

AN ETHICAL VIEW ON HUMAN MICROCHIP IDENTITY AND FUTURE USAGE

İNSAN MİKROÇİPE DAYALI KİMLİK VE GELECEKTE KULLANIMI ÜZERİNE ETİK BİR BAKIŞ

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Abstract

The high-speed expanse of computing and intelligence has shown importance and conversion of the integration of “smart” things as sensors and chips. Smart things can help users manage their daily tasks in an efficient and effective way by communicating with other smart things and interacting with people. Research on RFID chips has evolved as working topics aligned with these smart things. RFID chips has an ability to store information and transfer it with wireless electromagnetic fields in a range of a few meters. In the recent years, the ethics subject about RFID tags usage has been taken into consideration because RFID devices can generate information about people. Ethics has been studied with a variety of research in Information Technology perspective as being one of big trade off of the digital information age. This study is aimed to point out the attitudes towards human microchip identities and their preference between the implants and wearable chips. We proposed and explored relevant aspects of ethics on human microchip identity and future usage. We conducted in-depth interviews to surface out relevance of the proposed aspects and elaborate their implications from a user perspective.

Keywords: Ethics, Human Identity, Human Implants, RFID Microchips, Security, Privacy.

Öz

Teknoloji ve veri bilimdeki ilerlemelere paralel olarak “akıllı” şeylerin sensörler ve çipler olarak nesnelerin interneti, veri entegrasyonu ve dijital dönüşümünde önem kazandığı göstermektedir. Akıllı şeylerin, diğer akıllı şeylerle iletişim kurarak ve insanlarla etkileşim kurarak kullanıcıların günlük görevlerini verimli ve etkili bir şekilde yönetmelerine yardımcı olabileceği önerisi gerek bilim insanlarının gerekse sahanın (sektör, toplum ve son kullanıcı) gündeminde yer almaya başlamıştır. RFID çipleri üzerine yapılan araştırmalar, bu akıllı şeylerle alakalı çalışmalara odaklanmaya başlamıştır. RFID çipleri, birkaç metrelik

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bir menzilde kablosuz elektromanyetik alanlarla bilgi depolama ve aktarma yeteneğine sahiptir. RFID cihazlarının insanlar hakkında bilgi üretebilmesi nedeniyle, son yıllarda RFID etiket kullanımı ile ilgili etik konusu gündeme gelmiştir. Etik, dijital bilgi çağının ticari, hukuki, mahremiyet gibi bakış açılarını Bilgi Teknolojisi perspektifi ile hizalanarak çeşitli araştırmalar altında incelenmiştir. Bu çalışma, insanların mikroçip kimliklerine yönelik tutumları ve implantlar ile giyilebilir çipler arasındaki tercihlerini analiz etmek üzere bir ön çalışmayı içermektedir. İnsan mikroçip kimliği ve gelecekteki kullanımı ile ilgili etğin ilgili yönlerini keşfederek bir çerçeve önerilmiştir. Önerilen çerçevenin uygunluğunu ortaya çıkarmak ve sonuçlarını kullanıcı perspektifinden detaylandırmak için derinlemesine görüşmeler gerçekleştirilmiştir.

Anahtar Kelimeler: Etik, İnsan Kimliği, İnsan İmplantları, RFID Mikroçipler, Güvenlik, Gizlilik.

1. INTRODUCTION

The high-speed expanse of computing and intelligence has shown importance of integration and conversion of “smart” things as sensors and chips. Smart things help users manage their daily tasks in a quicker way by communicating with other smart things and interacting with people. RFID chips can be examined along with all kinds of smart things. RFID chips has an ability to store information and transfer it with wireless electromagnetic fields in a range of a few meters. These chips can be used not only to track livestock and pets but also can be used in transportation, licensing, credit card, vehicle routing, security, banking and medical proposes. It is newly started to be used for Automatic Identification and Data Capturing (Peslak 2005).

