Enhancing Self-Reflection with Wearable Sensors

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MobileHCI'14, Sept 23 – 26 , 2014, Toronto, Canada.
ACM XXX-X-XXXX-XXXX-X/XX/XX.

Abstract
Advances in ubiquitous technologies have changed the way humans interact with the world around them. Technology has the power not only to inform and perform but also to further peoples' experiences of the world. It has enhanced the methodological approaches within the CHI research realm in terms of data gathering (e.g. via wearable sensors) and sharing (e.g. via self-reflection methods). While such methodologies have been mainly adopted in isolation, exploring the implications and the synergy of them has yet to be fully explored. This workshop brings together a multidisciplinary group of researchers to explore and experience the use of wearable sensors with self-reflection as a multi-method approach to conduct research and fully experience the world on-the-go.

Author Keywords
Methods; Self-reflection; Diaries; Sensors; Multi-disciplinary

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Human Factors, Design, Measurement.

Introduction

Understanding human behaviour is vital for developing technology following a user-centred approach [10]. Exploring wearable sensors, data entry techniques and design for appropriation is not new within CHI workshop themes. Indeed, the nature of wearable computing and the available devices have been discussed in the CHI community in the context of how people interact with them and how data is captured [2, 9]. Designing for reflection on experience has also been explored and discussed within the CHI community [16]. However, the ubiquity of wearable sensors and self-reflection methods opens up new horizons for conducting research with potential impact across different disciplines and contexts. It is the synthesis, coordination and collaboration of these methods that now requires further exploration. This CHI workshop aims to build upon the existing knowledge and enhance the understanding of synthesizing self-reflection tools and sensors for creating, recording and responding to experiences 'in the wild'.

Mobile diary applications and self-reflection methods facilitate data collection in situ across different settings such as exploring and experiencing cultural sites [8], travelling [1], understanding serendipity [18], enhancing learning within classroom settings [12] or reflecting on everyday spending [15]. Such methodologies have provided a new level of individual self-awareness. For example, self-reflection methods can be highly insightful and beneficial for peoples' mental, psychological and social health [14].

Wearable sensors have been used in research to capturing data and experiences in in naturalistic settings [13]; for designing for smart cities [11]; for understanding attentional needs while on-the-go [17] and lifelogging [7]. Furthermore, sensors allow the collection of physiological data while on-the-go [19] and information about peoples' activity [4, 3]. It is acknowledged by many that sensing complex systems provides an opportunity for gaining insight as to how people and systems behave, interact and re-organise themselves in a dynamic environment. Indeed, self-report diary techniques and smart phones with sensors allow access to subjective reflections on behaviors of interest that otherwise would have been impossible to extract while on-the-go [6]. This workshop aims to explore the synergies between these methodologies, how we can synthesize them, how they influence each other, and the different environments in which they can be applied. We will address and reflect upon using these methodologies in conjunction to realize the dynamic and responsive nature of HCI.

Topics of Interest and Workshop Goals

The multidisciplinary background of the organisers includes HCI, engineering, psychology, design, social sciences, mathematics and human factors. We will invite contributions and opinions from individuals involved in a variety of different projects in which they have applied such methodologies. This workshop will revolve primarily around the following points:

- Discussion and experiences exchange from using wearable sensors and self-reflection methodologies across different settings and case studies (including pros and cons, challenges and benefits, validation and reliability issues, privacy and security issues)
- Exploring the way the synthesis of wearable technology and self-reflection enhances data

collection and user experiences in a wide variety of novel settings through scenarios development, role-playing and live field explorations.

- Identifying implications that synthesizing of technologies pose not only in the individuals but also for societies and technological advancement.

A particular focus of this workshop will be exploring refinements and extensions of these methodologies across different groups of people, themes and contexts. Validation and reliability issues will also be discussed.

Examples of Issues to be Addressed

Cross-Disciplinary Applications of Sensor and Self-Reflection Methodologies: The adoption of wearable sensor technologies and self-reflection means as data collection methods can have significant differences in perception and the behaviour that people exhibit. Furthermore, their use across different environments and settings and by people from different disciplines provides a rich mosaic of experiences of interacting with these technologies. Recent field experience by Alan Dix (Alan Walks Wales - http://alandix.com/alanwalkswales/) has been an example of how such methodologies could be adopted and 'embedded' as part of a deep experiential and personal history perspective. Living lab 'perceptions in the wild' are being transformed into a self-observatory and self-reflective journey using high-tech sensors technology and mobile phone infrastructure.

Capture, Feel, Reflect, Respond, Behave in the Wild: Exploring the opportunities and synergies of capturing *sensor data* while *self-reflecting* in the wild and vice versa, offers opportunities for understanding new norms and processes that occur within our natural and social environment. Issues regarding awareness, collaboration and performance are being raised as well as issues relating to the validity, reliability and ethics of these methodologies. Can capturing, feeling, reflecting, responding and behaving be part of one conceptual and methodological entity? They can certainly inform the way we think, experience and understand our surrounding environment as explored within projects at The University of Nottingham [15, 8, 18, 4]. The border between data collecting and 'living' the data is merging. The implications posed in synergising, designing and evaluating these methodologies will be identified and discussed with an aim to construct a framework of novel application and use.

Outcomes & Future Directions

The workshop will be used to explore and define the experiential utility of these methodological approaches when in synergy through 'hands-on' activities and role-playing. We will create a 'concept cloud' reflecting themes and issues as identified in the research field, while scenarios and role-playing will reveal tensions, advantages and potentials. 'Hands-on' experience with current technologies will offer further insight as to how people interact with these technologies when in conjunction. Based on these we will discuss and identify implications of adopting and using these methodologies together, their impact on the individuals' and on the socio-cognitive perceptions and behaviors. We will share our insights, activities and discussions via online documents hosted in a workshop-dedicated webpage, hoping to create an active community where interested parties can share insights, knowledge and best practice. This workshop builds on a prior event hosted at the University of Nottingham in June 2013. The further exploration of the interplay and the potential synergies that these methodologies provide needs to be

discussed and experienced through cross-fertilisation, new collaborations and cross-insight.

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