

**İSTANBUL TEKNİK ÜNİVERSİTESİ
ELEKTRİK-ELEKTRONİK FAKÜLTESİ**

OPEN SMART TRAFFIC ASSISTANT

Bitirme Ödevi

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SUMMARY

Open Traffic Assistance it's a Web Service related project which the intention is to describe the process of how this technology works and also implement an application for the mobile devices industry that shows how a client using this device can use this kind of services.

The application it's oriented for the industry of the mobile devices which it's in expansion in today's days. The aim is to give the possibility to a user to use a mobile device and at same time be able to access web services using wireless has data traffic interface.

The Services provided by the applications are traffic assistants inside the aero routes considering the problem has a graph where the edges are the routes followed by the aeroplanes and the vertices are the places where the aeroplanes can stop. This graph approach requires that algorithms operate over the graphs in order to extract a desirable route. The algorithms used are breath-first search and dijkstra both algorithms are used inside the graph theory area. Also other services are provided like country information or airline information.

This services approach requires a database to be established so it's necessary to create relational tables that will represent the aeroplanes routes also others information like country information and airline information has to be represented inside the database using relational Sql tables.

Other type of server it's required for web services in this case it was used Tomcat Apache with Axis that provides a good standard platform to deploy services and then this services can be accessed by any browser or any program that contact with the right address. The services use a SOAP protocol to communicate with a possible client and the messages send are converted in XML language, language also used to deploy services into the web server.

Inside the user interface since it's a mobile device it's was used J2ME to program this interface. It was necessary to use some special libraries in order to be possible to send SOAP messages into the server using HTTP connection in XML also it's a fact that this devices don't have a big capacity of processing so its environment its visual very simple and most of the tasks are made by the server and the client interface only makes some simple requests.

1. INTRODUCTION

Welcome to project Open Smart Traffic Assistant (OTA) solution for your traffic problems.

In our lives we deal everyday with traffic problems we can see them everywhere when we go out to the street and if we move from a place to another using some kind of transportation then the problems related to best route or which way to take in order to achieve a goal are common situations.

In order to help people getting better routes or some desirable route considering the neediness of someone inside the traffic environment it's today possible using some new technologies that send that information over air. This project is about one of that technologies called mobile phones and also Pocket PC that are starting to make part of our lives because of their incredible success inside the market. We can say that the number of people using mobile phones nowadays its extremely high comparing with some years ago.

Giving more functionalities to mobile phones it's an industry that is been growing very fast and therefore its necessary to invest more in this kind of applications that may provide to the user some useful tool. Open Traffic Assistant (OTA) is the name of the project that its aim is to provide solution for some traffic problems using Java programming language in order for the application to be platform independent and also make life easier with increasing usage of mobile systems.

2. PROJECT SCOPE AND DESCRIPTION

2.1. Project Definition and Details

OTA project aims to provide assistance to traffic problems inside the airport environment considering flights routes made by commercial planes and therefore giving information to the user about possible routes in order to get from one place to another using this routes considering this steps in order to illustrate the process:

- Selecting start and destination place.
- Select which are the desirable constraint like price and time. This constraint will tell to the database and algorithms what did the user wants the cheapest flights or more fast flights.
- Select the class of the flight. Also class is considered a constraint but since its present in all planes it only affects the final price of the trip.
- A database it's consulted about constraints like prices duration and number of flights.
- Deciding using algorithms which is the best route between places
- Show to the user the best route considering the constraint pick by the user

Considering this main concepts of the OTA project other functionalities have been added to the project such has: Country; Airline information Money exchange given by the database connected to the server that gives to the user the possibility to consult different kinds of info that is possible to be send to a Mobile Phone or Pocket PC using the web services technology that will be also like all the features of this project explained in the following sections.

