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An Adaptive Meta-Heuristic Search for the Internet of Things

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Abstract

The number of sensors deployed around the world is growing at a rapid pace when we are moving towards the Internet of Things (IoT). The widespread deployment of these sensors represents significant financial investment and technical achievement. These sensors continuously generate enormous amounts of data which is capable of supporting an almost unlimited set of high value proposition applications for users. Given that, effectively and efficiently searching and selecting the most related sensors of a users interest has recently become a crucial challenge. In this paper, inspired by ant clustering algorithm, we propose an effective context-aware method to cluster sensors in the form of Sensor Semantic Overlay Networks (SSONs) in which sensors with similar context information gathered into one cluster. Firstly, sensors are grouped based on their types to create SSONs. Then, our meta-heuristic algorithm called AntClust has been performed to cluster sensors using their context information. Furthermore, useful adjustments have been applied to reduce the cost of sensor search process and an adaptive strategy is proposed to maintain the performance against dynamicity in the IoT environment. Experiments show the scalability and adaptability of AntClust in clustering sensors. It is significantly faster on sensor search when compared with other approaches.

Keywords: Internet of Things, Context-aware Sensor Search, Ant-based Clustering

1. Introduction

Internet of Things (IoT) is a self-styled term to describe objects that are able to communicate via the Internet [1]. It has made the Internet

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