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# The Ethical Challenges of Experience Sampling Using Wearable Cameras

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**Abstract**

Self-report methods such as experience sampling provide an important means of understanding individual behaviors. The arrival of wearable camera technologies opens up research opportunities to provoke and explore in-depth contextual self-reflection on individual behaviors. Studies with wearable cameras have the potential to extend or/and complement existing experience sampling methods and provide greater insight into human behavior. However, the use of wearable cameras raises distinctive ethical challenges. This paper outlines a number of ethical challenges occasioned by the use of wearable cameras in research, both tractable and intractable.

**Author Keywords**

Methods; Self-reflection; Wearable cameras, Ethics, Ethical risks

**ACM Classification Keywords**

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

**Self-reflection and experience sampling**

Self-report methods such as diary and experience sampling approaches provide the means for self-reflection, which is an important medium for understanding patterns of individual behaviors, notably

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*MobileHCI '15 Adjunct*, August 24-27, 2015, Copenhagen, Denmark  
ACM 978-1-4503-3653-6/15/08.

<http://dx.doi.org/10.1145/2786567.2794325>

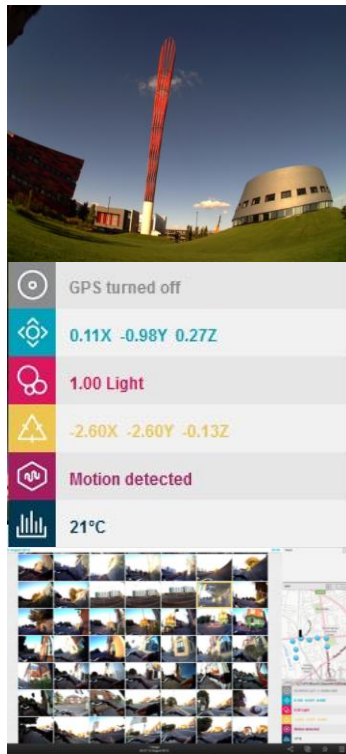


Figure 1: Rich image and sensor data (ambient light / accelerometer / magnetometer / PIR / temperature/ GPS) can be captured by an *Autographer* camera.

in domains such as sustainable consumption [7]. A drawback to these methods is that they are often disruptive to participants' daily activities and that they suffer from a lack of realism, since the researcher often does not know the contextual details of the experiences in question [3].

### Wearable camera: first person perspective

Studying everyday experiences from a "first-person perspective" has been made possible with the arrival of wearable technologies for capturing images and videos [2, 3]. *Autographer* [4] is an example of a wearable camera that opens up research opportunities to understand individual behavior in natural settings. The camera automatically captures images and data from five sensors when switched on (see Figure 1). Such rich media capturing technology could help to avoid retrospection and rationalization biases that are known in self-report methods [1]. It lowers the risk of missing key experiences, and places reduced burden on participants as the system captures data continuously with minimum intervention from the user [3, 5, 8].

In our own experience sampling studies using *Autographer* [9], participants were asked to wear the camera for several hours per day, during which time it passively captured images while participants went about their everyday business. The images could then be collected by the research team to be analyzed in a number of ways, e.g., by being coded into themes [2] or categorized using computer algorithms [1], or, as in our own case, the images were presented back to participants as means of reflecting on the activities captured by the camera.

### Ethical challenges

Whilst there are potential benefits to be had from the use of wearable cameras, our efforts to use them in research made it clear that numerous additional potential ethical issues arise as well. We are not, of course, the first to recognize that wearable cameras raise ethical challenges [6, 10]. Building on these insights we identify further ethical issues associated with using wearable cameras for research, both tractable and intractable. The distinction between ethical matters that are relatively easy to deal with and those that are hard to control has been acknowledged in previous ethical recommendations for wearable camera research [6]. Below we outline the key issues that emerged in the course of engaging members of the public in the use of wearable cameras for purposes of our research.

#### Tractable Ethical Issues

A key concern we encountered in organizing our studies was that members of the public should not be used simply to gather data via wearable cameras. Instead it was important that they play an active role as participants-in-the-research. As one colleague put it, "they are not fieldwork donkeys." This may seem an obvious point to make, but it is an important one nevertheless and one that framed and shaped the process of informed consent.

