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Quality and the Efficiency of Data in "Smart-Cities"

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Abstract

As a new form of sustainable development, the concept "Smart Cities" knows a large expansion during the recent years. It represents an urban model, refers to all alternative approaches to metropolitan ICTs case to enhance quality and performance of urban service for better interaction between citizens and government. However, the smart cities based on distributed and autonomous information infrastructure contains millions of information sources that will be expected more than 50 billion devices connected by using IoT or other similar technologies in 2020. In Information Technology, we often need to process and reason with information coming from various sources (sensors, experts, models,). Information is almost always tainted with various kinds of imperfection: imprecision, uncertainty, ambiguity, we need a theoretical framework general enough to allow for the representation, propagation and combination of all kinds of imperfect information. The theory of belief functions is one such Framework. Real-time data generated from autonomous and distributed sources can contain all sorts of imperfections regarding on the quality of data e.g. imprecision, uncertainty, ignorance and/or incompleteness. Any imperfection in data within smart city can have an adverse effect over the performance of urban services and decision making. In this context, we address in this article the problem of imperfection in smart city data. We will focus on handling imperfection during the process of information retrieval and data integration and we will create an evidential database by using the evidence theory in order to improve the efficiency of smart city.The expected outcomes from this paper are 1) to focus on handling imperfection during the process of information retrieval and data integration 2) to create an evidential database by using the evidence theory in order to improve the efficiency of smart city. As experimentation we present a special case of modeling imperfect data in the field of Healhcare. An evidential database will be built which will contain all the perfect and imperfect data. These data come from several Heterogeneous sources in a context of Smart Cities. Imperfect aspects in the evidential database expressed by the theory of beliefs that will present in this paper.

Keywords: Smart Cities, ICT, Real-time data, Imperfection, Evidential database, Theory of belief functions, IoT, IoE, Crowdsourcing