User Interface Design for Internet of Things and Intelligent Agents Systems

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ABSTRACT

This paper compares new media design and intelligent systems design as in interacting with intelligent assistants, agent-based systems and Internet of Things (IoT) applications. Both require a flexible user-centered, approach to interface design as a combination of user-centred design with co-design and co-creation methods.

Keywords: user-centred design, co-design, intelligent systems, user interface design, Internet of Things.

SOFTWARE DESIGN FOR NEW MEDIA

The design process of new media products like interactive websites and mobile apps is lightweight and flexible with respect to adapting to the market or customers' wishes. Because of the flexibility and ease of changing and updating media products, the design process is very lightweight and it uses a variety of informal tools without much reliance on the design notation (de Haan, 2015). The design process of media products is based on a range of prototypes. It is a features-driven process, where each design cycle (or Scrum sprint) focuses on the next most important features. Finally, it is an incremental process with iteration both during and after the design process, since maintenance includes further adaptation of functionality and presentation to evolving user wishes and tastes. Design and implementation proceed almost completely independent, allowing for a genuine user-centred design process featuring exploration, user participation, co-creation and co-design, paper- and rapid prototyping, etc. (van Dijk et al., 2011).

INTERFACING INTELLIGENT SYSTEMS

We analysed a number of projects about human interaction with intelligent assistants (de Haan, 2000; de Haan et al., 2005), designing intelligent interfaces to agent-based systems (de Haan, 2003), and work on design methods for IoT and ubiquitous systems (de Haan, 2015). In all of these cases, the essential part is the design of interaction between humans and intelligent agents. The following lessons were learned:

- don't bother the user with everything that may be worthwhile of telling, provide a selection.
- text messaging is far less intruding within the user's context then spoken messages are
- adapt the 'sophistication' of the interaction to the particular type of user
- during design, allow for design exploration and co-design within the (real-world) context of use

In all these projects, we noted that, even though usability was not the principal aim, design followed a user-centered approach using user participation, scenarios, prototypes and design exploration. For designing the user interface, it did not at all matter that the system was intelligent or agent-based; that was merely the 'service', delivering the result to the user interface. As such, the architecture of the user interface perfectly fits the mashup architecture that is characteristic for new media designs.

The same applies to e.g. the choice of the particular modality or the timing or manner of presenting information to the user. What is necessary, also for not-so-well-predictable systems as robots or intelligent systems is that, first, the design should allow for an flexible co-creation or co-design approach to ensure that the systems' behaviour fits the prospective users and, secondly, that it should allow for (agile) exploration and or 'tuning' of the design space to find the best possible way of presenting information or behaving, etc. to adapt the technical system to the user's context.

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