A Dynamic Genetic-Based Context Modeling Approach in Internet of Things Environments

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Abstract

Internet of Things (IoTs) enables entities every day to communicate and collaborate with each other for providing information, data and services to inhabitants and users. IoTs consists of a large number of smart devices that can generate immense amount of data with different types. These sensors raw data needs to be modeled in a certain structure before filtering and processing to provision context information. This process is called context modeling. Context modeling provides definition of how context data are structured and maintained through context aware system. However, employing model for every context type through context aware application is static and is specified by the application developer. The main problem in IoTs is that the structure of context data changes overtime, therefore static modeling cannot be adaptable for modeling these changes. In this paper, a new dynamic approach for context modeling based on genetic algorithm and satisfaction factor is proposed. Firstly, the proposed approach uses genetic algorithm to find the best matching between a set of contexts and a set of available context models. Secondly, it uses a satisfaction factor to calculate the satisfaction degree for each context with each available context model and select the context model with high satisfaction degree as the structure model of this context, dynamically. In addition, flexibility indicator property and context based are defined to measure the performance of the proposed approach. The results of conducted simulations show that the proposed approach achieves higher performance than static approach for context modeling.

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