Let's Talk About the Quantified Workplace

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Abstract
This workshop aims to bring together researchers from academia and industry to present and discuss new ways for understanding, quantifying and visualising the workplace environment. The goal of this workshop is twofold. First we seek to sum up the state of measuring and visualising the dynamics of the workplace by inviting prominent researchers in the space to share and discuss the most important findings of their work. Second, through our interdisciplinary organising committee, we will recruit participants from both industry and academia with the goal of starting a conversation around the practical challenges of and reflections on the Quantified Workplace. As a primer for this conversation, we will also bring together an invited panel of prominent industrial researchers who will share their insights and experiences on the topic.

Author Keywords
Workplace studies; Social Sensing; Feedback Visualisation

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

Workshop Theme

Workplace studies have played a prominent role in the field of computer-supported cooperative work (CSCW) over the past 20 years. Many of these studies have been aimed at producing design guidelines for systems, tools and interfaces, which in turn aim to facilitate productivity and efficiency in the workplace. These past studies have predominantly relied on ethnographic methodologies in the fields of organisational science [11] and social science [9]. Recently, a more quantitive side of social science has been explored to help understand both individual and collective behaviour at the workplace [1,2,3,4,5]. Studies have quantitatively examined both team dynamics and individual traits through large-scale mining of enterprise data. Ehrlich & Cataldo studied team's software development artefacts to understand communication patterns [18] and those of technical leaders [19]. Shami et al.[17] studied 75,747 employees' social media contributions and correlated those to performance results. Others have analysed this data to uncover sources of interruptions [5] or predict employee engagement [16]. Dashboards visualising this data have also been created and studied, such as those to visualise the mood of an organisation through social media [14] or analytics and visualisations of an employee's calendar [15]. These represent an important first step in helping management to understand the health of their organisation [1,5,14,15].

The proliferation of pervasive devices such as smart-phones and wireless badges have also led to advances in this area. For example, technology probes have been used to explore face-to-face interactions through active sensing[2,3,4,10]. Olguin et al.[10] have looked at using wearable electronic badges for measuring face-to-face interaction, conversations and physical proximity. Brown et al. took a similar approach by using wearable badges to track serendipitous interactions in a workplace and evaluated the effect of workers' cultural backgrounds on their interaction diversity[2,3]. Similarly, Pentland[12] showed that patterns of communications are important predictors of a team's success, and that these patterns carry vital information for better people management.

More recently with the rise of the Quantified-Self movement, the workplace studies have gone beyond pervasive sensing and have also started to look into new, sometimes playful, techniques in engaging users and collecting subjective data such as mood. Dugan et al. have deployed and studied kiosks for taking selfies in workplaces, which have the effect of capturing and sharing employees mood with others (through their facial expressions), and were also shown to improve employees' happiness and increase their engagement at work [13]. In [8], Gallacher et al. made use of multi-coloured squeezy balls to elicit mood inputs from employees. Mathur et al. showed that collecting mood as a participatory input became a habitual action by employees over time [6].

As a result of these trends, the ''Quantified Workplace" paradigm has emerged, in which the dynamics and health of organisations can be quantified through ubicomp technologies and visualised in order to offer collective intelligence to the managerial stakeholders and act as individual triggers for self-reflection and behavioural change. In recent reports Gartner estimates that by 2018, over 2 million employees will be required to wear health and fitness tracking devices. So it is important to bring together researchers and

thought leaders in this area at this time to discuss these issues.

To this aim we are seeking original submissions which offer new insights, propose new techniques or trigger discussions around the following dimensions of the Quantified Workplace:

- Novel sensing solutions and self-reporting techniques for understanding the dynamics of a workplace both at the user level (e.g., interactions, collaboration etc.) and the infrastructure level (e.g., spatial analytics).

- Practical challenges such as long-term sustainable engagement with such tools and methods of data collection with special consideration of privacy implications in the work environment.

- New meaningful visualisations at the individual or collective level that reflect behavioural patterns (e.g., human behaviour as well as spatial patterns) of the workplace. For example, the visualisation could offer actionable insights and provide direct affordances for behavioural change by taking inspiration from social data visualisation and emotional design.

- People analytics, ideas and algorithms to increase our understanding of the quantified workplace design.

- Cases studies that trigger discussion and explore dimensions of the Quantified Workplace topic.

Topics of interests include but are not limited to:

- Analytic algorithms and modelling of Quantified Workplace behaviour
- Qualitative studies (interviews, surveys, observations, ethnography) that are focused on the workplace.
- Visualisation of metrics of the Quantified Workplace
- Sensing technologies and system platforms for the Quantified Workplace
- Privacy and legal implications of Quantified Workplace systems
- Applications and user interfaces for the Quantified Workplace

Format

The Quantified Workplace workshop is based on a one-day workshop format. Concretely, it will consist of an invited talk, two sessions for technical papers, and one panel session featuring people from industry. The workshop will start with an introduction, proceeding next to the first invited talk. The paper sessions will include a mixture of invited and peer-reviewed papers examining the area of quantified workplaces. As workplaces are the core focus of this workshop, the panel will invite researchers and practitioners from industry. Taking advantage of the CSCW location and San Francisco IT ecosystem, the panel will bring together prominent panelists to start a conversation around future workplaces, along with reflections on and challenges associated with the quantified workplace. A tentative schedule is presented in Table 1.

