

# Providing context awareness via a large screen display

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## 1. What is context?

We define context actually as a multi-layered set of contexts: personal, project, group and organisation. At the personal level the context contains information about an individuals current activities such as where they are, what documents they are reading and who (if anyone) they are with. This information can be very personal and not available to others, even people involved in close collaboration.

At the project level, the context contains all the information relevant to meet the project deadlines and collaborate with the project partners. In a software design project examples are the project requirements and the documentation of the modules produced by other people in the project.

At the group level the context becomes less relevant to carry on the daily activities, however it supports the understanding of where the unit is going as a whole, and how the long-term priorities should be set. It is also relevant to reuse expertise at the level of the group.

At the organisational level the context contains not only the corporate strategies, but also the set of activities carried on by other groups that could be relevant.

In general all the four typologies of context contain:

- People and their expertise
- Information sources
- Informational documents and the evaluation of their relevance
- Relevant pragmatic documents (e.g. the Gantt chart of the project)

The higher is the context level, the less it is possible to rely only on personal judgement to define was is part of it and what is relevant in it.

## 2. Who might benefit from an awareness of their context; whose context is important to who, or what?

Short answer: everyone!

Long answer: We believe that an awareness of context would be generally useful both in novel situations involving mobile devices which would benefit from an awareness of their current location, and in traditional situations involving a fixed PC. We believe that an awareness of context is useful as it potentially reduces the demands on the user to explicitly communicate with a computing device.

- If a mobile device is aware of its location then a user merely has to ask “where am I?”, “what is there to see near here?” or “what is the nearest hotel?” without having to tell the device where “here” is.
- If a fixed information system knows what part of a town (or corporation) it is situated in then it can automatically tailor the display of information to suit that locale. What is more is that if in addition to this it knows who is nearby it can tailor its output to fit particular people.

## 3. Where can an awareness of context be exploited?

In our opinion context awareness is most useful when users are not explicitly interacting with a device either because they do not want to spend the effort or because they do not realise that the device can perform a useful function at that moment. In this situation a device with sufficient context awareness could proactively make information available without any action on the part of the user.

## **4. When is context-awareness useful?**

In our opinion context awareness is most useful when a user needs to ask a question, has an implicit information need or wants to provide information with reference to something in the user's environment. For example, we are currently working on an information system based around a large screen display. This system attempts to provide information that is relevant to its community of users using a user-definable set of rules which define what content is interesting. We plan to deploy this system in two very different settings: our laboratory in Grenoble and in Venice where it will act as an information system for tourists and locals in Venice.

At a minimum the system will exploit generic information about its current user group and its physical location in order to select which information to prioritise for display. However, we also intend to augment the system with other sensing technologies in order to take greater advantage of context. The technologies that we have under consideration at the moment include:

- video recognition of people
- pressure sensitive floor coverings to be able to detect the presence of people
- audio sensors to detect the presence of conversation and (perhaps) recognise keywords (We are well aware that generic speech recognition is not currently feasible but we hope that we might be able to recognise enough words to allow the system to make a guess at the general topic of conversation).
- Infrared or radio communication with PDAs to allow people to use their PDAs as a means of controlling the large screen display and as a means of signalling identity and of communicating an interest profile to the system.

## **5. Why are context-aware applications useful?**

We believe they are useful for two basic reasons

1. They avoid the user having to explicitly describe the current context and so cur down on the work of the user.
2. They allow systems to operate which do not require direct user interaction. Our goals for the large screen display is that it will display relevant information and provide a general awareness of activity in a community without people having to explicitly ask for information or interact with the device (although they are free to interact with the device if they see something interesting and would like more information).

## **6. How do we implement context-awareness so that we can develop context-aware applications?**

There are several components to this. The first is to have the raw information available whether from sensing devices or pre-specified data. The second component is to establish a representational framework which allows the raw data to be represented in terms that mesh with the goals of the system. The final component is a decision making mechanism that allows the system to decide when context is relevant to a given interaction – this could take the form of a set of rules, a neural net, or some ad-hoc program code.