

Using the SAREF ontology for interoperability and machine learning in a Smart Home environment

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The Horizon2020 InterConnect project, consisting of 50 European entities from eleven countries, aims to improve interoperability in the Smart home and office domain with the electricity sector. SAREF is an ontology created to enable interoperability between smart devices. However, there is a lack in the literature of practical examples to implement SAREF in a realistic setting. We validate the practical implementation of SAREF on two aspects.

Firstly we investigate the opportunities of having various data available as a SAREF knowledge graph in a Machine Learning (ML) context. We do this by transforming tabular data containing sensor data into SAREF and demonstrating the communication capabilities of IoT devices when represented as such. We furthermore demonstrate opportunities for rule-based smart home scenario handling using OWL and SWRL languages. We finally transform elements from the SAREF knowledge graph to common ML data formats.

Secondly we explore how to increase the explainability of ML algorithms in a Smart home context. We surveyed multiple members from the InterConnect consortium that are involved in developing Smart home applications. We question them about the usage of ML models and its explainability aspects. Also we explored the explainability benefits using Jupyter notebooks for controlling and visualizing the internal steps of ML algorithms applied to Smart home data.

We plan further experiments in an extensive pilot within the InterConnect project, consisting of almost 200 new apartments within the Netherlands that will be outfitted with smart devices expressing their data compatible with SAREF.

folder for extra information

https://interconnectproject.eu/wp-content/uploads/2020/01/AF-Interconnect_Leaflet_compressed.pdf