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A Systematic Review on the Use of Ontologies in the Internet of Things

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Abstract

The Internet of Things (IoT) is a novel paradigm that has gained significant importance within the scientific community and industry. This paradigm introduces a favorable impact on people's life quality and the sustainable development of society. However, IoT systems operate in very complex and uncertain scenarios. An approach to simplify the development and maintenance of these systems is the use of ontological models due to their expressive, semantic and extensible capacity. Therefore, this

study presents a systematic review to know the state of the art on the use of ontologies in the IoT domain, following Kitchenham's methodological guide. This review aims to answer the following questions: i) What are the purposes of using ontological models in IoT? ii) How are ontological models implemented in IoT? and iii) How is addressed the research in studies related to the construction of ontological models in the IoT? First, 453 primary studies were retrieved. Then, 23 relevant studies on ontological model approaches were selected due to applying the inclusion and exclusion criteria. Finally, a quality checklist was applied to the selected studies, and qualitative and quantitative methods were used to focus the presentation and discussion of the review results correctly. The results include the strengths and limitations of the approaches and research gaps, challenges, and opportunities. © 2022, Springer Nature Switzerland AG.

Author keywords

Internet of Things (IoT); Ontology; Systematic review

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