Micro- and Mobile Interactions to Support Dietary Monitoring and Diversification

Theme: Human Computer Interaction and Ubiquitous Computing
School of Computing Science and Institute of Health & Society

Supervisory Team
- Dr. Rob Comber, Computing Science, http://www.ncl.ac.uk/computing/people/profile/robert.comber
- Dr. Emma Foster, Human Nutrition Research Centre http://www.ncl.ac.uk/ihs/people/profile/emma.foster

Key Words
HCI, Mobile, Wearables, Nutrition, Smartwatch

Overview
Food intake plays a significant role in our physical and social well-being and the accurate monitoring of food intake is seen as a necessity for the development of personalised behavioural interventions to support healthier diets (Oenema and Brug, 2003). Digital technologies provide significant opportunity to improve the capture of accurate dietary intake, including ubiquitous and mobile data capture, automated inference, and continuous logging of dietary intake (Amft and Tröster, 2008, Thomaz, Essa and Abowd, 2015, Thomaz, et al. 2013). Novel tools for manual and semi-automatic monitoring (see Figure 1), also provide new routes to support annotation and assessment of food intake (Comber et al 2012), with increased robustness and accuracy within the 5% range. Where interventions are developed challenges exist in adopting healthier diets due to significant individual and environmental issues such as food access and food literacy. In this regard, digital technology provides significant opportunities to add value to the social and physical environment. Social computing systems can harness existing and create new social networks to support food provision, food knowledge and adaptive food security (e.g. Comber et al. 2013, Grimes and Harper, 2008, Ganglbauer, et al. 2014), while ubiquitous and mobile computing systems can provide new routes to healthier food practices and bridges between food environments (Comber et al. 2013, Ganglbauer, Fitzpatrick and Comber, 2013).

This project tackles the tripartite nexus of food intake, access, and literacy through the design, development and evaluation of mobile and wearable digital interactions to support the accurate, timely and mobile monitoring and diversification of dietary intake. Specific intervention is supported through the design of mobile and micro-interactions which: improve nutritional monitoring through user-generated annotation, increase availability of food knowledge as and when it is needed, and create a networked community of practice. From this research there are three targeted system outputs: 1) a mobile 24-hour recall food diary, 2) a smart watch cookbook, and 3) a mobile shopping assistant. Each system will be designed to explore micro-interactions as a means to decrease the perceived time burden of healthier food choices and to provide a short route to action from nutritional advice.

Figure 1: Visual assessment of food intake using the mappmal interface (Comber, et al. 2012).
**Methodology**

The work will be delivered through the development of digital technologies through cycles of user-centred design (see Figure 2). The research will take a mixed methods approach, with a focus on design-led research and will include both typical software development methods alongside social scientific and design methods. Methods such as focus groups, prototyping, and observation will be necessary to capture user requirements and inform the design process. Methods applied across the design, development, and evaluation will engage end-users and stakeholders in the design and evaluation of prototype systems and system designs.

![User-centred design process](image)

**Timeline**

Key outputs from this research will be delivered through an annual cycle of user-centred design involving scoping, design, development, and deployment and evaluation of digital systems (see Table 1). Three cycles will centre on incremental support for dietary monitoring, food literacy and food access, delivering systems as follows: 1) Mobile Intake24; 2) Wearable Recipe Support; and 3) Mobile Shopping Assistant. A final year will focus on integration of the systems for a scaled up deployment.

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**Training & Skills**

This project will require skills and expertise in the development of mobile applications and interfaces. Across the project the researcher will be trained to design, deploy and evaluate such systems and will extend their skills through targeted skills development in Research Methods (including fieldwork, interviews, and focus groups), Design Methods (including prototyping and technology probes), Human-Computer Interaction and User-centred design.

**References & Further Reading**


**Further Information**

Dr. Rob Comber
Open Lab, School of Computing Science
Rob.Comber@ncl.ac.uk