Introduction

We currently live in a society dominated by information and communication. At its centre, the Internet represents the ultimate information space allowing us to retrieve or contribute anytime and anywhere (when using the right tools). More than one billion people are already connected, searching information, communicating with each other, contributing thoughts and knowledge. But with the increasing universality of the medium, combined with growing information overload and a spoiling for choice of available tools and services, mastering the Web can quickly become a burden.

A personalised window to this messy world, tailed by and for the individual is what this project hypothesizes. By developing “large scale” prototype environments, restricted to specific informational domains we aim to create a controllable setting, that can be tested, developed and improved together with users of these systems.

Project Summary

The nature of my research interests is interdisciplinary with a strong focus on user interface (UI) design but influenced strongly by cognitive psychology, visual perception theories and didactical methods like constructivist explorative learning. At the core of my PhD project stands the formative development and evaluation of a prototypical information space (IS) for the web as reasoned in the introduction above. We aim to create two separate instances of this IS which will apply the domains of “computer security” and “nutrition”, each with the aim to address a broad but unique audience and stimulate collaboration. The prototype will provide means to communicate, contribute and of course access information. The ease of performing all of these relevant tasks will be part of the investigation. Especially with the novelty of the approach proposed here in mind (in terms of a novel interface and a novel interaction strategy) long term results are crucial, especially in terms of users’ satisfaction. It is intended to involve users in every stage of the development, to test improvements, gain qualitative feedback and improve the IS continuously alongside user requirements and expressed desires.

The main novelty of this IS will be the way it structures and displays information in a modularized and hierarchical manner. The design of the UI will make use of and develop further the Focus-Metaphor Approach [1, 2, 3] (see Figure 1).

This approach suggests a shift in structuring information on the Web. It proposes a separation of navigation and content that would have a similar impact as CSS had on separating layout from information. Using this

![Figure 1 - Screenshot of a Focus-Metaphor Interface](image-url)
approach, information will be modularized, hierarchically structured and displayed like visible in Figure 1. A complete explanation of this theory can be found in the paper “The Focus-Metaphor Approach: A Novel Concept for the Design of Adaptive and User-Centric Interfaces” [1].

For the further development and research, it is planned to conduct long term user studies and extensive in laboratory testing using eye-tracking equipment as well as physiological feedback to significantly improve the users’ experience of online information environments. It is aimed to investigate effects of user confusion, user orientation and navigational behaviour, cognitive load and other related aspects.

Starting with Furnas’ work on “Generalized Fisheye Views” [4], user interface visualizations using a focus + context approach became increasingly popular. Since then, many different projects have aimed to develop solutions to create contextual interfaces and Card’s work at Xerox Parc on DOI trees [5] represents a quite popular alternative. But even today, these solutions target mainly an alternative form of navigation which links to external content. This represents a “cognitive break” within the interaction process, which might especially effect performance in more complex tasks and increases cognitive load. Another alternative is the direct application of Fisheye views for graphical visualizations [6], but these scenarios are only usable for very restricted domains, like maps, lists or the like.

In contrast, the proposed research is focusing on a much more holistic approach of combining this sort of contextual navigation with the actual presentation of content. The Focus-Metaphor UI is dynamic, seamless and optimized for cognitive load, offering a focus + context visualisation that aims to provide a personalised “window” onto the IS. This personalisation will be created through various means, manually by the user as well as automatically through a smart backend. Whilst work on this novel UI is one core area of research, the second area will be the design and integration of this smart backend in form of a novel feature rich tagging framework that allows structuring the entire information space and providing a personalised view for each user. With these mechanisms of social tagging, the IS will be structured and personalised in a semantic way. When accessing information, users will have control on displaying what is relevant and interesting as well as hiding unwanted or overhead information.

**Relation to Workshop themes**

At the core of the proposed research stands the aim to deliver a more intuitive and efficient experience of personalisation in web environments. One underlying thesis of my research is, that current web-based user interfaces are not designed for and do not work with personalised content. Their design is rigid and static, layouted in grids and tables, with rows and columns that blur the borders between information and navigation, between tools and content. Perceptual Bandwidth is continuously increasing [7], and when looking at phenomena like banner blindness [8] and second-visit blindness [9] it is easy to conclude that conventional interfaces represent a burden [10] and are more likely to confuse users than assist them in finding relevant information or services. Current efforts towards the provision of personalised content (like Google’s personalised homepage, Windows Live or My Yahoo) lead the direction of future developments in this area. Nevertheless, this research is based on the hypothesis that the aspects mentioned above [7, 8, 9] represent critical drawbacks for effective personalisation like addressed nowadays by Google & co. and that the Focus-Metaphor approach will be able to provide a solution to these problems. By shifting the current fixation on search-based interaction (which could be regarded as a defeat of
information architects) towards a more contextual explorative interaction [11] there might be the ability to create a new paradigm for a personalised Internet.

The planned work especially addresses the first two themes of the workshop:

**How can computerized technology enhance or affect collaboration and communication?**

By providing novel means of seamless, integrated interaction with content and services on the interface side and by integrating social tagging to categorize and personalise information on the backend side, we aim to facilitate collaboration and communication among users through a smart user-driven information space.

**How can user-centred design help in the design of systems that adapt to individual profiles?**

Having a tag-based information space presented in a focus + context interface, user profiles (based on a user’s tags and an analysis of a user’s navigational behaviour) will enable us to completely personalise the view onto the information space.

**Workplan & Methodology**

The research will focus on the formative development of a “large scale” prototype that simulates/represents a collaborative web-based information space. Studies will target both qualitative and quantitative evaluations in a mainly scenario-based fashion that is close to simulating real-world usage. As the prototype will be available online for participants, these studies basically reflect realistic usage (e.g. in a planned course accompanying style). Besides logging statistical data through means of web-mining, we aim to get quality feedback, participants’ opinions, suggestions and complaints, to base further work on the prototype on these and to report findings. Another core aspect of the research methodology are in-lab experiments, where we will measure and analyse users’ gaze and stress levels through eye-tracking and physiological measures.

**References**


[3] FMI prototype (last accessed 27 April 2006). [http://hornbeam.cs.ucl.ac.uk/fmi/](http://hornbeam.cs.ucl.ac.uk/fmi/) (Please, consider longer loading times, as this is a very early version of a prototype, not originally intended for web-based access)


