

Grupo de Tecnología Electrónica y Comunicaciones

CONFERENCIA

Optimization of Deterministic Methods for Wireless Channel Characterization

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Universidad Pública de Navarra – Nafarroako Unibertsitate Publikoa

The capability of providing accurate wireless channel behavior estimations is gaining importance due mainly to the advent of IoT and 5G communication systems, as well as to the increasing number of deployed Wireless Sensor Networks (e.g. related with Industry 4.0). These estimations lead to the optimization of radio planning tasks in terms of node location (coverage), interference analysis (SNR/capacity), overall energy consumption, and cost.

In order to characterize wireless channels, several techniques can be employed, from semi-empirical regressive methods, which exhibit large errors and measurement dependent models, to deterministic-based techniques such as full wave electromagnetic simulation. As a midpoint between precision and computational cost, Ray Launching (RL) methods offer a good trade-off between accuracy and computational cost. However, when complex scenarios in which many potential transceivers can be located, RL exhibits high computational cost. In order to minimize that cost, we propose the combination of an in-house developed 3D RL code with different acceleration techniques and approaches such as Collaborative Filtering (CF), Neural Networks (NN) and Diffusion Equation. These techniques, hybridized with the 3D Ray Launching algorithm, provide wireless channel estimations greatly reducing the required computational cost.

Fecha: *jueves, 4 de julio de 2019.* ***Hora:*** *10:30*

Lugar: *Aula de grados, Facultad de Informática, Campus de Elviña, A Coruña.*

- **Peio Lopez-Iturri** received his Telecommunications Engineering Degree from the Public University of Navarre (UPNA), Pamplona, Navarre, in 2011. He obtained a Master in Communications in 2012 and his PhD in Communication Engineering in 2017, held by the UPNA. He gets the 2018 Best Spanish PhD thesis in Smart Cities in CAEPIA 2018 (3rd prize), sponsored by the Spanish network on research for Smart Cities CI-RTI and Sensors (ISSN 1424-8220). He has worked in 10 different public and privately funded research projects. Since April 2019 is partly working as a researcher for Tafco Metawireless. He has over 120 contributions in indexed international journals, book chapters and conference contributions. He is member of IEEE and is also affiliated with the Institute for Smart Cities (ISC) at UPNA. His research interests include Radio Propagation, Wireless Sensor Networks, Electromagnetic Dosimetry, Modeling of radio Interference sources, Mobile radio systems, Wireless Power Transfer, IoT networks and devices, 5G communication systems and EMI/EMC. He has been awarded the ECSA 2014 Best Paper Award and the IISA 2015 Best Paper Award.