Opportunities of Quantified Self for Resocialisation of (Ex-)Convicts

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ABSTRACT

Resocialisation is a guided process by which ex-convicts are introduced back into society. An issue that arises in this process is that ex-convicts are behind on technological developments when they return to society. Here, we present work on how quantified self technology, as an alternative to the present-day ankle monitor, can be a helpful tool to obtain overview and insight in their progress. In particular, we present a prototype that physically monitors stress levels as an indicator of behavioural patterns. Results from research with former convicts shows how giving ownership over tracking data can help the user group understand their societal status and become more sovereign during their resocialisation process. Finally, we reflect on ethical questions regarding data gathering, Quantified Other and privacy for ex-convicts.

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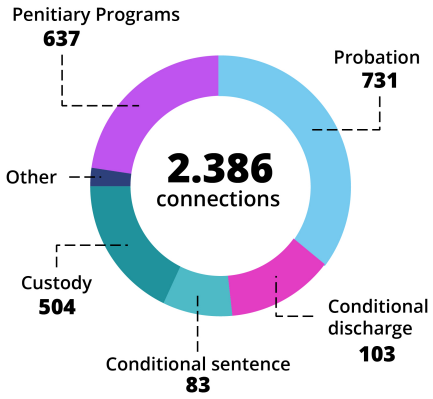

Figure 1: The total EC connections made and their motive in the Netherlands in 2017[8].

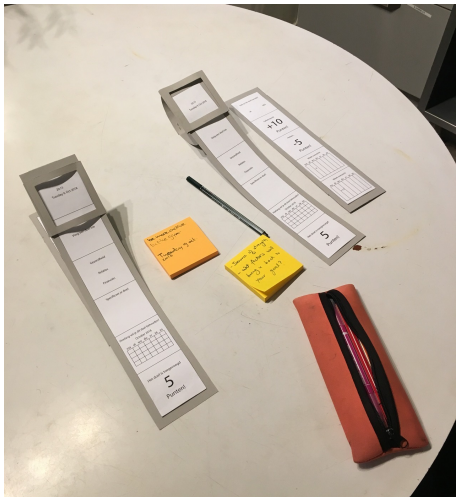

Figure 2: Paper Prototype of a smart watch wearable to test

KEYWORDS

Resocializaton; Recidivism; Quantified Self; Sovereign self.

INTRODUCTION

Annually, 34.985 people are sentenced to punishment by imprisonment in the Netherlands [12]. Although the length of these sentences varies, the majority of cases are assigned to the parole office[8]. The parole office will supervise the convicted from the point of arrest to release and guides them in their process back into society. The goal of this process is to ensure the convicted re-learn values of society so that they can re-enter society faster than the sentenced punishment. The convicted take part in conversations about social values, advice on their sentence and behavioural training [10]. The parole office is allocated to control the convicted under supervision, where the convicted have to abide predetermined rules and regulations [9]. One of these rules involves the use of Electronic Control (EC) in the form on an ankle monitor [11]. The present-day ankle monitor [4] is a monitoring device that utilises radio frequencies and/or GPS location to determine the position of the wearer [6]. Surveillance officers monitor the convicted and are authorised to inform judicial officers when the rules and regulations are not abided by[15]. The devices categorised as EC are increasingly being used in the Netherlands [11] (Figure 1). There were 835 connections made by EC[11] in 2012 and in 2017, 2386 convicts were assigned an EC device[11]. The judiciary office's focus on an increase in awareness in the EC towards convicted has resulted in an increase in the days an EC is employed, 23 in 2013 to 134 in 2016 [1]. The use of EC in the Netherlands[2] and related countries has effect on the resocialisation process [14]. In the project we set out to design an alternative to the modern ankle monitor (EC) using quantified self technology. The goal of the research is to identify opportunities to help former convicts get ownership over the data gathered about them in order to stimulate self-reliance during the resocialisation process. The research was conducted in collaboration with a non-profit organisation called Exodus, the biggest help-organisation for ex-convicts in the Netherlands, that aids ex-convicts during this process, as well as with clients of the non-profit.

INCLUSIVE USER RESEARCH

At local shelter homes owned by Exodus, interviews were conducted with a total of 7 ex-convicts (clients) currently participating in the Exodus Program. The respondents were former convicted between the age of 25 - 45 who have been living in an Exodus house and have started to get a work-life balance in society. In the first set of interviews, two clients were asked about the implementation of quantified self and their opinion on the progress and fall backs of their resocialisation process. A paper prototype of a smart watch (Figure 2) that was presented with the Wizard of Oz technique [5] gave insight in the perception of Personal Information Systems (PI). The majority of the participants

Figure 3: Testing with end-users to define design at an Exodus shelter home.

