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ITSC 2023

Bilbao, Spain
September 24 - 28, 2023

Special Session Proposal

Title: Leveraging Data in Connected, Cooperative and Automated Mobility (CCAM) enabled by Edge and Cloud

Modality

Half-day.

Scope

Motivation and general scope

There are several challenges to exploiting the full potential of Connected, Cooperative, and Automated Mobility (CCAM) data. Getting valuable insights from data is one of the biggest challenges, which involves designing and developing data structures and software architectures for data analytics. The processing of CCAM data can also be challenging, as state-of-the-art machine learning methods are very computationally demanding while the computing resources of onboard units (OBUs) are constrained for energy efficiency and cost-saving reasons. The distribution of processing elements in the Edge and Cloud is essential to promote the seamless integration of diverse computing and data environments in a computing continuum and enable complex data processing methods. Making data available from the data producer to the data consumer is also challenging. These data actors may require different technologies and approaches such as publish-subscribe messaging, REST APIs, or media streaming protocols in the application layer to enable multiple systems and actors to find and get relevant data samples. Data can be stored at different points of the data pipeline, with the objective of data buffering, caching, or offering persistent data storage. The transmission and storage of data need to fulfil the strict privacy and security requirements of CCAM applications, which can also suppose a challenge.

Relevance to the ITS community

This Special Session will explore the challenges to leverage data in CCAM and the role of Edge and Cloud as key enabling technologies. More specifically, it will focus on how to capture, structure, index, store and share data to enable analytical systems to get valuable insights; how to efficiently balance processing workload and assets in distributed infrastructures; how to transmit data efficiently and reliably; and how to address security and privacy issues. We aim to facilitate the exchange of ideas and promote collaboration to find novel solutions to these problems. By understanding the barriers and solutions to leverage data in CCAM, we can help pave the way for a safer and more efficient transportation system.

Topics of interest for the special session

Topics of interest include, but are not limited to:

- Internet of Things (IoT) messaging for CCAM data.
- Data structures and software architectures for CCAM data processing.
- Data analytics, data quality assessment, and visualization tasks at large scale.
- Collaborative and Federated analytics on distributed/decentralized data.
- Edge and Cloud computing for distributed data processing and storage.
- Edge-Cloud continuum integration and orchestration.
- AIOps and microservices platforms for data processing.
- Mobility-aware Edge computing provision and consumption.
- Digital Twins of vehicles.
- Secure/trusted service provisioning for data producers and data consumers.
- Data usage control and ownership management.

Organizers

Name: Dr. Gorka Vélez

Affiliation: Senior Researcher, Fundación Vicomtech, Spain.

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Short bio: Dr. Gorka Vélez received the M.Sc. degree in Electronic Engineering from the University of Mondragon (Spain) in 2007, and the Ph.D. degree from the University of Navarra (Spain) in 2012. He is currently leading the Connected and Cooperative Situation Awareness research line at the Intelligent Transportation Systems (ITS) and Engineering department of Vicomtech. He is the technical coordinator of the H2020 project 5GMETA funded by the European Commission. He is also involved in several other CCAM research projects, including 5G-MOBIX, PoDIUM and 5G-IANA.

Name: Dr. Ángel Martín

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Short bio: Dr. Ángel Martín is the head of the 5G communication research line in the Department of Digital Media, Vicomtech. He received his PhD degree (2018) from UPV/EHU and his engineering degree (2003) from University Carlos III. He worked in media streaming and encoding research at Prodys (2003-2005) and Telefonica (2005-2008). Then, he worked in the field of ubiquitous and pervasive computing at Innovalia (2008-2010) for the manufacturing sector. Currently, he is at Vicomtech, working in media services and 5G infrastructure projects.

Name: Dr. Marcos Nieto

Affiliation: Director of the Connected, Cooperative and Automated Systems department, Fundación Vicomtech, Spain.

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Short bio: Dr. Marcos Nieto received the Ph.D. degree in electrical engineering from Universidad Politécnica de Madrid (UPM), Spain, in 2010. He then joined Vicomtech (San Sebastian, Spain), where he is Director of the Connected, Cooperative and Automated Systems department, and technical coordinator of industrial and EU H2020 projects, such as AWARE2ALL or AITHENA, specialized in data analytics and semantics for the automotive sector. Participated as one of the main authors of the ASAM OpenLABEL 1.0 standard. Author

of more than 80 peer reviewed international publications and awarded in 2018 as one of the most relevant applied researchers of the Basque Country.

Intended audience and expected attendance of the special session

This session will be of interest to researchers and practitioners working on CCAM and related fields, as well as anyone interested in the role of data in modern transportation. Around 5 to 9 paper presentations are expected to be allocated in this half-day session.

Materials and equipment needed for the special session

No additional equipment is needed for the session rather than a projector and a screen.

Contact details of the proposers

The names and e-mail addresses of the three organizers can be found above. The postal address and the telephone number of the institution to which they are affiliated are the following:

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