The are many applications to support individuals have been proposed. Eagle Tracer installed an electronic tagging system at the hospital using TIRIS electronic tags and readers from Texas Instrument which is detecting and triggering the alarm system when a baby was taken away without any authorization. It was a very successful trial tracking the babies to protect them from kidnapping. Students were being tagged in Japan for security reasons by inserting RFID transponders inside their backpacks. Smart cards have already been in use for Management Control in business. It is quite easy to change the smart cards with RFID implants by transferring the data stored in smart cart to implants which is giving a great benefit to the workers to access a particular location in an easier way. VeriChip is a quite good example as being a human RFID implant sold out in North and South America. It is named as a global want technology that could collect and store different types of user information and users could control personal information that is accessible or not (Masters and Michael 2007).

VeriChips were implanted in human cadavers to track victims, after the Hurricane Katrina in August 2005. There is another microchip application which is as a substitute for keys and credit cards. Epicenter, a corporate innovation hub in Stockholm started implanting volunteer employees which enables them to open doors, operate printers, buy smoothies in January 2015. A doctor in US reported one of his patient that a young women forced into prostitution having a GPS tracking device implanted in her side in 2015 (Voas and Kshetri 2017).

Wearable RFID tags could be used to track people much like the retailers use to track inventory in stores and warehouses. A prototype real time location system with a wearable RFID tag has been

developed to track patients at an Alzheimer's care facility in 2013 by researchers at University Putra Malaysia. These tags have been developed and used to understand patient requirements better. Another QR Coded tag attaching to fingers and toes, has been introduced as a free service to track elderly people in December 2016, in Japanese city of Iruma. If a people wearing this tag got lost, the police can scan the QR code and obtain personal identity and contact details. In comparison with implants, wearable RFID tags don't require surgical procedure that mean no health risk. On the other hand, they're easily removed and exposed to the elements and thus less durable (Voas and Kshetri 2017).

Human RFID microchips could be used for many reasons such as health, location accessibility, identity and it could be implanted under skin or wearable. Therefore, there are many studies about human RFID microchips in the literature, there is not sufficient researches about the users preferences like the reasons or concerns of usage, attitudes towards adopting this smart things. In addition to the user preferences and attitudes towards human microchips, the requirement of legal arrangements topic is coming out because of ethical and security related concerns which could be considered as another point which is open to more advancement in the literature.

In the recent years, the ethics subject about RFID tags usage has been taken into consideration because RFID devices can generate information about people. Ethics has been studied with a variety of research in Information Technology perspective being one of the big trade off of the digital information age. As being stored large amounts of personal data, the biggest concern about information is to be gathered and stored in a proper way. Privacy and Security are being another big concerns of information management which causes ethical constraints. The ethical concerns about the human RFID microchips are coming from the potential risks on privacy, health, medical hazards, security subjects. Even though, there is a lack of literature about the ethical concerns of human RFID microchips, this study is aimed to make a systematic literature review so as to be summary of the existed literature and point out the potential concerns beyond the increased usage in the near future. "Perhaps the greatest concern with tracking humans [with RFID implants] is that it may lead to increased and even ubiquitous spying, surveillance, and stalking" (Glasser, Goodman, and Einspruch 2007).

2. METHOD

We conducted in-depth interviews to surface out relevance of the proposed aspects and elaborate their implications from a user perspective. Interviews broadly defined are an "interaction in which two or more people are brought together into direct contact for at least one party to learn something from the other. The Delphi technique structures a group communication process by bringing together a panel of experts to formulate a prediction or set of priorities" (Chalmers and Armour 2019). Generally, real world problems could be analyzed by using these techniques.

The interview questions have been derived from the proposed aspects and accordingly a number of questionnaire items are formulated. We should note that since the subject under investigation is

aimed to explore a number of aspects and concepts, the items are not meant to develop an instrument, rather surface out open issues related to the subject. In that sense, the applied research method has adopted typical grounded research principles (Glaser and Strauss 2017).

Table 1. Interview questions with related aspects and concepts.

