

Tomislav Bacinger

TEB Informatika d.o.o., Vončinina 2
tomislav.bacinger@teb-informatika.hr

Route planing

Introduction

Using GIS in the field of transportation opens up a wide range of possible applications. A GIS can provide a valuable tool in a spatially references context, viewing the paths as a transportation network. A GIS can help visualize and communicate the effects of roads on their environment. Route planning is one of the most popular applications within transportation.

Described route planning solution is based on Intergraph GeoMedia and GeoMedia Transportation technology.

Network

A Network is a system of connected linear features that can support the transportation of goods, services, or communications between locations on the network. A Network is a model that is derived from a set of linear features and their relationships. Each network model consists of a set of geographic features called "edges" and a set of implied features called "nodes".

Each edge in a network represents one component of the transportation system in the model. Streets, highways, shipping lanes, railway tracks, and Ethernet cable between computer systems are all examples of edges in a network. Nodes are implied features that connect the end points of edges together. A node could represent a physical structure or location (such as a street intersection, a seaport, or a computer name), but often it does not have a real-world equivalent.

Routing

Any business deploying vehicle is interested in determining which route is the best to follow as means to save time and essentially gain the best cost/benefit ratio. The Best Path software is developed for determining the shortest and fastest route, distance and time and it was designed specifically for calculating routes trough road networks. A major functionality is finding shortest or

faster route, distance and time analysis through networks of roads. This solution can be used for creating application for transport and logistic planning, vehicle navigation, and vehicle tracking.

For example, software lets users to implement custom solution involving shortest or fastest route finding in a flexible, efficient and highly cost-effective way. Customer can reduce time to deliver a solution and may therefore get products delivered more quickly to market.

Graphical user interface is designed in three parts; the main part is a GIS window with a detailed map, second is toolbox with easy to reach tools and third control window for determine the best path setup.

