

Murmur: Exploring how Awareness of Being Under Surveillance can Lead to Dialogue and Control

Jonathan Rankin

The University of Edinburgh

Edinburgh, UK

Jonathan.rankin@ed.ac.uk

ABSTRACT

Murmur is a prototype device which has been designed to create an awareness of when personal information is being recorded and shared by objects around a user. The physical design of Murmur has been developed to give the user a belief that it is a real, fully working device which can show where CCTV cameras are located and when they are recording video. Observations of Murmur being used by volunteers gave insights into how it gives the opportunity to control what personal information is being shared with a recording device and when it is being recorded.

Author Keywords

Research through design; speculative; consent; awareness; design artefact;

ACM Classification Keywords

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

INTRODUCTION TO MURMUR

Murmur is the result of a design-led research project exploring how to manipulate the feeling of paranoia as a method of controlling behavior. It was the final output from a double masters in Innovation Design Engineering at the Royal College of Art and Imperial College London. The project began by exploring the effects a heightened awareness for CCTV cameras had on a person, and resulted in the design of Murmur, an instrument which displays the locations of wireless devices and when they share data.

We are now recorded more than ever. The envisioning of a ‘smart home’ suggests an increase in recorded data in places which we would normally consider private [2]. With this, the line between public life and private life becomes blurred and forgotten. There may soon be few places where you can truly be yourself, without the risk of being recorded.

Consenting to the collection of information about you, whether it be audio, video or miscellaneous personal actions is approaching a one-off process [3]. In public spaces consent is presumed and automatic [6], and in private people are forced to consent to any number of conditions in order to try, or use a service or a product. Murmur gives a person the experience of being alerted to when a device records and shares information. This allows them to maintain control of what and when they share information about themselves to enforce the line between the public and private.

MURMUR AS A DESIGN OBJECT

There is already a great deal of work which is critical of a society under surveillance [1,5,8]. Yet, there are many advantages to having information about you recorded, amongst many others, it allows the targeted advertising [7] and deters crime [4]. This project considered how a more positive relationship of surveillance might be fostered by providing people a means to regulate what, and when they share information about themselves.

Murmur was designed after initial fieldwork that explored and confirmed how an ongoing awareness of, how often you are being recorded, who is recording the information and the type of data being recorded was required to feel as though you are in control of what and when you share. Murmur gives a person first and foremost an awareness of when they were under ‘surveillance’.



Figure 1. The hardware prototype of Murmur with a recording device shown by the red LED.

Murmur can be split into two distinct engagements a prototype of the software which runs on a desktop computer

Copyright 2019 ACM

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org or Publications Dept., ACM, Inc., fax +1 (212) 869-0481.

and performs analysis of wireless data packages to determine when a connected device is wirelessly sharing data, and a hardware prototype, Figure 1, which has a library of the location of CCTV camera GPS coordinates around South Kensington Station pre-loaded onto it. The hardware prototype is primarily used for fieldwork, where participants are able to walk freely around South Kensington Station whilst using Murmur to pinpoint the position of CCTV cameras which record video of public spaces, and to experience some of the possible physical interactions with a future device.

The hardware prototype uses an Arduino Nano, with a GPS module and a magnetometer to determine Murmur's location and orientation relative to the locations of the CCTV cameras. This creates the illusion of Murmur detecting and displaying the cameras as it is carried around South Kensington.

Murmur has a low-resolution display, which uses two concentric neopixel rings to show the location of a CCTV camera relative to Murmur when the recording device is within 10m or 20m. This display is enough for a person to navigate themselves through a digitally monitored environment. For instance, as a person who is carrying Murmur passes a camera, it appears on the outer ring of the display first, if Murmur is then rotated the 'camera' stays stationary relative to the user, in the same way that the needle of a compass continues to point north even when the compass is rotated. This allows the user easily understand their position relative to the displayed cameras.

Murmur has control knobs on the side of the device, shown in Figure 2, which allow the user to alter the range at which CCTV cameras are displayed on Murmur's outer ring, it can be thought of as a map zoom.

The electronics are housed in a machined aluminium case. Using aluminium that has an inherent weight and solidness compared to 3D printed plastic makes Murmur appear significantly more real, accurate and technologically advanced. The feeling created by the material helps to convince participants that they are experiencing something futuristic and real. The display is finished with a combination of acrylic diffusers which aim to give the appearance of depth whilst also hiding the electronics in the device.

The form, material choices the design of the controls take cues from analogue electronic and scientific objects to create the feeling of a precise 'instrument' which, although futuristic and technologically complex is designed to allow the user to feel as though they in control. The interactions a person has with Murmur are designed to give the feeling of being a slightly mad modern-day explorer tinkering and adjusting the device to best navigate their way through a digitally monitored landscape.

Murmur as a physical design prototype aimed to convince a user that they are holding and using something which is fully working and to embed them further into an imaginary world,

where they have a piece of futuristic technology which is able to show all the recording devices around them.

The interactions which the user has with Murmur were carefully considered to elicit specific behaviours. It is designed to be held and used like a compass, to encourage its use not just as a stationary object in the home but to be taken into public spaces and used as a means of navigating through the digitally recorded built environment.



Figure 2. The distance which recording devices are shown can be changed by adjusting the knobs on the side.

MURMUR IN THE WILD

Murmur was given to members of the public who were approached at random in South Kensington. They were told that they were positioned at the centre of the device, and that CCTV cameras which were recording video would show up around them on the display. They were shown that they could use the knobs on the side of Murmur to control the range at that the devices were displayed.

Participants were initially shown to an area where a camera would appear on the device to let them understand how their position was shown relative to the recording device, how it could be used and the distances at which cameras would start to appear, Figure 3. Once accustomed to the device

participants were told that they could go back to what they were doing prior to being approached and that they could use Murmur in whichever way they saw fit.

