

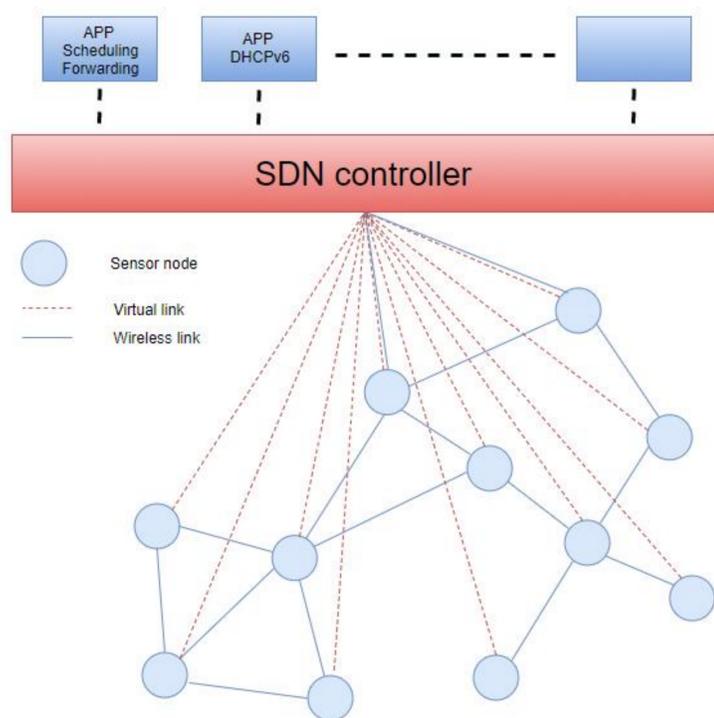
Research Topic

The application of the IoT paradigm to the manufacturing industry is called IIoT (or Industrial Internet or Industry 4.0). The IIoT will revolutionize manufacturing by enabling the acquisition and accessibility of far greater amounts of data, at far greater speeds, and far more efficiently than before. A number of innovative companies have started to implement the IIoT by leveraging intelligent, connected devices in their factories. The IIoT can greatly improve connectivity, efficiency, scalability, time savings, and cost savings for industrial organizations. Companies are already benefitting from the IIoT thanks to predictive maintenance, improved safety, and other operational efficiencies.

The main goal of this research is to develop a new solution for low power wireless sensor networks for real-time applications in industry 4.0. Industrial Wireless Sensor Networks (IWSNs) are found in many application domains that require low latency, robustness, and determinism.

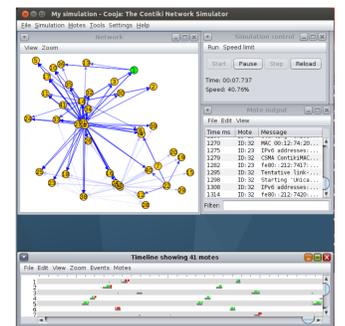


The Protocol



The proposed protocol establishes an initial mechanism for clustering sensors based on their position. Each node communicates to the app of the SDN controller the received signal power from neighboring nodes; The SDN controller, having a global network vision, calculates the frequencies of the TSCH frequencies hopping (removing disturbed frequencies). Additionally, the SDN controller calculates the time slots to be used and the flow tables of the optimal paths for packet forwarding.

FaTS-SDN (Forwarding and TSCH Scheduling Over SDN)

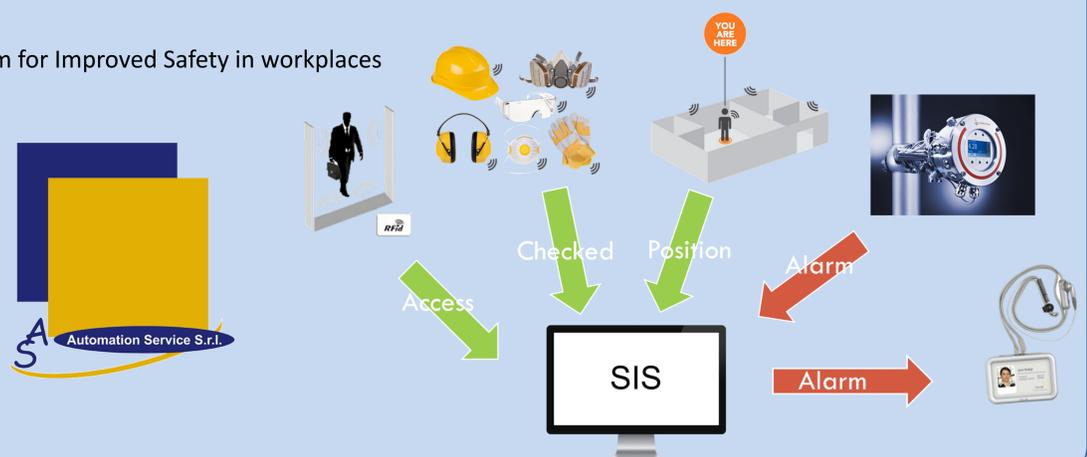


FaTS-SDN development tools:

- ONOS stands for Open Network Operating System. ONOS provides the control plane for a Software-Defined Network (SDN), managing network components, such as switches and links, and running software programs or modules to provide communication services to end hosts and neighboring networks.
- SDN-WISE is a Software Defined Networking solution for Wireless Sensor Networks. The aim of SDN-WISE is to simplify the management of the network, the development of novel applications, and the experimentation of new networking solutions.
- COOJA is the CONTIKI network simulator. Cooja allows large and small networks of Contiki motes to be simulated. Motes can be emulated at the hardware level, which is slower but allows precise inspection of the system behavior, or at a less detailed level, which is faster and allows simulation of larger networks.

Use case 1 AUTOMATION SERVICE S.R.L.

System for Improved Safety in workplaces



Use case 2 AUTOMATION SERVICE S.R.L.

Scaffold monitoring system for Improved Safety in workplaces.



WSN FaTS-SDN

