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Development of Methodology of the Bank Branches' Optimal Placement

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Abstract

Article considers a new approach for solving of the problems, which occurs when opening new branches of banks. Usually, the most of banks during opening of branches use certain models, which take into account only some aspects of banking activities. Such approach inaccurately describes existing problems of bank new branches' opening. In presented article is developed an approach that is based on methods of artificial intelligence and a set of mathematical programming methods. Is developed a decision-making scheme that takes into account the intuition and experience of highly qualified bank employees. Implementation of the developed approaches will simplify the solution of the mentioned problems.

Keywords: bank branch, model, territorial placement
JEL: G21

Introduction

As it is known, the majority of banks during opening of branches use certain models which reflect some aspects of banking activities. Such an approach inadequately describes existing problems of opening new branches of the bank. In addition, opening of branches of banks depends on many parameters, which significantly complicate this task. So, it is necessary to develop new models, schemes, algorithms and approaches for the effective solution of this complex problem.

Methodology

The tasks of placement of bank branches may be divided into three classes: a) allocation of new branches; b) optimization of the network of existing branches; c) complex tasks (Kiselgof et al., 2009). Appropriate mathematical models and approaches are used to solvie these different tasks (Starovoitov et al., 2008).

As numerous types of research show, customers often go to those banks that are near their home or office. Therefore, right territorial placement plays an important role in the effective functioning of bank branches. The city and the district usually have a variety of requirements to banking services which further complicates the problem of proper placement of bank branches. A mathematical description of the requirements of the needed area is developed for model construction. Usually, small areas, such as, quarters, districts, etc., which are relatively homogeneous in terms of requirements, are selected for description. A variety features of demand are given for each area. These include: the level of income of residents, the number of employees in offices, the number of pensioners, etc. Used features depend on a particular model, conditions, as well as the reliability of data that can be obtained from selected districts (Plastria et al., 2008)

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It is also possible to group bank branches (Alexandris et al., 2008). Branches with similar environmental parameters should be united in one group. Such groups are: residential district with narrow streets, shopping areas near transportation nodes, tourist zones along the main streets, etc. Branches within the group should be selected according to these parameters. Such branches should be considered in terms of management efficiency. The profitability of the offered service is also visible for each group. Using these features enables to estimate allocation of the new bank branches.

One of the models describes the behavior of users. It is the MCI (Multiplicative Interaction Choice) model, which is a modified gravity model. The district, where the branch should be placed, is divided into subareas. Such subareas may be too many. Each subarea gets a weight in the district according to the level of demand, which takes place in the given subarea. Then, the probability of the client's arrival from i-point to j-point determined.

Often, to get the real picture, more complete information is taken into account for calculating the attractiveness of opening branches. The factors that are directly dependent on the bank may be considered attractive. These include a range of services, the number of entrances, car parking, proximity to the shopping mall, age of the bank branch, etc.

With the view of effectively allocating bank branches, the model, which conventionally is called the overlay model is often used. This model does not consider the impact of competitors' behavior in the evident form.

In addition, the flow the model describes customers' behavior through the flow of people. In this case, the characteristics of consumers and flows are given, in particular, start and end points of the flow. In a flow the behavior of users can be described in various ways. In some cases, it is considered, that the user receives the services in any case, if he passes by the side of the place where the bank branch is placed. In other cases, the probability of the users' coming into the bank branch is calculated, which is depended on the distance from his route to the branch and the bank branch attractiveness.

In the majority of the models the distance has great influence on the choices. In models, where users and branches are placed on the plane, the Euclidean distance is often used, because its use simplifies calculations. In models, in which graphs are used for the description of users, branches and the territory, the shortest distance in the network is taken in the kind of the best decision.

Discussed problems frequently occur when solving tasks, such as, modeling of users' behavior, formulation of goals and constraints, taking into account the possibility of competitive interactions, etc. However, often in a real situation, it is impossible to get the data for any model. Therefore, it is necessary to develop such approaches, when it will be possible to make decisions in the case of absence of complete information. When opening bank branches what should be taken into account is the fact that they open for a long time and during this period changes in the competitive environment may occur. But it is necessary to take into account the behavior of competitors, the structure of the demand and changing of users' properties.

In order to fully and thoroughly solve the problems, which occur when opening new branches, the optimal methodology of allocation of bank branches is developed. The content of methodology is the following. Depending on a district, in which deployment of bank branches is scheduled, a set of mathematical models is selected (Fig. 1). Appropriate mathematical methods will be selected from the set of mathematical programming methods for solving of the given models. For each model a set of optimal solutions will be defined. The second step is to perform analysis of solutions and decision-making by the experienced and highly skilled professionals. As a result, a more optimal solution is selected. The third step of the decision-making process is to take into account the intuition of experienced specialists when selecting the best solution. Non-formalized problems, such as, staff selection, choosing a competent and honest man as the bank branch manager, are taken into account. The block of artificial intelligence is offered for solving non-formalized tasks.