From previous fieldwork during the initial stages of the project it was noted that observations must be recorded in the least obtrusive manner. This was to try and minimise my own influence on the feeling participants experienced when they were aware of their actions being recorded. To achieve this, I watched participants interact with Murmur at a distance and recorded my own observations with a dictaphone.

Once participants were finished with the experience, short unstructured interviews took place. This allowed me to get clarification on some of the more unusual behaviours, to find out what else people might want from a future device, and their reflections on using Murmur.



Figure 3. Participants were first allowed to familiarise themselves with the device.

REFLECTIONS

Murmur was used by participants in a number of different ways. Some would carry it in front of them and watch it as they walked, others would stop look at it, take in their surroundings and choose their path from there, walking with it at their side.

There were a number of unexpected interactions which people had when they were using Murmur.

At one point a participant got a phone call and instead of answering it without hesitation they checked to see what was being shown on Murmur's display. When asked afterwards why they did this, they mentioned that it was their girlfriend calling, and that they 'felt strange that someone might be watching them talk to her'.

Another participant used Murmur to avoid all of the cameras as they were walking from the Albert Hall back to South Kensington Station. Their reasoning was that they were treating the built environment like a new version of the game 'the floor is lava' where children will try and cross a room using 'safe spaces' not touching the floor, Figure 4.



Figure 4. "The floors are lava"

DISCUSSION

It was noted during fieldwork that whilst the display of Murmur gives a clear indication of where a CCTV camera located in 2-dimensional space, the world around us is 3-dimensional. This is not a significant problem when outside, as the location of the CCTV camera can be roughly estimated from experience and as long as it is within the participants line of sight, they are able to match what is shown on

Murmur's display to what they see in front of them. However, this could become problematic when Murmur is used inside or the recording device is not within the users line of sight. A device displayed on Murmur could in theory be shown to be right next to the user however it may well be several floors below or on the other side of a wall. If further design work was going to be carried this would be the first area of exploration and development.

The project which Murmur was the result of began as an investigation into human nature and the tendency that people have to trust. Trust that their data is kept safe, that they are only recorded when they expect and that it won't be misused. As we move towards a future where personal data is collected constantly we can either accept and forget or maintain awareness and control over what we share. Murmur offers an ongoing awareness of when a connected object is recording and sharing data. With fresh awareness, a person has the power to manipulate the situation they are in to maintain some control over the information which they are sharing. An example of this was shown by the participant who used Murmur to avoid all the cameras on their journey to the station, in this case it gave them the power to control when they were being recorded by CCTV cameras.

The current state of consent with regards to data collection is close to one off, but with ongoing awareness, consent can be forced to move towards an ongoing dialogue between the user and the objects which record data. This dialogue gives a user the power to consent for a short time, to consent occasionally or to withdraw consent completely.

There is already a huge volume of data recorded about a person, and an alert given every time data about them is recorded and shared would be completely overwhelming, at first, and then over time just fade to background noise. It is therefore important that a future device displays the unusual occurrences of personal data recording and sharing. These events could be determined in a number of ways, over time a user can mark the expected occurrences which can then be ignored, perhaps AI algorithms can be written to remove human interpretation of what is 'normal' or finally Murmur could watch for unusual instances itself. For example, Murmur could be designed to have its own 'awareness' and watch for Alexa coming to life without being called upon.

CONCLUSION

Murmur is a device which makes a user aware of when they are under surveillance and personal data they are sharing. This new-found awareness gives a user an improved opportunity to control the occasions when they let themselves be recorded and what information they share. By being able to control this information a user can maintain an ongoing dialogue of consent between themselves and the data collection devices around them. This dialogue of consent goes some way to providing the user power to define the line between the public and private, to opt out and regulate what, and when they share information about themselves.

ACKNOWLEDGMENTS

I'd like to thank the volunteers who gave up their time for fieldwork. The visiting designers, and academic tutors from the Royal College of Art and Imperial College London who gave feedback on my thoughts and designs. And finally, Dr Chris Elsdon who has helped getting my thoughts onto 'paper'.

REFERENCES

1. Dries Depoorter. 2016. Jaywalking. retrieved February 8, 2019 from <https://driesdepoorter.be/jaywalking/>
2. Data Protection Working Party. 2014. Opinion 8/2014 on recent developments on the internet of things. retrieved February 7, 2019 from <http://www.dataprotection.ro/servlet/ViewDocument?i=1088>.
3. Data Protection Working Party. 2013 Opinion 02/2013 on apps on smart devices. retrieved February 7, 2019 from <https://www.pdpjournals.com/docs/88097.pdf>
4. Brandon C. Welsh and David P. Farrington. 2009. Public Area CCTV and Crime Prevention: An Updated Systematic Review and Meta-Analysis, *Justice Quarterly*, 26:4, 716-745, DOI: 10.1080/07418820802506206
5. Coop Himmelb(l)au. 2014. Jammer Coat. Retrieved February 8, 2019 from <http://www.coop-himmelblau.at/architecture/projects/chbl-jammer-coat/>
6. Information Commissioner's Office. 2019. In the picture: A data protection code of practice for surveillance cameras and personal information. retrieved February 8, 2019 from <https://ico.org.uk/media/for-organisations/documents/1542/cctv-code-of-practice.pdf>
7. Louise Story. 2008. To Aim Ads, Web Is Keeping Closer Eye on You. Retrieved February 8, 2019 from <https://www.nytimes.com/2008/03/10/technology/10privacy.html>
8. Ai Weiwei. 2011. Surveillance Camera, Lisson Gallery, retrieved February 8, 2019 from <https://www.lissongallery.com/exhibitions/ai-weiwei--2>