A framework for context elicitation in medicine

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Adaptative, contextual, ubiquitous: new challenges for information delivery
Sharing pedagogical ressources: proposing medical houses for elderly people suffering from Alzheimer disease was very well adapted to France but not well adapted to Mali.

Alerting about ADE: Alerts about the use of heart medication are well know and not so useful in cardiologic department and on the contrary very useful in some other departments.

Giving some advices upon test lab follow-up: such information is not useful if the test lab has already been ordered.
Difficult to spot on contextual information

- *Something is context because of the way it is used in interpretation, not due to its inherent properties* (Winograd 2001)
- Proceduralized context is built from the knowledge that is pertinent to use in a given situation (Brezillon 2004)
- *Context information* [is used] *as implicit input* (Schmidt 2002)
We aimed at

- Better understand how to spot on information
  - Contextual
  - Useful

- In a given situation
Model and use a cycle of context elicitation

1. **NEEDS**
2. Useful knowledge
3. Information
   - Intrinsic
   - Contextual
4. GOAL
   - Presentation of information and services to a user
   - Automatic execution of a service for a user
   - Tagging of context to support later retrieval

Useful knowledge is related to needs, which leads to information as follows:
- **Intrinsic**
- **Contextual**

This information is then used to achieve the goals mentioned.
First step is to state what is the context used for, we propose the 3 features mentioned by Dey: “

- presentation of information and services to a user;
- automatic execution of a service for a user;
- tagging of context to support later retrieval”.

It helps us to specify the application needs.
we determine the useful knowledge needed to compute the application.
Among the informational space, we classify the information:
- contextual
- not contextual (i.e. intrinsic to the application).
Resources of information:
- ontologies, classifications, terminologies,
- Hospital information system, medical record
- habits of a department, prevalence of a disease

Structuration of this

Classification of information through the expert
analysis of the application needs
Representation of the procedures able to provide them (age is provided by date_of_birth, name is found in HIS).
Acquisition of the information to reach the goal of the contextual application

Information

Intrinsic

Contextual

GOAL

presentation of information and services to a user

automatic execution of a service for a user

tagging of context to support later retrieval
The objective (in p–LearNet national project) was to allow the residents to build and to share pedagogical resources, issued from their activity, during their activity. It is still difficult to find short pedagogical information, well suited to a situation of care, easily appropriated by health care professionals. We have computed an existing personnel paper notebook used by most of the residents and built an augmented notebook through a wiki. The notes must be enriched with some information which can help the resident to compare a situation of care with the one in which the note has been written.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Tagging of context to support later retrieval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs</td>
<td>Enrich the notes so that the situation of care in which they are written could be understood.</td>
</tr>
<tr>
<td>Useful Knowledge</td>
<td>Department, topic of the note, author,...</td>
</tr>
<tr>
<td>Intrinsic information</td>
<td>What is written in the note (ex: disease, dosage, ...)</td>
</tr>
<tr>
<td>Contextual information</td>
<td>Author is novice, department is pediatry, ...</td>
</tr>
</tbody>
</table>
The objective of the research situation (in European PSIP project) was to reduce inadequate display or overalerting when using a Clinical Decision Support System dedicated to prevent Adverse Drugs Events. If not contextualized, the alerts interrupt healthcare professionals unnecessarily and lead to an "alert fatigue."

### Situation 2: proposition of alerts (or more clever: advices) during prescription

<table>
<thead>
<tr>
<th>Goal</th>
<th>Presentation of information and service to a user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs</td>
<td>Be able to focus on useful advices or alerts: for example when prescribing a medic which should modify the natremia level, avoid to advice to order blood analysis if a lab test has already been ordered.</td>
</tr>
<tr>
<td>Useful Knowledge</td>
<td>Medication of a patient, nature of the test lab ordered, is the last test result sufficiently recent?</td>
</tr>
<tr>
<td>Intrinsic information</td>
<td>Link between the risk of hyponatremia and the follow up of natremia level</td>
</tr>
<tr>
<td>Contextual information</td>
<td>Trace of blood analyse, date of last blood analyse</td>
</tr>
</tbody>
</table>
Context should be introduced in many complex applications in order to match the actual needs of the users.

But the complexity of context makes it difficult to decide which specific information, which data should be used as contextual features instead of one other.

- elicitation of context used in two different medical situations.
Thanks