

Review of dissertation thesis

Author of the Thesis: **Tomas Bravenec**

Title of the Thesis: **Exploiting Wireless Communications for Localization: Beyond Fingerprinting**

Reviewer of the Thesis: **Enrique Quintana Orti, Escuela Técnica Superior de Ingeniería Informática, Universitat Politècnica Valencia (Spain)**

Theoretical framework and bibliography:

I do not wish to comment on the theoretical framework of the work since it is a strongly experimental thesis.

As for the bibliography, it is largely the result of an extensive review of the state of the art carried out by the doctoral student, which provides a good perspective of the degree of originality of the contributions of the thesis and of the novelty and current relevance of the topic addressed.

Novelty of the topic:

The thesis addresses the privacy problem of indoor positioning systems (IPS).

This problem is relevant as there is a strong growth in the sector due to tracking applications that need to record physical activity as well as autonomous driving and robotics. Current technologies do not sufficiently guarantee the privacy of users, particularly wireless networks such as Wi-Fi (IEEE 802.11 and its variants). From this point of view, the thesis analyses the capabilities of passive presence detection and indoor positioning. As a second objective, the thesis proposes two techniques for the reduction of the computational needs of the algorithms, based on the use of reduced precision and interpolation algorithms.

The study of privacy in wireless networks, as well as the reduction of computational requirements in this type of scenarios can be considered as novel.

Methodology:

The thesis employs a traditional methodology in experimental sciences, which starts from a working hypothesis, the proposal of a solution, and the design, implementation and validation of the proposal through a series of objective-driven experiments. From this point of view, the methodology is positively evaluated.

Relevance of the results:

The thesis makes a series of contributions along different lines, which are presented as follows in the chapters of the report.

In chapter 2, a new selection equation for the kNN clustering algorithm for IPS is provided; furthermore, elements or components for reproducible experimentation are provided: a traffic capture software (sniffer), 802.11 frame test sets and test sets for IPS.

Chapter 3 basically presents two IPS algorithms, respectively for presence detection and room occupancy detection.

Chapter 4 provides two strategies to reduce the computational and/or storage cost of IPS systems: reduction of arithmetic precision and use of interpolation schemes.

Evaluation:

As a conclusion to the information provided in the previous sections, the evaluation of the thesis is positive and should proceed to its defence.

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Place and Date

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Signature