Intelligent Query Answering Mechanism in Multi Agent Systems

Safiye Turgay
Abant İzzet Baysal University, Turkey

Fahrettin Yaman
Abant İzzet Baysal University, Turkey

INTRODUCTION

The query answering system realizes the selection of the data, preparation, pattern discovering, and pattern development processes in an agent-based structure within the multi agent system, and it is designed to ensure communication between agents and an effective operation of agents within the multi agent system. The system is suggested in a way to process and evaluate fuzzy incomplete information by the use of fuzzy SQL query method. The modelled system gains the intelligent feature, thanks to the fuzzy approach and makes predictions about the future with the learning processing approach.

The operation mechanism of the system is a process in which the agents within the multi agent system filter and evaluate both the knowledge in databases and the knowledge received externally by the agents, considering certain criteria. The system uses two types of knowledge. The first one is the data existing in agent databases within the system and the latter is the data agents received from the outer world and not included in the evaluation criteria. Upon receiving data from the outer world, the agent primarily evaluates it in knowledgebase, and then evaluates it to be used in rule base and finally employs a certain evaluation process to rule bases in order to store the knowledge in task base. Meanwhile, the agent also completes the learning process.

This paper presents an intelligent query answering mechanism, a process in which the agents within the multi-agent system filter and evaluate both the knowledge in databases and the knowledge received externally by the agents. The following sections include some necessary literature review and the query answering approach Then follow the future trends and the conclusion.

BACKGROUND

The query answering system in agents utilizes fuzzy SQL queries from the agents, then creates and optimizes a query plan that involves the multiple data source of the whole multi agent system. Accordingly, it controls the execution of the task to generate the data set. The query operation constitutes the basic function of query answering. By query operation, the most important function of the system is fulfilled. This study also discusses peer to peer network structure and SQL structure, as well as query operation.

Query operation was applied in various fields. For example, selecting the related knowledge in a web environment was evaluated in terms of relational concept in databases. Relational database system particularly assists the system in making evaluations for making decisions about the future and in making the right decisions with fuzzy logic approach (Raschia & Mauaddib, 2002; Tatarinov et al. 2003; Galindo et al. 2001; Bosc et al. Chaudhry et.al. 1999; Saygın et al. 1999; Turgay et al.2006).

Query operation was mostly used in choosing the related information web environment (Jim & Suciu, 2001; He et al. (2004). Data mining approach was used in dynamic site discovery process by the data preparation and type recognition approaches in complex matching schema with correlation values in query interfaces and query schemas (Nambiar & Kambhampati, 2006; Necib & Freytag, 2005). Query processing within peer to peer network structure with SQL structure was discussed generally (Cybenko et al. 2004; Bernstein et al. 1981). Query processing and database was reviewed with relational database (Genet & Hinze, 2004; Halashek-Wiener et al., 2006). Fuzzy set was proposed by Zadeh (1965) and the division of the features into various linguistic values was widely

used in pattern recognition and in the fuzzy inference system. Kubat, et al. (2004) reviewed the frequency of the fuzzy logic approach in operations research methods as well as artificial intelligence ones in discrete manufacturing. Data processing process within the multi-agent systems can be grouped as static and dynamic. While the evaluation process of existing data by the system can be referred to as a static structure, the evaluation process of new data or possible data within the system can be referred to as a dynamic structure. The studies on the static structure can be expressed as database management's query process (McClean, Scotney, Rutjes & Hartkamp, 2003) and the studies on the dynamic structure can be expressed as the whole of the agent system (Purvia, Cranefield, Bush & Carter, 2000; Hoschek, 2002; Doherty, Lukaszewicz, & Szalas, 2004, Turgay, 2006)

AGENT BASED QUERY ANSWERING SYSTEM

The query process lists the knowledge with desired characteristics in compliance with the required condition while query answering finds the knowledge conforming to the required conditions and responds to the related message in the form of knowledge. In par-

ticular, a well-defined query answering process within multi agent systems provides communication among agents, the sharing of knowledge and the effective performance of data processing process and learning activities. The system is able to process incomplete or fuzzy knowledge intelligently with the fuzzy SQL query approach.

