Undergraduate Internship Program

João Sá – Fall 2015

This report provides a short summary of my work during the UIP at Carnegie Mellon University – Silicon Valley campus (CMU-SV) hosted by Professor Patrick Tague in the Mobile, Embedded & Wireless Security Group - MEWS (affiliated with CyLab) - from October 23rd to January 17th, 2016. During my stay at Carnegie Mellon University I focused and developed some work for mobile/android security, in particular, regarding privacy issues associated with third-party API permissions' system design such as Facebook API. The main objective was to provide enough evidence to support an underlying security framework currently being developed by Yuan Tian, Professor Patrick's student, as part of her PHD thesis. This collaboration started after I met with her at the beginning of my stay in CMU, where we discussed this project's main objectives and goals and what she expected me to do to help her finish this proposition, to be submitted for USENIX-Security Symposium in Austin, Texas, by the end of February. More specifically, this new scheme aims at: minimizing the number of permissions to reduce developer and user burden; minimize the number of user prompts; achieve least privilege to protect user privacy; match user's mental model of sharing context; and enable cross-user, cross-application sharing without compromising security, privacy and usability. Three mechanisms have been proposed (opaque handle, opaque display and user-driven access) in order to meet these goals, and were currently being assessed. With Patrick and Yuan's guidance I was able to produce a small demo/case study based on an open-source application available on F-Droid (an alternate software repository comprising free and open software) – *UberSync* – that implements the previous concepts using the layercake technology proposed in [1] - *https://layercake.cs .washington.edu/*. I also collected complementary information from popular android apps regarding the use of Facebook private information, using it's aforementioned API, by performing static code analysis on the available source code (APKs) available in the Google App Store. Besides Professor Patrick Tague and Yuan Tian, the remaining members of MEWS security group, Jun Han, Le T. Nguyen, Xiao Wang (ECE PhD Candidates), as well as, João Vilela (Professor and supervisor at DEI in the University of Coimbra) helped me a lot fulfilling my objectives and making my stay at CMU pleasant and rememberable. Furthermore, my adventure in Silicon Valley was definitely amazing and, not only was I able to fully experience the technological environment surrounding this area, but I also made a lot of friends and acquaintances that will remain forever. To sum up, my participation in the UIP was very interesting and rewarding and I would definitely recommend it to anyone else.

[1] *"Securing Embedded User Interfaces: Android and Beyond"*, Franziska Roesner and Tadayoshi Kohno, University of Washington, Proceedings of the 22nd USENIX Security Symposium (2013)