Aspects	Concepts	Interview Questions	References
Usage	Identity	"What do you know about human microchip identities?"	Pettersson, Mona (2017)
	Application Area	"Would you insert a subcutaneous microchip? For health purposes For identification purposes For everyday home usage (unlock house, car, computer, mobile phone.etc?) If you were assured that GPS positioning and tracking were not possible?"	Čičević, Svetlana ,Samčović, Andreja, Dragović, Magdalena (2019)
	Usefulness	What concerns and benefits does members of the general public identify?	Pettersson, Mona (2017)
Adoption	Ease of Use	Do you think that perceived ease of use of embedded technologies will positively impact individuals' adoption of such technologies?	Gangadharbatla, Harsha. (2020)
	Attitudes	Do you think that Individuals' attitudes toward embedded tech will predict their adoption of such technologies?	Gangadharbatla, Harsha. (2020)
Ethics	Challenges	What is the biggest obstacle for you in obtaining a microchip?	Pettersson, Mona (2017)
	Awareness	Do we know what we are doing? Has anyone really carefully thought about this?	Michael, Katina and Michael, M G (2010)
Privacy	Self Control	Do you feel like you are out of control?	Michael, K. & Michael, M. G. (2013)
	Adoption Challenges	Do you think that the level of privacy concerns associated with embedded technologies will negatively influence individuals' adoption of such technologies?	Gangadharbatla, Harsha. (2020)
Security	Concerns	Does my right to security supersede my neighbors right to privacy?	Michael, K. & Michael, M. G. (2013)
Implementation Choice	Concerns	Do you have knowledge on the prospect of RFID implant viruses spreading, relationship impacts, potential health risks and security breaches, and other general concerns?	Graafstra, Amal; Michael, Katina; and Michael, M G, (2010)
	Preferences	Do you prefer wearable microchips or implants and why?	Graafstra, Amal; Michael, Katina; and Michael, M G, (2010)

The research questions are specifically selected from the previous studies in the literature. The aim of the questions is to understand people's awareness about the human RFID microchips and to evaluate their tendency whether if they prefer to use implants or wearable microchips. The interviews were done with the people who are expert on using technology for their business such as information system implementors, pilots, infrastructure developers, information systems

researchers. The question structures are mostly open ended not to limit the people but to better understand their knowledge and attitude towards human microchips. Semi-structured interviews were done as following the Delphi Methodology.

3. FINDINGS

Semi-structured interviews were conducted face to face to 7 respondents in total. The respondents who has joined the interviews were frequently using technology both in their work and daily life routine. The respondents were a combination of academicians and technology professionals. Each of the interviews took around 30-45 minutes. The main observation about the interview is that people are thinking that human microchip implants is a kind of a fiction describing the far future. All of the people joined the interview has an idea about what is human chipping and they both have concerns about it. Below, the answers of the people who were joined the interview were summarized in the table.

Table 2. Interview results

Key concepts	Summary of Answers
Usage	Even though all of the respondents mentioned that they even do not have detailed information about human microchips, the only reason using a microchip could be because of health reasons. 5 respondents said to use microchips only for health and 1 respondent totally rejected to use microchips. The respondent refers to ease of use as the benefit of this technology and shared their ethical concerns about the trustworthiness of human microchips.
Adoption	Although 4 respondents are agreed that ease of use will affect the adoption of this technology, 2 respondents didn't agree. The respondents were agreed that the attitudes towards human microchips will affect the adoption as people generally believes that technology will obtain benefits to their lives.
Ethics	The biggest obstacles were mentioned as privacy by all of the respondents and 3 of them were mentioned security as well. 1 of the respondents paid attention on the reliability of the supplier. All of the respondents were agreed on that people even don't have a sufficient knowledge about human microchips to make a proper decision. So that, transparency of the cause and effects is another concern of human microchips.
Privacy	All six people mention that they have privacy concerns about human microchips. 4 people mentioned that privacy concerns will affect the adoption of human microchips in a negative way.
Security	3 respondents also touch security risks. 2 of the respondents mentioned that the security risk of human RFID microchips might increase when 5G will become prevalent.
Implementation Choice	All of the respondents choose to use wearable microchips than implants in order to remove it whenever they would like to.