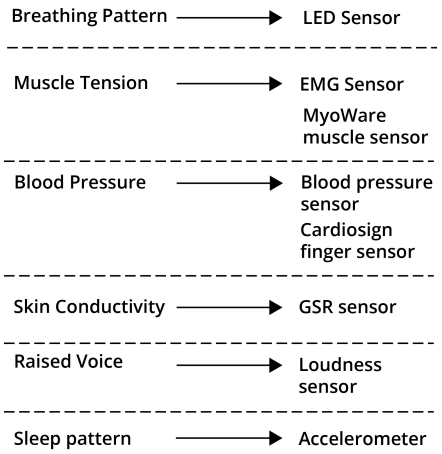

Figure 4: An overview of sensors that can help indicate aggression.

are opposed to EC devices due to their image of control and experience these devices to be a peril to their freedom. The interaction with the device should evoke trust and promote ownership for the end-user. One of the main insights gathered from these interviews was that the end-users welcomed the element of sharing their progress with third parties, such as care takers and other end-users. After these interviews, care takers of Exodus were questioned in another set of interviews (Figure 3). The results of these interviews were combined into designated themes: behavioural change related to aggression, technological implementation and behavioural stages within the resocialisation processes.

We compiled a questionnaire on behavioural change related to aggression which focused on understanding how stress and symptoms of stress disrupt the daily routine of the client. For this, Exodus has implemented a method called the "Thermometer", a form with three colour coded segments (Red, Yellow and Green) where the client can indicate their experience of certain events. One caretaker of Exodus noted that: "Opposed to the dominant systems in place for resocialisation, Exodus focuses on care. Instead of (micro) managing their aggressive behaviour, we give space, and then talk." It is important for the user group to learn the effect of their stress levels on their behaviour. Stress is tightly intertwined with behavioural changes. The expansion to related steps such as frustration, aggression and even physical expression of their stress can jeopardise the state of mind of the client and with it their judgment within society. Due to restrictions exacted on former convicts, a lower margin of error is in place and could restrict their freedom in society, by further imprisonment or setbacks in their resocialisation process. The possibility to receive insights in the daily activity of clients was enticing to caretakers as a conversation starter to be more constructive in conversations if the lack of trust towards PI systems would improve.

TECHNOLOGY

PI and Biofeedback have been studied by various disciplines[13]. Wearable systems offer an ideal platform to create solutions that utilise long-term measuring and stimulate behavioural change by measuring physiological signals caused by daily activity [7]. Wearable devices that are equipped with wristband sensors can instantly translate measured value such as heart rate into readable graphical visualisations to the user (Figure 4). Parallel to the user research, an ideation process of a PI wearable was carried out. Insights gathered from interviews were implemented in each iteration. User testing was used to set up prototype parameters: 1) Form; the final product should easily integrate in the life of former convicts, 2) Function; the navigation and function of the product should aim for simplicity and inclusivity, 3) Placement; the placement of the wearable should not be intrusive to daily activity and 4) Goal; the product should guide the user to a goal with care and understanding. By utilising sensors that track physiological signals and process the data into valuable information the wearable gives direct insight in the impact of events occurring during daily activity on stress levels. Evaluation of the first prototype was carried out with caretakers and leaders of Exodus between age 40-50 and

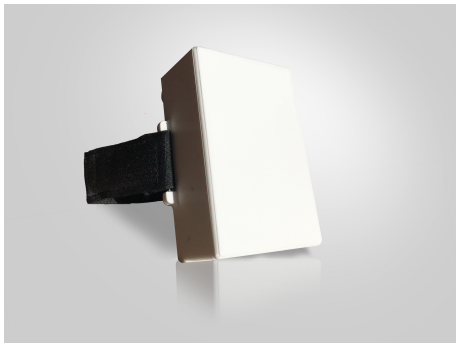

Figure 5: Prototype of the wearable.

Figure 6: The inside of the ambient visualisation prototype.

