Data Design for Personalization: Current Challenges and Emerging Opportunities.

The following topics are covered in this proposal:

- Personalization
- Intelligent User Interfaces
- Human Computer Interaction
- Mobile Human Computer Interaction
- Interaction Design

Title:

Personal propensity profile for risk: me and my digital aura

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We present a position paper on behalf of the IT as a Utility Network+. This Network, otherwise known as ITaaU, is funded by the Research Councils UK (RCUK) as a priority challenge area of the Digital Economy theme. The goal is to foster multidisciplinary research between disciplines, institutions and sectors in the context of IT utilities and the digital economy. By this we mean there is an overt aim to break down barriers between research in academia, research in business and also to interact with policy-making and public bodies on a national and international stage. Based on emergent ideas from the activities across the network, we are moving towards a model and a process for evaluating personal propensity profiles with respect to appetite for risk in using IT utilities. This is being done from the perspective of the individual and their emergent digital aura. The term digital aura relates to the collection of digital artefacts that link both directly and indirectly to the individual as they pass through the physical and digital environments. The ideas and intentions described within this paper have largely emerged from the workshops and other activities of the ITaaU Network+. For that we thank the many individuals who have participated in these activities.

The events and activities of ITaaU have provided an opportunity for reflection on this emerging vision of a digital economy for smart people living in smart connected cities. But what do we mean by the digital economy? What do smart cities offer: utopia or dystopia? What do connected communities look like in practice: a surveillance society or a caring environment? Research is underway in universities, and some companies are exploiting the economic opportunities offered by new technology, but how does their research differ? We perceive that

data is playing and will continue to play a key role in the evolution of the digital economy as indeed the fundamental commodity that underpins the digital economy.

IT utilities are social machines

If data is the key commodity of the digital economy, we should explore issues such as: the competency of the data; whether commodity data is fit for purpose; and what else we need to know about its provenance and usability, and how factors such as these affect the value of the data. We have also been exploring the idea of IT utilities as social machines. Interestingly, the etymology of commodity tells us that the concrete senses of the term are relatively recent; commodity originally suggested qualities such as convenience, suitability and utility.

However, in addition to addressing the underlying technological foundations of the digital economy, ITaaU was created with clear goals relating to people be they users or providers. These goals encompass the following: bringing together researchers, service providers and policy makers; understanding how businesses and consumers are using on-demand services; understanding the provision, uptake and usability of apps and services delivered in the future Internet; to champion simple, usable and safe IT; and to identify perceived barriers that inhibit new users.

In order to achieve these goals, a collection of methods and practices have been developed that we now refer to as the "ITaaU Method". Whilst network success was originally predicated on the three pillars of workshops, pilot projects and secondments, we have found that successful workshops are the surest platform for achieving success. Once participants develop an understanding of how the network operates, stronger applications follow for subsequent schemes and opportunities. Rather than focus on the technological options for delivering IT utilities, we opted to start with relevant topics: libraries, the food chain, emerging economies, 3D printing; together with emergent crosscutting themes: trust, security, design and diversity, plus, of course, data, which relates to everything. To achieve these goals and to develop a deeper understanding of themes such as personal propensity profile for risk, we have run a number of interdisciplinary events and issued calls to draw experts together from many diverse but related fields.

Data in the value chain

If data is considered the commodity that underpins the digital economy then who owns it and who profits from it in the value chain? Big data is everywhere: huge quantities of homogenous, heterogeneous and disparate data. To manage big data and whether to profit from it through innovation or to create scholarly knowledge from it requires either greater computing power or new mathematics or both. Metadata will play a part in this as we seek to endorse, count and control our data. To reap the potential benefits of the digital economy, information will need to be transformed: this is the new IT.

Design will play an increasingly important role in information transformation processes. Designers possess the skills to communicate with the multidisciplinary teams and the users who will participate in the development processes for the devices, services and interfaces. We have worked with top Tech City app and interaction design company **ustwo**, to share and evaluate their efficient methods for rapid prototyping participatory design. From our workshops assessing the future role of libraries and the librarian we have discovered that there is much work to be done in assisting scientists in designing the metadata needed around their traditional experimental data to preserve their findings for the future.

Capturing our appetite for risk

Key to "design for use" is the profile of the users in setting a suitable ensemble of scenarios on which to base the user-centred design and this process must include an assessment of the individual's propensity to accept risk. How do we quantify our appetite for risk? Superficially, interface design and personalisation is about fonts and feel, but dig below the surface, and isn't what we are really managing the user's propensity for risk? How many contractual terms and conditions have you agreed to in less time than it takes for your eye to focus on the words "I agree"? In our workshop on trust and security we heard how three-dimensional models can be used to capture and evaluate the complexities of security profiles for individuals in such a way as to reflect varying moods and environments. We heard how surveys involving thousands of users are needed to deeply understand the complexities of appetite for taking risks in order to achieve trust. Fundamentally it all comes down to whether the user "feels good" in themselves. Such are the complexities of the human brain.

So how can we assist users towards a more informed choice of "feeling good"? We must dig deeper into these trust models and provide access to the relevant, information, both objective and subjective, in a manner that is easy to understand. In the realm of science we are working to integrate more supporting evidence about the hazards and risks inherent in chemical substances into the experiment planning process, such that the risk information emerges in the metadata associated with the results of the experiment.

In terms of the food chain, we are working with agencies to help them to better integrate formal testing data with social media data to compile recommendations and suggestions that will equip the public, professionals and even the executive with the information needed to make crucial decisions in the event of crises and opportunities. The next step will be to bring together the trust/risk models and the design framework with the goal of empowering the user to manage their own risk profile in a way that controls that process in a structured manner, and by providing risk profiles enable better future design scenarios

The way forward

Interdisciplinary approaches will continue to play an important role in connecting research activity to organisations and enterprises outside of

academia. Computer scientists, designers and engineers alone cannot create the IT utilities needed to realise the vision of the digital economy. Psychologists, statisticians, economists, social scientists, and even insurers and actuaries are needed. By workshops we perhaps mean think tanks: environments where ten to twenty aware individuals from different fields and sectors come together for a structured day or two of creative discussion.

Ultimately we aim to create a template to facilitate the evaluation of personal risk profiles and then to see how these can be aggregated into a semi-statistical model to facilitate design. Smart cities are created by a combination of top-down vision and bottom-up initiatives that are fully inclusive. Funded interventions support the evolution of such environments and also provide for reflection and review. Communities are the glue, but they are flexible and fluid collections of people with interests, practices and needs that are changing as the apps, devices and technologically enhanced surroundings change.