4. DISCUSSION AND CONCLUSIONS

This study is aimed to point out the attitudes towards human microchip identities and their preference between the implants and wearable chips. The answers of the respondents are quite similar with the concerns studied in the literature. People most likely have concerns about RFID

implants related with possible health, privacy security matters. As the technology being so new, there might be many unexpected issues occur in the future in these areas. For this reason, the producers and governments have serious responsibilities to make this technology be acceptable into our lives by reducing risk on these very critical aspects. These concerns are very essential at the public and private and also government agencies' (Privacy Rights ClearingHouse), a nationally recognized consumer education and activist nonprofit organization devoted to safeguarding the privacy of American consumers, lists many threats to the privacy and civil liberties due to the usage of RFIDs. On the other hand, the common approach is that this will not be a blocking effect on technological progress. The important point is to restructure the laws and ethical codes to support personal privacy and security in parallel with the ongoing technological developments (Khan 2018).

Therefore, one can point out emergence of an awareness about possible security and privacy risks in the future. This necessitates a better understanding of user preferences regarding innovative microchip-based services. Possible questions to asked may include: Do you think that RFID implants will gain the control of yourself? Do you feel safe while using RFID implants? Do you find more secure a wearable RFID tag rather than an implant? Do you think that it is secure to store all your identity information and daily transactions into an implant or wearable RFID tag? Do you find it easy to use an RFID tag or implant? Isn't it annoying that all of your movements can be trackable through GPS if you have an implant in your body? Many questions could be populated for a better understanding of people's preferences between wearable RFID or implants in privacy and security point of view to be used with enlarged scope and respondents in the future.

According to the study of Gangadharbatla (2020), the key success factor of an embedded technology is its usefulness and ease of use for adoption point of view. When the manufacturers and brands working together for the adoption of these technologies, the most critical topic that they need to pay attention is the risk and privacy concerns. Even though, consumer concerns related with privacy and control are very serious, the industry is required to create and implement some best practices to gain customer trust and support the adoption (Gangadharbatla 2020).

It seems like people would like to choose using human microchip identities that its ease of use will bring many benefits in their lives. The key point here is to ensure of the trustworthiness of human microchip identities and bringing transparency in many aspects to remove the doubts and unspar in front of the adaptation. A few main discussions about implants is that it requires a surgery to be inserted under the skin or to be removed, another open topic is that what if implants can cause health risks such as hearth diseases, blood pressure increase. On the other hand, these critical risks are not valid for wearable RFID microchips. Many applications can be combined in microchips and would give benefits to the users when taking the costs into consideration. Below the table is a summary of benefits and costs of both wearable and implant RFID microchips (Masters and Michael 2005).

Table 3. Costs and benefits of wearable RFID microchips and implants.(Masters and Michael 2005)

	Wearable RFID microchips	Implants
Benefits	“Improved control, enhanced security, improved care, accurate identification, theft-proof, counterfeit-proof, access control, resource monitoring, location tracking and emergency alert (with GPS), interactive locations and devices, biosensing, streamlined processes, data portability, time savings, economic benefits, implant is hidden, tag cannot be forgotten or ‘lost’ “	“Secured within the body, reduced theft and loss of components, serial numbers and passwords on the transponder are imperceptible to the naked eye Cost Lack of widespread”
Costs	“Lack of widespread reading infrastructure, need for data correlation, need for a standardized placement of the transponder to facilitate accurate reading, possible involuntary use of application, crude success in human-to-human communications “	“Material constraints, computational ability, low power, wireless interference, system complexity, fault tolerance, need for continuous operation, robustness, implant attacked or rejected by the human host, dislodgement, close proximity between reader & tag, external GPS integration”

The other critical and general view about human microchip implants obtained from the interviews is that it is mostly preferred to use wearable RFID microchip identities.

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