The distributed query answering mechanism was proposed as a cooperative agent-based solution for information management with fuzzy SQL query. A multi-agent approach to information management includes some features such as:

- Concurrency
- Distributed computation
- Modularity
- Cooperation

Figure 1 represents each agent's query answering mechanism. When the data is received by the system, the query variables are chosen by query and then the data related with fuzzy SQL are suggested. The obtained result is represented as the answer knowledge in the agent and thus the process is completed.

The data are classified by the fuzzy query approach, depending on fuzzy relations and importance levels. The rule base of the system is formed after a

Figure 1. Model driven framework for query answering mechanism in a multi-agent system
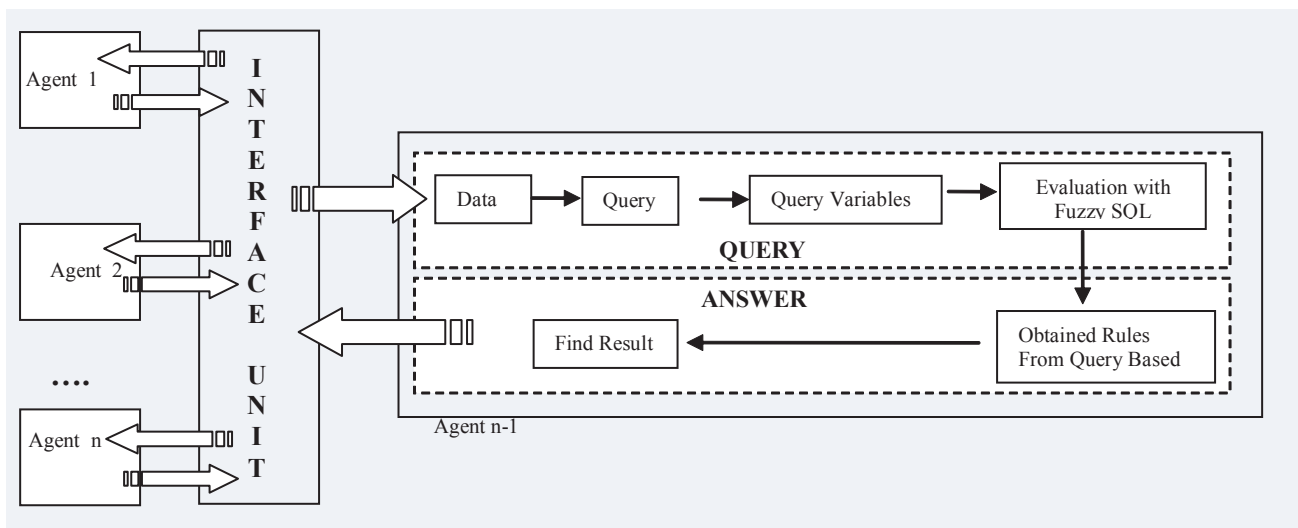
Related Content

KStore: A Dynamic Meta-Knowledge Repository for Intelligent BI
Jane Campbell Mazzagatti (2009). *International Journal of Intelligent Information Technologies (pp. 68-80).*
www.irma-international.org/article/kstore-dynamic-meta-knowledge-repository/2452

A GenAI Ontology for Academic Literacies Teaching and Learning Practices
Oscar Oliver Eybers (2024). *AI Approaches to Literacy in Higher Education (pp. 197-218).*
www.irma-international.org/chapter/a-genai-ontology-for-academic-literacies-teaching-and-learning-practices/346004

Random Acquisition in Compressive Sensing: A Comprehensive Overview
Mahdi Khosravy, Thales Wulfert Cabral, Max Mateus Luiz, Neeraj Guptaand Ruben Gonzalez Crespo (2021). *International Journal of Ambient Computing and Intelligence (pp. 140-165).*
www.irma-international.org/article/random-acquisition-in-compressive-sensing/279589

Using ZigBee in Ambient Intelligence Learning Scenarios
Óscar García, Ricardo S. Alonso, Dante I. Tapiaand Juan M. Corchado (2012). *International Journal of Ambient Computing and Intelligence (pp. 33-45).*
www.irma-international.org/article/using-zigbee-ambient-intelligence-learning/68843

Modularity in Artificial Neural Networks
Ricardo Téllezand Cecilio Angulo (2009). *Encyclopedia of Artificial Intelligence (pp. 1095-1101).*
www.irma-international.org/chapter/modularity-artificial-neural-networks/10378