Research Report 2019

Universitatea Politehnica Timişoara

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2020

PRIMUL VEAC DE ÎNVĂȚĂMÂNT
UNIVERSITAR ÎN TIMIȘOARA

PRESENCE - PRIVACY-ENABLED, SECURED INTERACTIONS BETWEEN VEHICLES AND SMART ELECTRONIC DEVICES

Goal of the project:

The main target of the project is the design, analysis and implementation of security and privacy mechanisms for mediating access to in-vehicle functionalities by using intelligent mobile devices instead of classical RF and/or mechanical vehicle keys that are rigid and are lacking in terms of configurability and functionalities. The design of such security solutions is challenged by limitations on computational capabilities of existing components, e.g., in-vehicle controllers, as well as by the potential insecurity of smartphones.
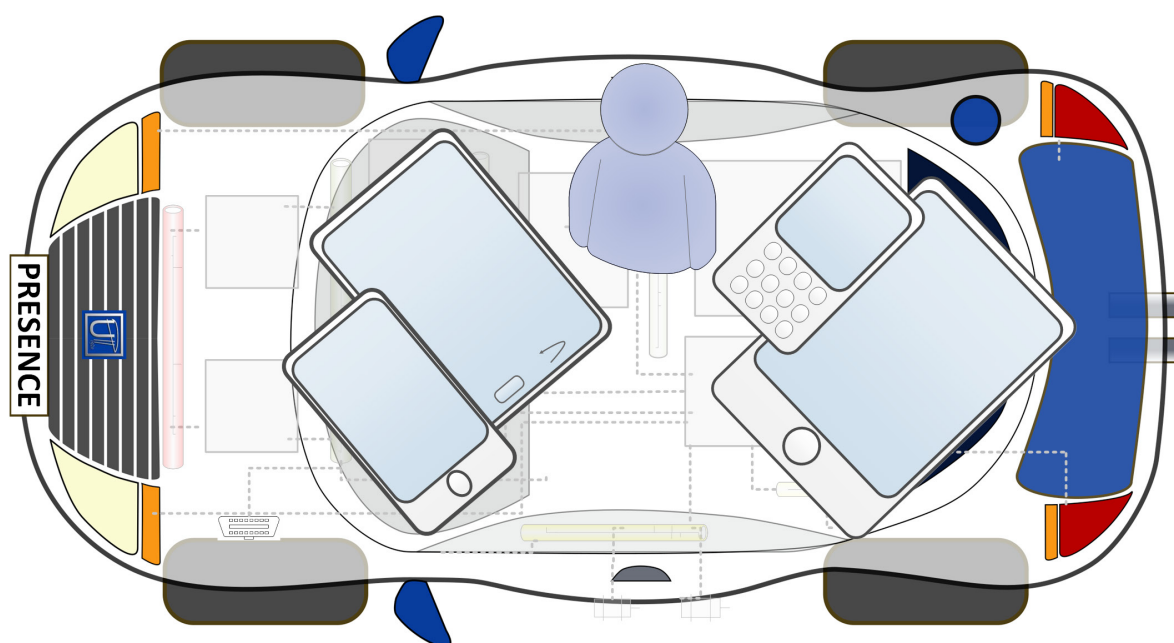
Short description of the project:

PRESENCE addresses the security of the newly emerged ecosystem of modern vehicles that interact with intelligent mobile devices, e.g., smart-phones.

Project implemented by

Politehnica University Timişoara

Implementation period:

2018-2020

Main activities:

Our project calls for the use of security enforcing technologies (e.g., NFC security cards) and modern device pairing techniques by harvesting environmental data (e.g., accelerometer data) to provide a secure and usable solution. Privacy enhancing technologies also need to be put in place in order to protect the users in front of corrupted cloud owners. As deployment platform we target Android, the mobile OS with the largest installed base. We also test the computational feasibility of the proposed solutions on a commonly employed controller for car BCMs. Main project objectives:

1. Design, analysis and implementation of security protocols.
2. Security enforcing technologies (e.g., NFC cards).
3. Ecosystem-based device association (e.g., accelerometer data).
4. Cloud-based access control.
5. Connectivity to in-vehicle control units.

Results:

We expect 5-10 research papers in relevant workshops and journals in the field addressing new concepts in vehicle access control supported by practical deployments on real-world components. PRESENCE is still in its first year of run, the publication list will be updated on the project website.

[1] Tudor Andreica, Bogdan Groza, Stefan Murvay, Applications of Pairing-Based Cryptography on Automotive-Grade Microcontrollers, 1st International Workshop on Safety, securiTy, and pRivacy In automotiVe systEms (STRIVE 2018, SAFECOMP 2018 Workshops), Vasteras, Sweeden.

[2] Camil Jichici, Bogdan Groza, Stefan Murvay, Examining the Use of Neural Networks for Intrusion Detection in Controller Area Networks, 11th International Conference on Innovative Security Solutions for Information Technology and Communications, SecITC 2018, Bucharest, Romania, 2018

Applicability and transferability of the results:

Replacing traditional keys with smartphones appears like a natural step for achieving increased usability and an improved user experience. Industry application of the designed protocols and implemented functionalities for car access control by modern smartphones is immediate.

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Research Centre

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