

Researching how to improve certification of intelligent devices

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In today's world there are more devices capable of processing and transmitting information that monitor a multitude of physical processes in interconnected global digital networks, such as drones, autonomous cars, industrial robot chains or intelligent trains. Now a European research project called AMASS in which scientists from the Universidad Carlos III de Madrid (UC3M) are participating is attempting to improve the certification processes used to accredit the proper functioning of these devices. The objective: to develop a tool which allows the establishment of a sort of digital "device inspection" of the future. Credit: uc3m

AMASS (Architecture-driven, Multi-concern and Seamless Assurance and Certification of Cyber-Physical Systems) is a research project of the European Union Framework Programme for I+D+I Horizon 2020 - coordinated by TecNALIA (ref. GA-692474), with a budget of more than 20 million euros and with the participation of more than a hundred researchers from 29 institutions from eight European countries. In Spain, UC3M is leading a work package and various tasks. Its main research areas are how to improve device certification based on its specifications and the integration of the necessary information for its certification.

The objective is to reduce [certification](#) time, cost and risks for "cyber-physical systems", which are the devices that make up computational, storage and communication capabilities in order to monitor and interact with a physical process. "These systems normally are interconnected among themselves, with the virtual world and with global digital networks", explained José Luis de la Vara who is responsible for research in the IT department of UC3M. An autonomous car interconnected to another could be a good example of a cyber-physical system, although numerous applications and domains can be found, such as airplanes, devices in hospitals and intelligent offices, industrial robots, etc.

The importance of certification

The cyber-physical system market moves thousands of millions of euros around the world and is a field in which millions of people in Europe work, the researchers added. "Certification is important because it is necessary to assure that these systems are not going to put our lives at risk," says José Luis de la Vara, who gives us an example: "If someone had a pacemaker with computational and communication capabilities we must be sure that it works correctly and that no one can access it and change its proper functioning." And certification requires giving formal proof of all of these aspects.

Because these new systems use innovative technologies, often the means to certify them do not yet exist. In addition, these advances can present new risks. "The fact that one car can communicate with another can also mean that someone can access the car's system, so the system must be protected and it must be demonstrated that this has been done," the scientist added.

The final objective is to create a tool that collects and reviews all of the necessary information to prove that these cyber-physical systems are precise and secure. "It will be an open-source tool that will make work easier for developers and integrators as well as assessors and certifiers," said the researchers in the UC3M Knowledge Reuse research group who are participating in this project which ends in March, 2019. They said that the results will be developed incrementally, so that three versions of the AMASS tool will be created, the first being available in March, 2017.

Provided by Carlos III University of Madrid

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