

Dynamic Security Questions in Smart Environments

Bachelor / Master Thesis

To add an additional layer of security to knowledge-based authentication mechanisms, *security questions* oftentimes serve as additional mean to identify the legitimate user (in particular in cases such as resetting the password). Related work already suggested dynamic security questions [1] or location-based questions [2]. We believe that this concept may be promising to transfer to new fields.

With this thesis, we aim at transferring the concept of security questions in the broader scope of smart environments. As an example, devices such as smart speakers could start a dynamic „Q&A“ session to verify the legitimate user. Contents of questions may vary according to current contexts or previous interactions while preserving users' privacy (i.e. do not put sensitive questions!).

Tasks:

- Comprehensive survey of related work
- Get familiar with hardware and software
- Conceptual design of authentication mechanisms using security questions for smart environments, considering:
 - Device & interaction modality (e.g., smartphone, smart TV, smart speaker, etc)
 - Content of questions? (e.g. recent events? what about privacy-sensitive content?)
- Implementation of a concrete prototype
- Evaluation of security as well as usability of the prototype

Requirements:

- Independent scientific work and creative problem solving
- Interest in designing and conducting user studies (also: wizard-of-oz)

Related Work:

[1] Alina Hang, Alexander De Luca, and Heinrich Hussmann. "I know what you did last week! Do you?: Dynamic security questions for fallback authentication on smartphones." *In Proceedings of the 33rd SIGCHI Conference on Human Factors in Computing Systems (CHI '15)*. Seoul, Korea, April 18 - April 23, 2015. ACM, New York, NY, USA. <http://www.medien.ifi.lmu.de/pubdb/publications/pub/hang2015chi/hang2015chi.pdf>

[2] Alina Hang, Alexander De Luca, Matthew Smith, Michael Richter, and Heinrich Hussmann. "Where Have You Been? Using Location-Based Security Questions for Fallback Authentication". In *Eleventh Symposium On Usable Privacy and Security (SOUPS 2015)* (pp. 169-183). <https://www.usenix.org/system/files/conference/soups2015/soups15-paper-hang.pdf>

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