

Accessibility

Accessibility is one of the key issues at the forefront of new technical innovations. As software becomes increasingly more prevalent, our methods of interacting with software systems have become more varied and more ubiquitous. “From desktop computers to laptops, to smartphones, tables, and smart watches, we are already, literally, wearing software platforms on our bodies, and the future has, for sure, much more reserved” [1]. Given its prevalence, it is not surprising that software has become one of the “biggest agent[s] to promote an inclusive society” [2]. Despite this, accessibility for web and other applications is relatively under implemented and often overlooked in the development process. This has been attributed to “lack of knowledge in this field” [3] rather than the difficulty of the development itself. I feel there are several areas that warrant research in this field.

First, there is the area of identifying key methods of increasing accessibility and determining what features are important for accessibility. In particular, making use of Intelligent Personal Assistants and other Natural Language Generation technologies to increase accessibility of applications for blind and physically disabled users through speech is an area that is connected to research I have done previously. Additionally, exploring issues surrounding accessibility of wearables and with elderly users both offer merit as fields of research. To the best of my knowledge, Dr. Hawker is the primary faculty member doing research on accessibility.

Internet of Things/Smart Cities

Research into technologies surrounding the Internet of Things is also a field which presents multiple research opportunities. Much like accessibility, the increasing pervasiveness and ubiquitousness of software platforms pushes this issue into a prominent position. As the world’s population continues to grow and urban centers (towns and cities) continue to become more population-dense and information-risk, “the enormous pressure towards efficient city management has triggered various *Smart City* initiatives by both government and private sector businesses” [4]. A union of the Internet of Things and these Smart City initiatives has created a rapidly growing research field that is rich with opportunities. However, there are “practical issues” within these domains that must be addressed, “including how to handle dramatic increases in network scale and how to determine device proximity” [5]. Exploration into how to create a better world model, how to more efficiently collect data, and how to more efficiently process data are all fields that can be expected to see an upswing in efforts towards answering these questions. To the best of my knowledge, Dr. Hawker is the primary faculty member conducting research on the Internet of Things.

Web & Mobile Security

Having completed my undergraduate degree in what was essentially web and mobile development, I’ve seen firsthand the need for strong web-based security, but I’ve also seen the issues present in teaching these principles to students. “The omnipresence of web applications in our way of life and in our economy is so important that it makes them a natural target for

malicious minds that want to exploit this new streak. The security motivation of web application developers and administrators should reflect the magnitude and relevance of the assets they are supposed to protect” [6]. However, there are several factors that make web security a difficult task to achieve. The web application market is growing too fast to stay completely up to date on all necessary security protocols. Additionally, many developers and administrators lack any real knowledge or experience with security. Beyond that, web applications often protect valuable data and assets (such as credit card information, to name one) and are exposed to attacks from anywhere in the world. It is obvious that security demands a great level of focus and attention during the development lifecycle. Research into how best to expose developers to these security concerns and research into more effective ways to test for security during the development lifecycle could prove fruitful. To the best of my knowledge, Dr. Krutz and Dr. Meneely have conducted research into security-related issues.

References

- [1] Joao de Sousa e Silva, Ramiro Goncalves, Jose Martins, and Antonio Pereira. 2017. Making Software Accessible, but not Assistive: A Proposal for a First Insight for Students Alvaro Rocha, ed. *Advances in Intelligent Systems and Computing*2 (March 2017), 149–156.
- [2] Passerino, L.M., Montardo, S.P.: Inclusão Social via Acessibilidade Digital: Proposta de Inclusão Digital para Pessoas com Necessidades Especiais. *Revista da Associação Nacional dos Programas de Pós-Graduação em Comunicação* **8**, 2–18 (2007)
- [3] Sarah Horton and David Sloan. 2016. Accessibility for Business and Pleasure. *ACM Interactions* 123, 1 (February 2016), 80–84.
- [4] Charith Perera, Arkady Zaslavsky, Peter Christen, and Dimitrios Georgakopoulos. 2014. Sensing as a service model for smart cities supported by Internet of Things. *Emerging Telecommunications Technologies*25, 1 (January 2014), 81–93.
- [5] Roy Want, Bill N. Schilit, and Scott Jenson. 2015. Enabling the Internet of Things. *Computer*48, 1 (February 2015), 28–35.
- [6] Jose Fonesca, Marco Vieira, and Henrique Madeira. 2013. Evaluation of Web Security Mechanisms Using Vulnerability & Attack Injection. *IEEE Transactions on Dependable and Secure Computing*11, 5 (October 2013), 440–453.