MEDIATOR BASED GEOGRAPHICAL MODELING OF COMMUNAL LIBRARY SITE

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Abstract

Public libraries play essential role in providing information and cultural activities, education to local populations. Digitization and the Internet have changed the traditional functions of public libraries and caused them to become more community-centered and offer more diverse services. Mediator-based geographical modeling is a method for simulating complex urban environments using heuristic and approximated algorithms. The agent model for public libraries developed for this study demonstrates the possibilities for analyzing accessibility, exploring demographic data of potential users, finding underserved areas, and searching for the best locations or relocation sites for libraries. This model has been implemented and tested using the entire public library network. Mediator based geographical modeling is a promising method for research in the field of library and information science.

Key Words: *Library, Library network, geographical modeling, mediator based modeling (MBM)*

INTRODUCTION

The public libraries (PLN) perform a broad range of activities to reach out to target groups. PLNs are not only coping with the effects of digitization, rapid developments, and the use of information and communications technology, but they are faced with general trends affecting society when planning their future function and design. Public libraries play an important role in the provision of analogue and digital information and have a clear responsibility and authority to serve public needs. In recent years, the tasks and activities of public libraries have extended beyond lending books and into different nontraditional domains. Increasing digitization is changing libraries' functions, amenities, and facilities. These trends require adaptation of services because of an aging population, of whom a significant number may have physical and other disabilities. Library services encounter a society that is becoming increasingly multicultural as a result of immigration. There is also evident competition from other providers of information and the changing nature of rural and urban communities.

The integration of MBM and geographical information systems (GIS) into Agent-Based Geographical Modeling (ABGM) enables simulations of a complex urban environment. Today is an era of big data computational social science, and of tools which can go beyond the visualization of data to model the complex relation between data and human action. Mediator-Based Modeling (MBM) is a class of computational models for simulating the actions and interactions of autonomous agents, both personal and institutional entities, with a view to assessing their effects on the system as a whole. It is a challenging and promising approach for

analyzing the spatial distribution of public libraries and measuring the accessibility of public libraries to the population. In 2018, the Ministry of Culture of the Republic of Slovenia, with the National and University Library of Slovenia and Urban planning Institute of the Republic of Slovenia, started a review of Slovenian library standards. The authors developed a simple ABGM model called Library Agents Space (LAS) when cooperating in this process and were highly motivated to ensure that the LAS model was developed, examined, tested, evaluated, and used for the whole Public Library Network of Slovenia (PLNS).

The main objectives of LAS were to estimate the number of potential users of each individual existing public library, and identify areas underserved with public libraries according to existing Slovenian standards. Therefore, the LAS model was not just an academic exercise that demonstrates the use of AGBM. From the beginning, LAS was actually developed in a real environment using real life demands, becoming one of the main tools for analyzing the current and newly proposed Slovenian library standards. The changes in library services, particularly due to digitization and the internet, demand adaptation and reorganization of the library network. Public libraries need to understand their potential users in more detail in order to develop more relevant collections and programs, and to justify the need for more permanent or mobile library services. Therefore, it is necessary to examine whether and to what extent this method is relevant and efficient for geographical modeling of public library locations, and, more specifically, address the following questions:

1) Can the ABGM results be used as a tool for citing new branches and mobile libraries to maximize the accessibility of residents?
2) Is it possible to define ABGM agents in order to provide an in-depth understanding of the potential user behavior and library utilization?
3) Is the ABGM approach flexible, easily expandable, and upgradable to make more complex decisions and add more complex agent behaviors?

In the LAS model, agents act in geographical space. There are two types of agents: *Library agents* represent distinct individual public libraries: agent C represents a central library, agent B represents a branch library, and agent M represents a mobile library. They represent existing libraries according to their size. Central libraries (C) are assumed to be the largest libraries, branch libraries (B) are medium-sized libraries, and mobile libraries (M) are mobile library stops. Library agents are described by their accurate geo location and by attribute data (name, library category, collection, number of users and visits, number of computers and seats, etc.). Agents B and M are also creative and are able to reproduce themselves and prepare proposals for new library facilities B or M, respectively, which can be moved in geographical space to find an optimal location and can be used to supplement the existing PLN. The agents act in an *environment* that is a real geographic space with spatial features, including a layer of digital road network.

CONCLUSION

In brief we can conclude here is that the mediator-based geographical modeling of public library locations is feasible, comprehensible, understandable, cost effective, and versatile for library research and administration. The LAS model is simple, although solid and expandable beyond the testing environment of Slovenia, and usable for other library networks. Looking ahead, ABGMs have the potential to shed new light on library location problems, deepen the understanding of real word interactions, and, in this way, support a development of complex library field decision support systems.

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