

Chapter 25

A Web Based Decision Support System (DSS) for Individuals' Urban Travel Alternatives

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ABSTRACT

The progress in web based DSS technologies in recent decades has given individuals many opportunities to make their business environments and daily lives so easier that could never been imagined before. Use of traffic information systems are getting wider. In this study, a decision support system for individuals' travel alternatives between any origin and destination points in urban areas is described. The original study is derived from a project prepared for the Ankara Municipality (Turkey). The described project gave individuals opportunity to select among all travel alternatives under different criteria, both for public transport riders and car users. It is a web based DSS, which uses GIS. The Floyd-Warshall algorithm has been used to solve all-pairs shortest path problem. Static data are based on base map, addresses, point of interests, lines, stops, schedules, etc. The dynamic data are received from the online vehicle tracking system. The design of the project is given to help other researchers design their projects according to the requirements specific for their own cities.

INTRODUCTION

The progress in web based DSS technologies, in recent decades has given individuals many opportunities to make their business environments and daily lives easier in ways that would have been unimaginable until recently. The contribution of Geographical Information Systems (GIS) to these systems is also significant, in that it provides the

possibility of involving the geographical attributes and spatial location to any decision making process.

Nowadays, many public authorities have reformed their web sites to better provide online information and services to their residents. In addition to many other types of online services, use of city information systems and traffic information systems are increasing within this medium. For

example, all over the world major city authorities are publishing their city's maps on their web sites and are utilizing query possibilities. In some cities, traffic cameras supply online information on some of the most problematic junctions and arterials. Traffic jams can be followed and observed via constantly updated traffic volume maps. On most of these web pages, information on public transport lines are also listed and marked on these maps for ease of viewing. Some of these traffic volume maps help with managing queries by using shortest path algorithms. However, written literature about these applications is currently very limited, like most of the other intelligent traffic solutions. Commercial secrets can be brought forward as a possible reason for this lack of literature and resources on such applications; however a more important reason is that any progress with these technologies is very challenging and resource intensive. Once these applications are initially implemented, the unlimited imagination and demands of the users of these systems contribute in creation of many special projects. It should be remembered that, although most of these web applications looks similar at first sight, each of them is designed for a specific problem determined by their city dynamics, which changes the chosen algorithms, and that makes them unique. The user interface (UI) hence the appearance is similar on many of these applications however the algorithms and processes that are running in the background are very different with each of them.

Decision support systems are fed by many algorithms from computer science. Shortest path algorithms are among the most important ones in solving transportation problems.

In this study, a case study is given with some details. The original study is derived from a project prepared for the Ankara Metropolitan Municipality (Turkey). The described project is a decision support system (DSS) (<http://map.ego.gov.tr:8080/ego/index.aspx>) that aims to give individuals the

opportunity of choice among all travel alternatives under different criteria, both for public transport riders and car users.

Decision support techniques, thus decision support systems are designed to support groups or individuals. The introduced system here is designed for individual DSSs.

The organization of the rest of the chapter is as follows:

In the next section, background information from existing literature is given. A literature survey on fields of applications of Intelligent Transport Systems (ITS) is given. General information on shortest path problems with an emphasis on the shortest travel time between all pairs of points provides some details about the algorithms used in the project. Web based decision support systems are also explained briefly.

Literature survey is followed by the case study itself. In this section, a project prepared for the Ankara Municipality is described. A list of Municipality's demands is given to better define the problem that is to be solved. The design of the system, its capabilities and examples with screenshots are also included.

The conclusion section includes a general evaluation of the system in addition to the suggestions for further research.

BACKGROUND

Intelligent Transport Systems (ITS)

Intelligent transportation systems (ITS) are advanced applications which provide smart use of the transport systems to users. The innovative services related to different modes of transport provide users the chance to be better informed about the transport system(s) (e.g. transport modes, travel alternatives, road conditions, etc.) and the decision makers to better manage the complicated situations

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