#### I) INFORMED CONSENT

In addition to standard informed consent forms, greater precautions had to be taken in explaining the rights and responsibilities of the participants. This involved providing guidebooks and project description cards, accompanied by a briefing session, to fully inform the participants about the following ethical issues.

1. They should respect the privacy of other people and turn the camera off when:
  - Anyone is feeling uncomfortable with recording;
  - Entering a setting where photography is prohibited;
  - Entering any public places where privacy might be reasonably expected (i.e. changing rooms);
  - They are in the presence of children or other vulnerable individuals;
  - They are in private places with individuals who have not been informed of the research and have not provided written consent (e.g., at home with guests).

The participants were also informed that:

2. They have the right, and are provided with the means, to edit and/or delete any images captured by the camera in order to respond to any request or any recording restrictions encountered.
3. Researchers are not permitted access to the image/data until participants have formally agreed to hand it over, after they have deleted image/data as they wish.
4. They should carry and show members of the public the project description card explaining the use of the wearable camera and enabling them to contact the research team should the need arise.
5. They risk incriminating themselves by handing over any illegal activity captured on camera to the researchers.

#### II) VISIBILITY OF THE CAMERA

The potential impact of recording on third parties in both public and private places and the commensurate risk of harm to participants [10] not only had raised the requirement that participants should be briefed about these risks but also to mitigate the risks the camera be

*made visible* by, for example, putting a camera sticker or label on the recording device, and through the placement of signage at entry points in private places.

#### III) RECORDING IN PUBLIC SPACE

The participants were also briefed that recording in public places is not always permitted and that they should be sensitive to this fact. Furthermore, where it can be predicted that recording *will* take place in such spaces (e.g., malls), then it was deemed to be the researchers' responsibility to determine the permissibility of recording and notify participants accordingly.

#### IV) JUSTIFICATION OF THE USE OF WEARABLE CAMERAS

Given the risks and hazards of using wearable cameras to study natural behaviors, the necessity for its use in research had to be clearly justified and explained to the participants at the outset. More broadly, the benefits of the study should outweigh the risks to the participants, with lower risk study designs being used where possible.

#### *Intractable Ethical Issues*

One of the main difficulties in using wearable cameras for research lies in fully informing the participants when it is appropriate or not to make recordings. Asking participants to make these calls or to delete images (e.g., of third parties) is, to a certain extent, a delegation of ethical decisions from researchers to participants [8]. There is, of course, no guarantee that the delegation will work. Two key issues present themselves in this respect.

## V) CONSENT FROM THIRD PARTIES

While researchers are obliged to obtain written consent from all people entering private settings where recording takes place, and are subject to disciplinary action should they fail to do so, it is very difficult to ensure that participants actually do this. This, in turn raises real issues of auditing data derived from wearable cameras gathered by participants and tracking informed consent.

## VI) PRIVACY AND CONFIDENTIALITY

Despite the precautions taken to protect the privacy and confidentiality of the participants, and the people who are implicated in the data they capture, the risks of breaching confidentiality always exist. For instance, unauthorized parties might seize the camera, the images it contains be shared or publicized on social media, participant data stores might be hacked. Furthermore, researchers may be legally obliged to hand over the data to third parties (e.g., the police if illegal activity was suspected). Privacy and confidentiality cannot be guaranteed, and it is an ethical requirement that researchers and participants are aware of this when they turn to wearable cameras as a resource in research if there is to be any meaning to 'informed consent'.

**Conclusions**

We have outlined ethical issues associated with using wearable cameras in experience sampling research. Wearable cameras create a new role for the participant, transforming them into researchers who must make decisions normally taken by trained researchers. This occasions a number of risks, tractable and intractable, and obliges researchers to weigh these against the benefits of using wearable cameras in research.

Furthermore, just as trained researchers require ethical sensibilities, then so do participants-as-researchers. Our experience of using wearables in research suggests that these sensibilities need to be built into the process of informed consent.

**Acknowledgements**

The research was supported by EPSRC grants EP/G065802/1 and EP/M001636/1.

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