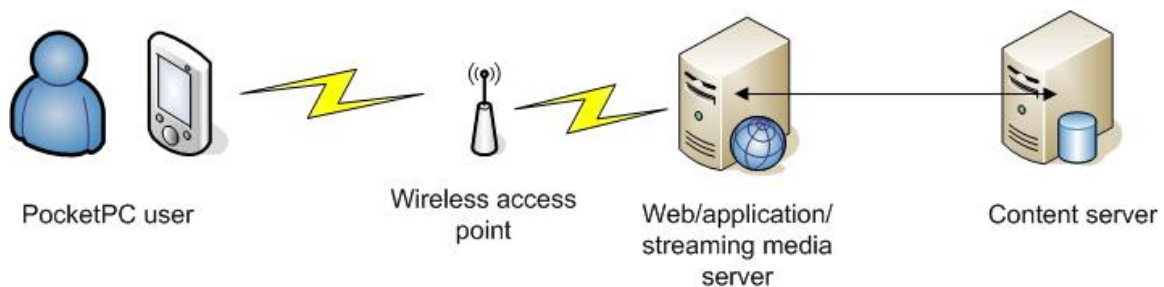
3.3 Requests and Recommendations

The development of the second tier of the location based service rests on a positioning engine. We believe that the Ekahau Positioning Engine™ would provide an adequate solution. However, this particular solution requires the purchase of several Ekahau components (Ekahau Manager™, Ekahau Client™, Ekahau Application Framework™) and binds the system as a whole to Ekahau. Furthermore, the system requires a client-side application written in Java which currently only supports Windows Mobile PocketPC devices. These concerns, in addition to the implementing costs (time and resources) as well as the price of software itself are the primary reason behind why we have chosen to modularize our solution into two independent tiers.

If the system, as a whole, is deemed as an imperative then the Ekahau Positioning Engine™ is the obvious choice for the second tier. However, the successful implementation of this whole system is beyond the scope of this project's time frame. Therefore, we suggest the deferment of the second tier of the system until after the completion of the prototype of the first tier of the system. Furthermore, we recommend the second tier as a task for two master's students with the system as the main thesis topic.

4 References

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[5] Michel Foucalt. The Archaeology of Knowledge, Routledge Classics, 2002. First published: L'Archeologie du savoir, Editions Gallimard, 1969