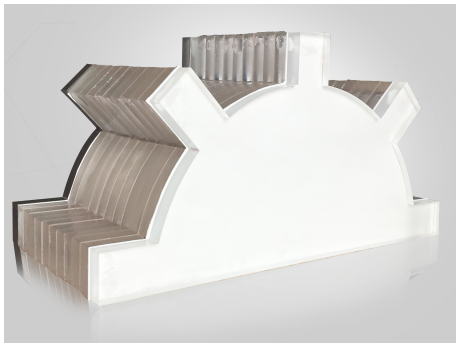

Figure 7: The shell of the ambient visualisation prototype.

with +5 years of experience with guidance. To extend the care given to former convicts outside of the Exodus houses, the concept of implementing artificial intelligence was explored. Could the end-user label the measured data as true or false and build a database? The concept behind this addition is that, if the end-user can indicate when an event was disrupting their self-reliance, an algorithm could advise them on repeating occurrences of the same event.

PHYSICALLY REPRESENTING DATA

The emergence of biosensors in the public market has led to an increase in the understanding of data visualisation with the general audience[3]. Current digital tools used for social services are not inclusive due to their conventional visual representations of data in the form of graphs. Graphical visualisations have become the primary style for behaviour monitoring in the field of PI[3]. However, these visual representation require a basic understanding of collected data and a level of navigation the user group has yet to connect with. During a retrospective of the research, the "Thermometer" method used by Exodus was explored as a visualisation method. Can the instant labelling of events with the same colour codes as the "Thermometer", (Red, Yellow and Green) work in translating measured values to the end-user? Iterations on graphical visualisations directed us towards other ways of visualising physiological data, namely by using ambient visualisation. This artefact utilises light values to communicate the measured stress levels to the user.

FINAL PROTOTYPE

The proposed outcome of the project is a guidance system for the former convicts. The system is formed by four major components: A wearable that measures stress levels during daily activity, a high-information database that stores up to one month of gathered data, an ambient visualisation of daily activity and a feedback system that assist the end-user after their initial resocialisation process within judicial programs.

Wearable

The wearable (Figure 5) utilises heartbeat sensors collated with positioning sensors to compare measured data on its relevance. Not all rise in stress levels is due to actual task-based stress and could be perceived misleading towards end-users. The device is designed to be unnoticeable and is not disrupting the daily rhythm of the user. The goal of the wearable is to collect data that can be labeled later by the end-user.

Ambient visualisation

The ambient visualisation (Figure 6) (Figure 7) indicates measured stress levels in line with colours of light. The design process guided the team towards a low-information communication of stress levels,

due to the fact that the complexity of typical graphical visualisations was considered incomprehensible to the end-users. The device is composed of 4 elements that represent a time period during a 24 hours day. Each modular part is coloured according to measured stress levels, and give insights in measured stress levels during the day. If the measured data would be false in relation to activity, the end-user can label these as such. The system would learn that when a similar measuring occurs in the same position, the system would not translate this with the similar values.

Graphic Visualisation database

The purpose of the graphical visualisation database is to establish transparent communication between end-user and caretaker. By using a high-information graphical visualisation, caretaker and end-user can analyse gathered data together.

Feedback Algorithm

The purpose of the proposed system is to give end-users ownership of gathering data and insight in their resocialisation process. End-users gain control of collected data and label activity based on disruption to the resocialisation process of the end-user. When the database is sufficiently labeled, an algorithm indicates directly to the end-user when measured values are considered precarious. The system could offer help and add to sustain the right direction during a process that, if individually approached, can be considered confusing and limiting to end-users.

CONCLUSIONS AND DISCUSSION

Digital inclusivity regarding Quantified Self for former convicts brings ethical discussions on data gathering, Quantified Other and privacy. We have been researching how to design a PI system for an user group whose data could be requested by law and jeopardised at any given time. Presenting our research towards a board of judicial officers, ethic experts and former convicts have given answers to aspects of quantified self that the common user has yet to face. Namely, the confrontation with the predicament that the complete sovereignty of collected data by the ex-convict can not be obtained during (and after) the period the individual is under judicial guidance. The research guided towards a system that could replace the current infrastructure of Electronic Control Devices. The Quantified Self, in theory, has the potential to give insight in physiological signals to individuals who would be willing to undergo the trajectory of investigating and analysing collected data. However, when it comes to the fields of personal health, behaviour and justice, should relevant issues be the concern of the individual or is this responsibility shared with the greater society? The system could assist ex-convicts in getting insight and overview in their process back into society and with it, create more ownership over this process and their place within society. Further development of the project involves improving the current relationship between ex-convicts and tracking technologies, implementing the

product in a small-focus group and designing a model for the machine learning algorithm to support ex-convicts on their way back into society.

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