The intention of this project is to send information to inside a mobile device using wireless interfaces, and give a response in real time considering that the user of this device it's moving or preparing a route for some traffic problem. Representing the traffic problem in a map it's a good way for helping the user getting into a good route but users don't have maps on their head, they can have some experience and knowledge, but if they face an area that is unknown for them then they may need some orientation

considering other people experience and knowledge or some system like the OTA project that's its intentioned for this kind of traffic problems and its aim its to give the best solution considering knowledge presented in the server and therefore its general more accessible more trusted more reliable and more fast than the help of any persons experience or knowledge.

This project it's divided so in two main parts client and server. Server provides to the client all the information that the client's requests using wireless interfaces. Information considering traffic problem countries and airlines is provided. The traffic problems are inside the Best Route approach considering prices, time, and less number of flights between routes. The country information gives to the client info like capital, government type, population number, official language, religion and continent name for some country choose by the client. Airline information gives to the client info about website and phone number about some airline companies.

The Best Route approach it's calculated by the server over a graph represented inside the database that represents some possible traffic situation using shortest path algorithm called Dijkstra for obtaining best route considering price or time and breath first search BFS that considers only number of flights.

2.2. Project Innovation and Creativity:

The intention of this project is to send information to inside a mobile device using wireless interfaces, and give a response in real time considering that the user of this device it's moving or preparing a route for some traffic problem.

2.3. Social Responsibility:

Traffic problems are nowadays deeply inside our lives and getting solutions for them it's each day more complicated because of the increase number of more possible routes and also more users. OTA project aims to offer a solution for some of these problems using a mobile/web solution providing to the user possible responses for their needs inside some traffic route. So it makes the life easier for their users.

2.4. Benefits and Advantages:

Benefits and Advantages for the user that may use this technology given by a mobile phone or pocket PC interface are listed below:

2.4.1. Easier Daily Life

Using this kind of services the users may get a quickly response in a real time situation that may be useful considering that nowadays time its money and if we can simplify the time that we spent trying to get some route inside the traffic then our quality of live may get higher because of solution quality and response time.

2.4.2. Platform Independent

Since this project it's made in Java programming language then it's possible to port it to any hardware device that has a Java Virtual Machine JVM installed. The server can be placed in any computer that has JVM installed and the client can be ported into any mobile device that has also a JVM installed. In this case the mobile device is programmed considering the Java 2 Micro Edition J2ME API's.

2.4.3. Adaptable

OTA project has a database that can be updated with new and more routes and also with more information regarding countries or airlines and that so it's possible to represent on it many different kinds of traffic situations and also provide to the user more selected and better info considering the possible client needs.

2.4.4. Extensible

More features can be inserted into the project such has reservation of a plain ticket considering a login system, also other features like other possible routes than the best approach one's maybe added considering has alternative routes, and considering other algorithms that may provide other kinds of solution for the same problem considering

for instance the neural networks that may give an optimized solution for a specific route considering many constraints at same time.

2.4.5. Increased Usage of Mobile Devices

Since the client part of the OTA project it's implemented in order to work in a mobile device then it's possible to be seen by many people because of the increasing number of users that Mobile Devices industry it's facing in our days

2.4.6. Effective

OTA provides an effective solution for a traffic problem, and since it uses mobile devices then the information can be reached from anywhere and anytime. The resulting situation it's considering a user that needs to make a decision about a trip or travels only considering some factors so effective solutions may be in his hand in an easy touch of device bottoms interface.

2.4.7. Sensitive

OTA is a traffic assistance application so it considers the real live situations of the people that may face this kind of problem when they need to travel using some traffic route.

2.4.7.1. Conditions effecting traffic

There are many conditions that can affect a traffic line of flow and in this project we consider three: the price, duration, number of flights and class of the flight.

2.4.8: Ready for New Solutions

Many other problems considering traffic can be added to this application, and also because the future of traffic is changing day by day, new constraints and many more others consideration can be only overcome considering new and better algorithms that may provide effective and good solutions any kind of traffic problem.