Multi-Agent-Based Analysis and Design of Decision-Support System for Real-Time Environment Control

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ABSTRACT

The authors analyze different temperatures in different times and different seasons. They apply well-known data analysis agents, such as interpretation analysis, observation analysis, deductive analysis, and predictive analysis on the proposed framework. Some temperature values fall in intersected zones in which it is not definite to decide output measurement based on real-time temperature. In such scenarios, they apply fuzzy reasoning for analyzing real-time data and find the best possible solutions. Maximum method and centroid method are used for better performance in achieving optimum results for specific decisions as a support system.

KEYWORDS
Agent, Clustering, Data Analysis, Decision Index, Fuzzy, Membership Function

INTRODUCTION

Data preparation has always been an important and critical step in any research. Several researchers have discussed about different agents of data analysis in their researches. A well-defined dataset always helps in efficient analysis of data. Yu et al. (2006) have established a complex data analysis technique in financial domain and also proved the immense impact of data preparation in data mining and knowledge discovery. Science oriented applications generate raw data in a large scale. Specific program is required to analyse specific files. Silva, Oliveira, and Mattoso (2014) have shown a dataflow approach to analyze data from many raw data files and have evaluated them with montage application from domain of astronomy. Pauly et al. (2009) have introduced a concept of fusion of irregular data in “Eonfusion,” and have fused several modelled & sampled data into a single set with shared coordinates. Differentiation, optimization, and innovation could be driven by information that is derived from measurement data. The acquired data should be effectively managed; otherwise it would be series of files only. Snyder and Burrell (2011) have presented several technologies and techniques to provide modular, scalable approach for data management gaining context for data and making data traceable, useable and logical to store. Proper management and utilization of data increases knowledge and also reduces cost. Sadeghzadeh (2015) proposed an applied data reduction and appropriate variable selection scheme to assess risk and make decision in a complex large-scale
data analysis system framework. Appropriate variable selection plays an important role to avoid difficulties in making decisions and facilitate survival data to analyze failures. Many businessmen have tried to apply data analysis-based agents to transaction data for understanding their business prediction with an improved fashion to uplift particular business decisions. The data analysis wizard “SPIDA” configures and runs automatically on chosen methods of data analysis (Spott & Nauck, 2005). For representing original multivariate time series data more stably and concisely, utilization of stationarity is a good approach. Before performing any co-relation-based data analysis, first stationarity test has been executed to decide whether the co-relation in above said data is stable or not (Yang & Shahabi, 2005). “ReDCAS” is developed for Ford Motor Company, and it employs Bayesian data analysis techniques for estimating reliability measures based on warranty, test, engineering judgment. It has provided reliability and failure rate estimate (Groen et. al., 2004). University institutional data are not standardized and compiled yielding difficulty in integrating their information for reporting or comparative analysing. A generalized layered database structure based on link-based data set is required (Ida, 2014). Exploratory data analysis is a good examination tool for a crime scene as it is guided by clues. Traditional statistical approaches might fail in recognizing unexpected behaviour of data giving erroneous answer (James, 1998).

Aim

Our aim is to design a modular system framework to analyze real-time temperature of a particular geographical location for predicting a range of temperatures in distinct weather zones including overlapped situations.

Our contributions are as follows:

1. Agent-based decision-support system design;
2. Evolve agent based Statistical report generation on temperature;
3. Cost analysis;
4. Load analysis;
5. Comparison.

Scope

Temperature-based system is analyzed using fuzzy reasoning to exhibit distinct temperature patterns throughout specific time period.

Organization

Rest of the paper is organized as follows: literature review has been discussed in next section followed by proposed work along with data analysis using fuzzy system; experimental observations are observed and analyzed in experimental discussion section; conclusion reports our overall performance for designing the system framework.

LITERATURE REVIEW

Different agent applications of data analysis play a major role in data centers, and have become important to understand behaviours of computer systems. Zhen et al. (2013) have characterized the micro architectural characteristics of data analysis workloads with the help of hardware performance counter, for understanding the implications of data analysis workload on the superscalar out of order processors. Manual analysis is not feasible for voluminous data. Hilbrich et al. (2013) have enlisted an overview of manifold automatic analysis agent and its classification in some research fields. Technical data analysis and experts judgement, both are required for analysing remote sensing agents. Lehner et al. (2009) have examined confirmation bias in the field of technical data analysis for data
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