Application of GIS in Building Bus Route Maps in Dong Da District, Hanoi

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***Abstract*—This thesis explores the application of Geographic Information Systems (GIS) in creating bus route maps for Dong Da District, Hanoi. It covers the theoretical foundations of GIS, data structuring, and the development of a practical application. The research highlights the challenges and limitations encountered during the project, particularly in handling large datasets. The study successfully digitized a specific area of Hanoi (Dong Da District) and developed a GIS application for bus routes, but the application did not fully meet the requirements for handling large datasets. The authors suggest that further research is needed to improve the application's performance.**

***Index Terms*—GIS, bus routes, shortest path algorithms, Hanoi, Dong Da District**

I. Introduction

The thesis introduces the concept of GIS and its applications in various fields, emphasizing its importance in modern life. It discusses the development of a GIS-based application for bus routes in Dong Da District, focusing on the shortest path algorithms and the challenges faced in implementing the application. The research aims to provide a practical solution for optimizing bus routes in a densely populated urban area, enhancing the efficiency of public transportation. The project utilizes GIS tools such as MapInfo and MapXtreme to create a digital map of the district, incorporating various layers of data including roads, landmarks, and bus stops. However, the authors acknowledge the limitations of the project, particularly in the implementation of search modules for large datasets [1]. Published books on the methods and subject of this project provide context for this English summary [7].

II. Methods

The methods section covers the theoretical aspects of GIS, including data structuring, database management, and the use of software tools like MapInfo and MapXtreme. The research also delves into shortest path algorithms and their application in creating bus route maps. The authors describe the process of digitizing the area of Dong Da District, which involved collecting and organizing spatial data. They then applied shortest path algorithms to optimize bus routes, ensuring that the application could provide the shortest and most efficient paths for passengers. The implementation of the application faced challenges, particularly in handling large datasets, which limited the application's performance [1].

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III. Results

The research successfully digitized a specific area of Hanoi (Dong Da District) and developed a GIS application for bus routes. However, the application did not fully meet the requirements for handling large datasets. The authors implemented shortest path algorithms to optimize bus routes, but the application's performance was limited due to the challenges in managing large datasets. The application was able to provide basic route information, but it struggled with real-time updates and dynamic routing. The authors suggest that further development is needed to enhance the application's capabilities, particularly in handling large datasets and providing real-time updates [1].

IV. Discussion

The discussion highlights the limitations of the project, particularly in the implementation of search modules for large datasets. The authors suggest that further research is needed to improve the application's performance. They propose that the use of more advanced data management techniques and algorithms could enhance the application's ability to handle large datasets. The authors also recommend the integration of real-time data feeds to improve the application's responsiveness and accuracy. The project's success in digitizing the area and providing basic route information is acknowledged, but the limitations in handling large datasets and real-time updates are emphasized [1].

V. Conclusion

The thesis concludes that while the project achieved the goal of digitizing a specific area, it faced challenges in handling large datasets. The authors recommend further development to enhance the application's capabilities, particularly in handling large datasets and providing real-time updates. The project's success in digitizing the area and providing basic route information is acknowledged, but the limitations in handling large datasets and real-time updates are emphasized. The authors suggest that future research should focus on improving the application's performance and addressing the challenges of managing large datasets [1].

References

[1] ICTU Student 198, ”Application of GIS in Building Bus Route Maps in Dong Da District, Hanoi,” internal undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2010.

[2] Trần Thị Băng Tâm - 2006 - Giáo trình hệ thống thông tin địa lý - Trường ĐH Nông nghiệp I Hà Nội

[3] Lê Minh Hoàng - Bài giảng chuyên đề Lý thuyết đồ thị - Đại học Sư phạm Hà Nội

[4] Đặng văn Đức - 2001 - Hệ thống thông tin địa lý - NXB Khoa học và Kỹ Thuật, Hà Nội

[5] Lê Huỳnh, Lê Ngọc Nam - 2001 - Bản đồ học chuyên đề - NXB Giáo dục, Hà Nội

[6] D.R. Green, D. Rix, and J. Cadoux Hudson (eds). 1994. Geographic Information - The source book for GIS - Association for geographic information - AGI. Taylor & Francis

[7] A. Silberschatz, H. F. Korth, and S. Sudarshan, Database System Concepts, 5th ed. McGraw-Hill, 2005. ISBN 9780072958867.