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MULTI-AGENT BASED DISTRIBUTED INFORMATION SYSTEM OF INVESTMENT DECISIONS SUPPORT

Abstract. Decision making in unstable economic condition is a challenge and requires new approaches and methods of information proceeding. The information system described in the paper aims to provide new tools of decision-making to small and middle business. These tools are based on the analysis of information from open Internet sources. Multi-agent based architecture is the most appropriate for such a kind of information systems. Multi-agent system paradigm includes a huge variety of approaches and technologies some of which are analyzed in the paper.

Key words: multi agent information system, investment analysis, decision making.

1. Introduction

A multi-agent system (MAS) is a system formed by several interacting intellectual agents [1]. In 1975 the actor concept was described [2], which is considered to be the first attempt of creation of MAS-based decision support systems.

The paradigm of multi-agent architecture arose in the late 1990s, when the MASswere separated into an independent class, combining research in the field of distributed artificial intelligence [3-5]. In 1999 the modern concept, taking into account types of agents' tasks and the peculiarities of the environment where agents operate, has been defined and the first software framework for DSS has been described [6]. Besides, in the same year the term "multi-agent decision support" was introduced [7].

Today, MAS has received significant development and is used in such areas as Knowledge Mining [8], Natural Language Processing (NLP) [9], Natural systems modeling [10] and others. As a basic of DSS, MAS has been implemented in transportation management [11] and medicine [12].

Architecture is an essential component of MAS and should be consistent with its objectives. The architecture defines the principles of interaction and the structure of agents, the direction of information flows, the format of messages, etc. So at the first stage of the MAS development it is necessary to carefully evaluate all the advantages and disadvantages of various architectural solutions [13].

Under the intelligent agent in this case, we mean a program that independently performs the task specified by the user, for long periods of time. In our case, these are intelligent tracking agents that perform database monitoring and ensure the actualization of data and mathematical models.

2. Related work

The comparative analysis of multi-agent architectures has been done for choosing a platform for developing a distributed information system of investment decisions support.

To date, a large number of different multi-agent architectures have been developed; among them the following groups can be distinguished: flat and hierarchical architectures, architectures with a management center and distributed, closed and open operating in an environment with high and low uncertainty, etc. In general, the flexibility and stability of a multi-agent system are mutually exclusive concepts. That is, to achieve the greatest flexibility of the system, to allow the dynamic addition of new agents, it is necessary to complicate the mechanisms of interaction, which naturally leads to a decrease in the reliability and stability of the system.

Among all the variety of architectures designed to implement the multi-agent approach, we will