Result

Thus, in presented article offers the approach that is based on artificial intelligence and a set of mathematical programming methods. A decision-making scheme is developed that takes into account the intuition and experience of highly qualified bank employees. As a result of the implementation of the developed scheme, it will be possible to more effectively solve the problem of locating the bank branches.

Conclusion

The article proposes a new approach, the essence of which is as follows. A set of mathematical models is selected for the region in which it is planned to place the bank branches. At the next step, corresponding mathematical methods for solving of these models are selected from a set of methods of mathematical programming. Solving of each model gives us the set of optimal solutions. What follows after this is that the experienced and highly qualified group of professionals analyzes the solutions and makes decisions. As a result, the optimal solution is selected. At the last step of the decision-making, during selecting the best solution the intuition of experienced specialists is taken into account. Also, at next steps the non-formalized problems, such as, the wrong enetrance to the market, wrong choice of the branch manager, lack of normal working ties between the parent bank and branches, the wrong place for the bank branch, wrong selection of personnel, lack of good lawyers, absence of mechanisms of new staff'adaptation, lack of mobility of decisions, etc. are taken into account.

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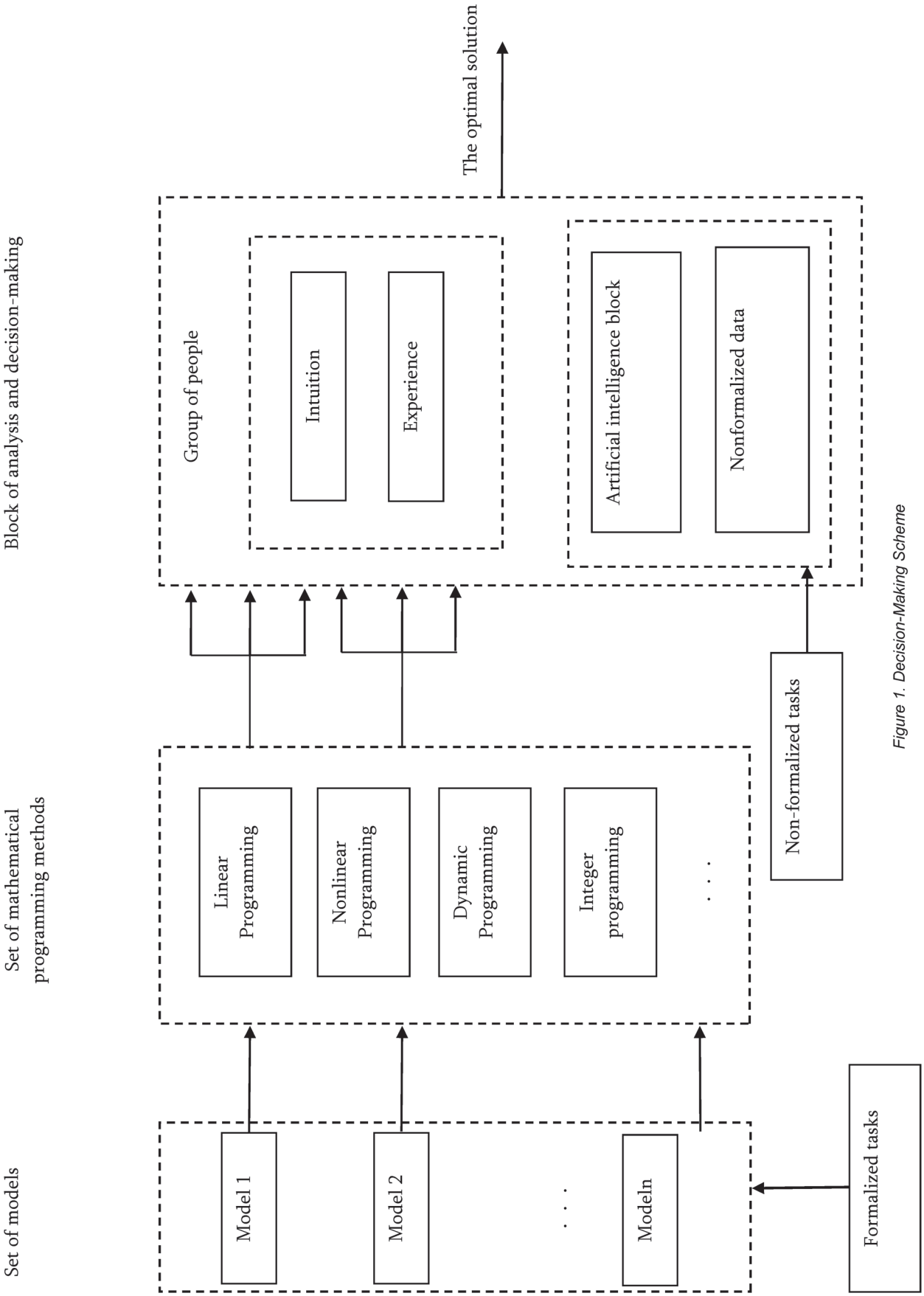

Figure 1. Decision-Making Scheme

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