VTT

New solutions for systems requiring digital trust - possible applications for energy flexibility and hunting safety

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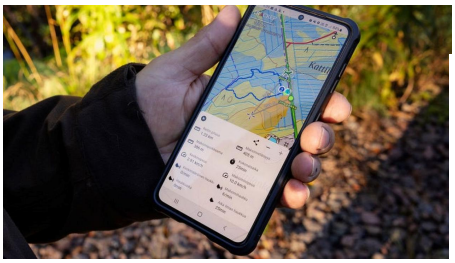

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Physical systems are increasingly being monitored and controlled remotely using communication networks. When several players are involved in such a cyber-physical system, digital trust takes on a key role. In a project coordinated by VTT, innovations that strengthen digital trust have been developed in areas from energy flexibility to improving hunting safety.

A cyber-physical system is a combined physical and digital system in which a physical device and its environment are measured, and data is collected from it. The data is analysed, and decisions can be made with the help of e.g. artificial intelligence solutions on what state a physical system is in, and how it could be used better and more cost-effectively way. Remote control is also possible online.

These kinds of systems have long been in general use, for example, in industrial automation. When switching to critical systems of multiple actors, where private individuals or companies can be the end users or producers, the activity requires a high level of privacy protection and reliability. This applies to, for example, energy, building automation, or traffic systems.

“We are studying critical cyber-physical systems and especially looking for solutions to ensure digital trust. For example, we have developed a CPShub for trustworthy data sharing. These kinds of solutions are essential when developing smart cyber-physical systems for many actors”, says the head of the research project, **Juhani Latvakoski**, Principal Scientist at VTT Technical Research Centre of Finland.

“The aim of the project is to create methods, mechanisms, and tools that would enable the secure data sharing while ensuring the privacy and confidentiality of the data and allowing the flexible availability and manoeuvrability of the data”, adds Senior Product Manager **Anton Gyllenberg** from Bittium.

Electricity pricing information brings consumption flexibility to energy market

For example, smarter use of energy systems is possible by controlling energy consumption flexibly and cost-effectively according to changes in the market price of energy. Methods and solutions have been developed in the project for the automatic control of the use of energy in buildings based on price. There are needs for these kinds of solutions now in winter as possible energy shortages may emerge.

Enerim has developed an aggregation platform which enables new, smart solutions based on energy flexibility. “With the help of the platform, it is possible, for example, to automatically control the energy consumption and production elements of buildings according to energy market price forecasts. At the same time the requirements of the end-users, the system operator, and the balance responsible party can be considered. This allows the development of new flexible products for energy and to optimise electricity distribution and improve its reliability in electricity systems of the future”, says **Amir**

Safdarian, Development Manager at Enerim.

Solutions for improving hunting safety

Also examined in the project, together with Tracker Oy and Polar Oy, has been the possible use of cyber-physical systems to prevent hunting accidents. Hunting safety could be improved by increasing exchange of information between devices carried by the people. Hunters would receive information about people moving about nearby, which would prevent accidents.

“We develop products and services connected with hunting in which human safety is the priority. Developing information exchange methods between products can prevent hunting accidents, thereby saving human lives”, says **Hannu Lohi**, Head of Research and Innovation at Tracker Oy.

“We have focused on studying and utilising new short-range radio technologies and on the trustworthy sharing of information. We have especially studied the use of Bluetooth Low Energy in secure and privacy way. Cooperation among the parties to the project also makes it possible to use solutions in 3rd party systems”, says **Jyrki Schroderus**, Research Director at Polar.

TIoCPS (The Trustworthy and Smart Communities of Cyber-Physical Systems) is an international research collaboration project coordinated by VTT. New innovative solutions are being developed in the project for cyber-physical systems requiring digital trust. In addition to energy systems and hunting safety, potential application areas include traffic systems and building automation, for example. In addition to VTT, Finnish participants in the project include Polar Electro Oy, Bittium Oyj, Tracker Oy, Elvak Oy, Optima Oy, and Enerim Oy. The project is made possible by Eureka ITEA as well as national funding organisations from Portugal, Belgium, and Turkey. In Finland the project gets funding from Business Finland. A total of 15 partners are taking part in the ITEA project, which opens significant new opportunities for cooperation for Finnish companies.

Additional information about the project: https://www.tiocps.fi/
TIoCPS Project Profile