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Developing a model for mapping an enterprise or an economic environment

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Abstract

Having information about economic markets is important due to the dynamics of the economic phenomena on that market and the impact of the decisions regarding the enterprise. From a geographically point of view, a market can be modeled using various types of structures, but the most appropriate, from our point of view, is the graph representation. In this matter, in a previous research we developed an economic model that maps the market entities and the economic relations between them in the form of a graph. We have to mention that the model is built based on the geographically point of view, thus it has certain specifications. In this paper, we would like to refine and extend the model by adding certain functionalities which refer to applying built-in classic graph algorithms to study the economic effects, finding best providers or clients for a specific enterprise or refining the calculus of the affinity between enterprises.

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1. Introduction

Optimization within an enterprise or information within an economic environment of a market is extremely important, due to resource limitation and obtain of advantages with fewer costs [1]. In this matter, the main parameters that are being used are the profit, the costs and the income [2]. The issue has important implications in the problems such as supply chain management [3].

In the literature, the issue is also approached based on the graph representation. Researches are mostly focused on supply chain management issue. Based on mathematical determinations starting from economic indicators (costs, income etc.), there are determined some connections between enterprises on the market. The main idea of the study is the enrichment of the graph-based approach with an index formed of several parameters that can be taken into consideration within the economic environment of the market and its applicability to a lower level, within an enterprise.

The model brings into attention the representation of a market or enterprise as a network-based structure, like a graph, and the refinement of the construction of an affinity index based on various parameters [4]. The system leads to building an intelligent system and also studies the economic and time management, bringing optimization aspects to the enterprise activity and studying market evolution. Initially, the system was built based on the economic importance of agriculture within an economical market represented geographically [5, 6].

We referred to the usage of the model within an economic market, but the model can be also applied if we reduce the market to an enterprise and the economic entities as departments of the enterprise. Thus, the model can be used to map the departments of an enterprise and the relations between them. In both cases, enterprise-based and market-based, the management of the processes can be observed in a schemed and simplified way, clearing the evolution of the routes.

Essentially, the model is based on the dual representation of an enterprise as both provider for other enterprises and client of another ones. The relation between two enterprises of the market is measured by taking into account several parameters which include offered products or services, the necessary of raw material, geographical closeness or even human interaction between managers or contact persons. All these parameters are concentrated in a general index that measures the affinity between two enterprises up to a certain point.

Nomenclature

P	provider
C	client
GAI	general affinity index

2. Short description

The economical map of a geographical market is structured in the form of a directed graph, where the vertices are represented by enterprises and the nodes are considered relationships between enterprises. This representation brings out some key characteristics of the system: duality of vertices, contractility, expansion capability, non-isolation and on-line commerce interference.

The duality of each vertex means that the entire system is based on the dual aspect of each vertex/entity: it is seen both as a provider (P) for some other entities and as a client (C) for another set of entities. In the same time, the output produced by an entity is an input for other related enterprises/departments, while the input needed for the internal activity is provided from another entity.

The contractility of the system refers to the fact that the system formed from a definite set of economical entities can be part of a more expanded system. In this matter, the system itself is certainly related to other systems. We can think of a geographical part of a market represented by the enterprises in a village. They form a market that can be represented using a network-based model, as the one presented in this paper. In the same time, the village is connected to other similar or different systems from other geographical locations. In order to ease the overview of