

# EVEREST: The perceived and monetary value of in-home privacy.

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Personal data is a highly discussed topic nowadays, which will continue to grow since data is collected even more due to the rise of smart homes. Remarkable is the shift in the way the personal data is collected due to the smart homes. Where data used to be gathered by an active contribution to the internet (e.g. smartphones and computers), smart homes enable a new passive contribution to collecting and sharing data with the use of all smart products and their sensors. Although society considers their homes as a secure and safe place that they feel protected by, personal data is increasingly collected and shared from within their homes, sometimes even without knowing which data is collected.

According to R. Bellotti and A. Sellen [1], privacy can be considered as a design issue. Understanding concerns, awareness and desires of the user of the new technologies are key in designing new data-based innovations, which are changing rapidly since the rise of smart homes. As a result, new security and privacy related expectations, actions and attitudes of the inhabitants arise [2]. In addition, data is increasingly considered as a currency since the increasing awareness and amount of gathered personal data. When data is seen as a currency, new questions arise towards the value of data. In a preliminary study of Fan et al [3], a model that calculates monetary value of data is constructed in order to enhance the awareness of data being a currency. Privacy of data in relation to smart homes is not only a discussed topic in the academic world. It is more and more integrated in design projects. For example, Dutch Design Week (DDW) [4] gives platform, with an exhibition called "Home Smart Home" [5], to designers to express their visions on this topic. Next to this, perceived monetary value of personal data is also a topic that is addressed by designers all over the world. In response to this growing trend, Studio Julia Janssen [6] designed 'bet on that one' [7] as part of the Attention Fair [8]. The vicious circle where participants of her work fell into, provokes and creates attention to the monetary value of their personal data.

Since this study focused on conducting research with a "Showroom" approach, radical scenarios and their effects on visions of future living were brought to the table. During ideation sessions, this study created its own radical scenario with the focus on monetization of personal data while considering the previous described work. The question: "How does the awareness of the monetary value of personal data affect the perceived privacy of people in a home environment?" is addressed within this study. One of the goals was to trigger society to speak up and form their opinion by provoking reactions. In order to provoke, this study created a fake, thus credible, company with a new vision on data collection and sharing within smart homes to use as a conversation starter. In addition, point of sales materials were designed to enhance the credibility of the company and their new system and products.



Figure 2, EVEREST Filter



Figure 3, EVEREST Mobile Application



Figure 4, EVEREST Sensors: Water, Temperature, Light, Toilet and Door

## Methodology

The new founded company was named "EVEREST" and a logo (fig. 1) was designed. Since this study did not want to bias participants beforehand with our corporate identity, a simplistic and hollow name with a clear logo was our goal. Enabling the inhabitants of smart homes to filter all outgoing personal data from within their home towards the outer world is the main goal of EVEREST. EVEREST also explores ways to convert data into money and discounts by implementing a new data sharing system. In order to communicate this concept as striking as possible, products and marketing materials had to be designed. The EVEREST Activity Filter (fig. 2) serves as the 'filter' between the outer world and all internet use inside the smart homes. This way, the filter will physically represent a wall around your smart home and the collected data in it. To enhance the imagination of the participants of this study and the credibility of the company, a prototype of a mobile application was developed (fig. 3). The application can be seen as the remote control for the whole system, enabling the user to select which data is filtered and which data is sold for money or discount. With this application the participant is able to play and interact with the system which can contribute to the desired provocation.

Five extra sensors (fig. 4), which the inhabitants can connect to the EVEREST system, were designed to ensure gathering personal data. Therefore making money has become even more easy. In order to relate to every participant, each sensor had a different function such as sensing, humidity,

temperature, light, toilet use and the activity of doors. The sensors need to be placed inside the smart homes at the designated locations.

Next to the products, this study also designed point of sales materials (fig. 5). Firstly, an overall poster was designed to elaborate the concept in a clear way. Secondly, for every sensor a specific poster was designed to clarify what data can be collected and where it should be placed inside the smart home. Lastly, a leaflet with a brief description of our research and contact details was designed that will suffice as a form of a consent form, since no personal data of the participant was used during this study.

All products and posters were used to create a first selling point for our new company (fig. 6). This 'selling point' was used as the testing environment for this study. The stand was built up to look professional, the posters were presented and prototypes of the products were 3D printed. The mobile application was shown on a smartphone of one of the researchers. The 3D printed products and the application served as an extra conversation starter. The stand was located at Atlas, the main building of TU/e, at the corridor on the first floor. People passing by were addressed to share their opinion about the new company and concept. On the basis of a prepared dynamic questionnaire guideline information of the participants opinion was gathered. With consent of the participant, the conversation was recorded and notes were written down.



Figure 5, point of sales material



Figure 1, Logo EVEREST



Figure 6, Stand - test setup

## Analysis & findings

After the data collection from the participants, all data was analyzed. Firstly, this study started with quantitative data in order to understand the background of each participants regarding to the research topic. To gain a better understanding, the results of the quantitative data are visualized in fig. 7.

Secondly, all recordings were transcribed and relevant quotes to the research were selected. While doing thematic analysis, six themes were discovered to be remarkable for this study; data usage, monetary value, trade-off, control, indifference and limits & standards

As seen in fig. 7, most of the participants knew that their personal data was collected. However, no one could pinpoint the monetary value of their personal data. At last, most of the participants with smart home devices in their homes, were interested in purchasing the service EVEREST. Considering the qualitative data, it is assumed that data gathering by companies is being accepted since people do not feel that they have a choice. The convenience of smart homes outweighs the privacy issue.

In addition, it is noticeable that people want transparency in how their data is being used and what the purpose of their data is. Realistic examples of the endpoint of the data should be provided to the people. It was remarkable that only one participant went fully through the term of service when purchasing a smart home device. Next to this, presumably, people are willing to share more personal data than initially expected. For example, sensing and sharing bacteria inside the toilet was okay for most of the participants. However, there are still limits towards sharing personal data. The factors that influenced these limits were; physical security, intellectual security and embarrassment.

In addition to the findings of this study, some limitations raised to the surface. The environment in which the user test took place can be considered to be biased since most participants were students of the TU/e. Next to this, the number of participants should be increased in future research.

Answering the research question, it can be concluded that monetary value can be used to explore the limits of in-home privacy. Nonetheless, some participants did not want to make profit out of their smart homes at all. The definition of home is personal. Therefore, the definition of in-home privacy and the importance differ per person, influencing the perception of what is a home. This study believes that a person's definition of home and perception of privacy are closely related.

This poster is based on research conducted by Audenaerd W., Buijs R., Oh H. and Plijaer B. for the course Constructive Design Research 2019/2020 of the Eindhoven University of Technology [9].

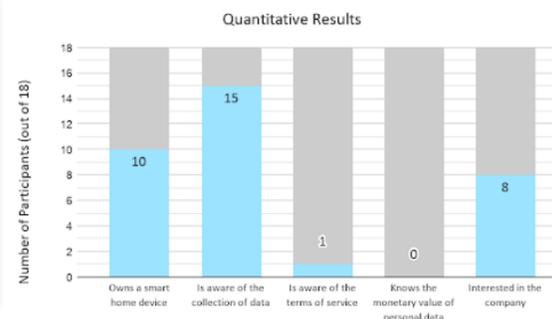


Figure 7, Quantitative data analysis

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