Time	Activity
9:00	Introduction
9:30	First Invited Talk
10:00	Coffee Break
10:30	Paper Session 1
12:00	Lunch
13:30	Panel
14:30	Coffee Break
15:00	Paper Session 2
16:00	Closing Remarks and Best Paper Award

Table 1. Tentative schedule for the workshop day.

Expected Outcome

The expected outcome of this workshop is in twofold. First we will make available the technical papers and materials of the workshop on a dissemination webpage [20]. With this, we will also start an initiative to encourage enterprises and workplaces to share their collected datasets with the larger CSCW community. IBM and Bell Labs foresee this initiative as having a big impact on future Quantified Workplace research and will provide a platform to host and make Quantified Workplace data available.

Secondly, based on the materials presented in the workshop and the past literature around the quantified workplace, we will put together a journal publication summing up the current state of the art and the future challenges and opportunities in this area, to share with the larger community.

Based on these two outcomes, we expect a new community to be formed. For which we foresee the opportunity to follow-up on this workshop in future relevant conferences.

Soliciting Submissions

We solicit original research submissions which propose mechanisms for better understanding workplace behaviour or offer systems that could be used to measure, quantify and visualise various aspects of an organisation. We expect the workshop to attract submissions from both the Ubicomp community where much recent work has been aimed at understanding interactions, interruptions and individuals' behaviour in the workplace, as well as from the CHI community where researchers have paid closer attention to how visualising the Quantified-self movement can trigger behavioural change. As broad participation will be crucial to the success of our workshop, a great deal of effort will be dedicated to attracting attendees from both industry and academia. In this vein, 5 invited papers will be from top research groups working on the topic of the Quantified Workplace. The open CfP is foreseen to attract around 15 submissions, from which the top 5 will be accepted and invited to present their work during the workshop.

Selecting Participants

To ensure a rigorous peer-review process, we have put together a program committee with relevant research expertise in Ubiquitous Computing, Social Sciences and HCI, who will be involved in the reviewing process. All

submitted position papers will be reviewed by at least three PC members and judged on originality, technical correctness, relevance, and quality of presentation. All contributions must not have been previously published or be under consideration for publication elsewhere.

Organisers

Afra Mashhadi is a senior research scientist at Bell Laboratories. Her research focuses in ubiquitous computing where she leverages human behavioural patterns to design human-centric systems; and HCI where she aims to uncover the perception of users's interactions with such systems. Her recent work focuses in understanding people's face-to-face interactions within the context of the enterprise. She has previously organised technical workshops and conferences, including GeoHCI and UrbanIoT. Before joining Bell Labs, Afra was a postdoctoral researcher in UCL where she also obtained her PhD degree.

Fahim Kawsar leads the Internet of Things research at Bell Labs and is working within the field of distributed systems, data analytics, and pervasive computing. His current research explores how wireless network can be used as a platform to model human behaviour and to design future connected services. Fahim's work has been published widely in international books and journals, presented at conferences across the world and has had projects commissioned. He has served or is currently serving as General Chair, Program Chair or Program Committee Member in many conferences including the most influential ones in his field (e.g., UbiComp, MobiQuitous, IoT, INSS, etc.). He run the DIPSO/Dome-IoT workshop series with UbiComp Conference for 6 years, and Pervasive Intelligibility workshop with Pervasive Computing Conference for two years. He is a former Microsoft Research Fellow and has worked before at Nokia Research, and Lancaster University.

Akhil Mathur is a researcher in the Internet of Things department at Bell Labs Ireland. His current research interests include mobile sensing, pervasive computing and enterprise-quantification technologies. He is the recipient of Best Paper Honourable Mention Awards at ACM CHI '09, ACM MobileHCI '13, mBillionth Award South Asia 2013 and the University of Toronto Wolfond fellowship. His research has been covered by several media organisations including the New Yorker, Financial Times, Livemint and CBC. He holds a MS (research) in Computer Science from University of Toronto, and a B.Tech from DA-IICT, India.

Casey Dugan is a researcher in the Cognitive User Experience Lab at IBM Research in Cambridge, MA, working at the intersection of technology and social science. Her research is focused on social software and social media, studying analytical dashboards, user-generated content, and methods to increase participation, like crowd-sourcing, recommender systems, and gamification. The tools she's created have touched tens of thousands of users, from one of the first enterprise social networking sites to crowdsourcing employees who use Twitter and personal time analytics dashboards of employees' calendars. Her most recent work involved deploying and studying kiosks for taking selfies at IBM office locations around the world.

N. Sadat Shami leads the Center for Engagement and Social Analytics at IBM Corporate Headquarters in Armonk, NY. His team of researchers and practitioners focus on delivering business insights by pushing the boundaries of the inferences that can be drawn by combining large scale social media data with enterprise

data. His research interests fall at the intersections of social computing, computer mediated communication, and workforce analytics. Prior to his current role, Sadat worked at the IBM TJ Watson Research Center in Cambridge, MA where he led research on microblogging, social file sharing, and the use of virtual worlds for meetings and conferences. Sadat has a PhD in Information Science from Cornell University, has published over 20 articles in highly selective peer reviewed conferences and journals and is co-inventor of several patents. He has previously organized workshops at CHI and ICWSM.

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