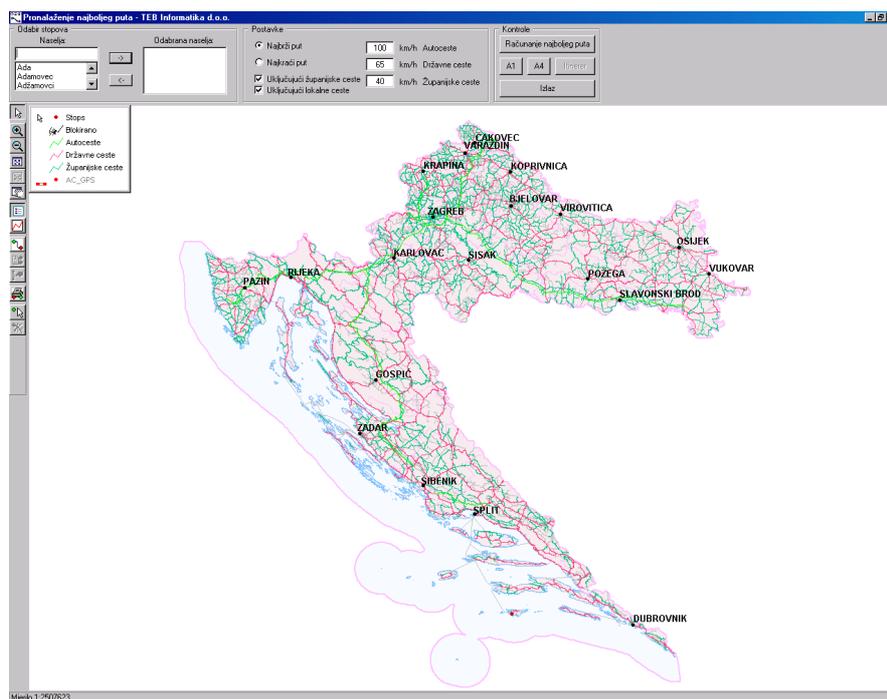


Figure 1. Route planning software

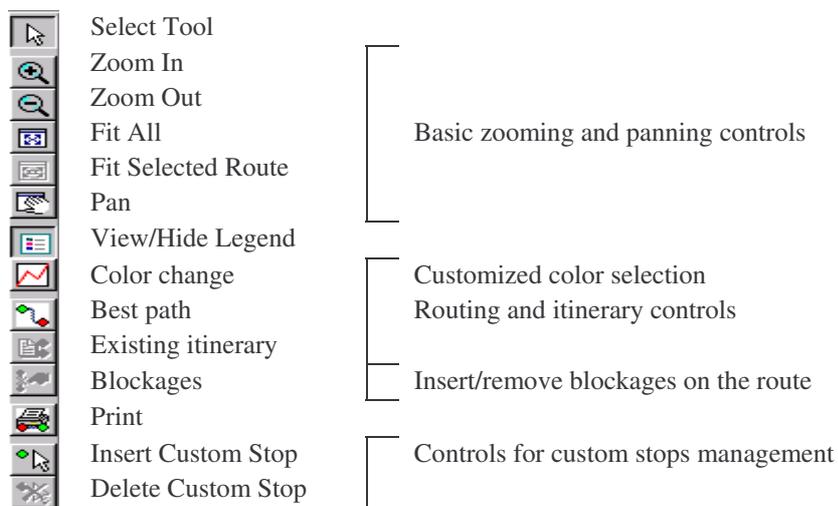


Figure 2. Toolbox with description

How does it work?

First step in finding the best path is selecting desired start and end destination. It is possible to select localities from the list, or by clicking directly on the map. The software is not limited in finding the path only from point A to B, it also possible to select as many stops you want. Available localities cover all existing localities in Croatia, but that is sometimes not enough. Application supports user custom created stops anywhere on the map and including it in the list of selected stops and in route calculation. Application automatically defines and calculates position of the custom stop on the road network.

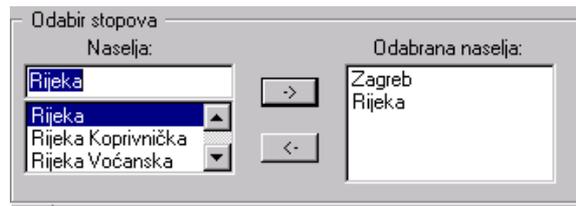


Figure 3. Stops control box

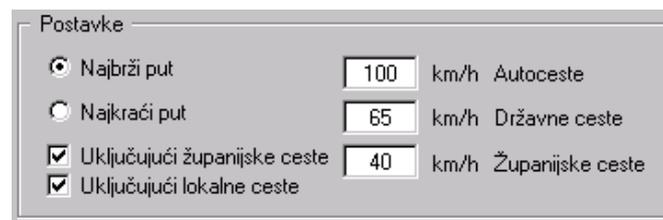


Figure 4. Best path set-up box

Best path can be generated as shortest or the fastest path. It is also possible to change driving speed (separately for highways, state roads and county roads). Some customers don't want or are not allowed to drive via local roads (for example heavy truck or special transportation), so it is implemented option to turn off these roads in best path calculation.

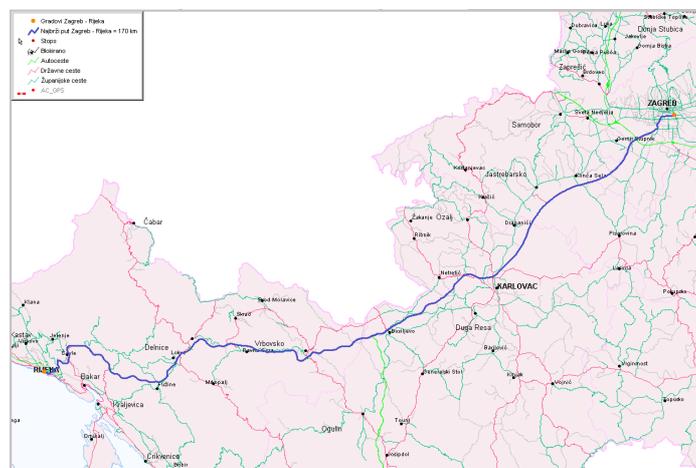


Figure 5. Best path result

The output is displayed as a highlighted route on a map overlay. This gives a graphical output showing a selected route.

This way prepared graphical map can be easily printed on a paper and used later for navigation.

The Best Path application can be also used as a non-graphical application for finding the distance, an estimate of travel time or proximity to a given location with provided textual itinerary. This itinerary can be saved in plain textual file for later use or just printed to fulfill the use of printed graphical map.

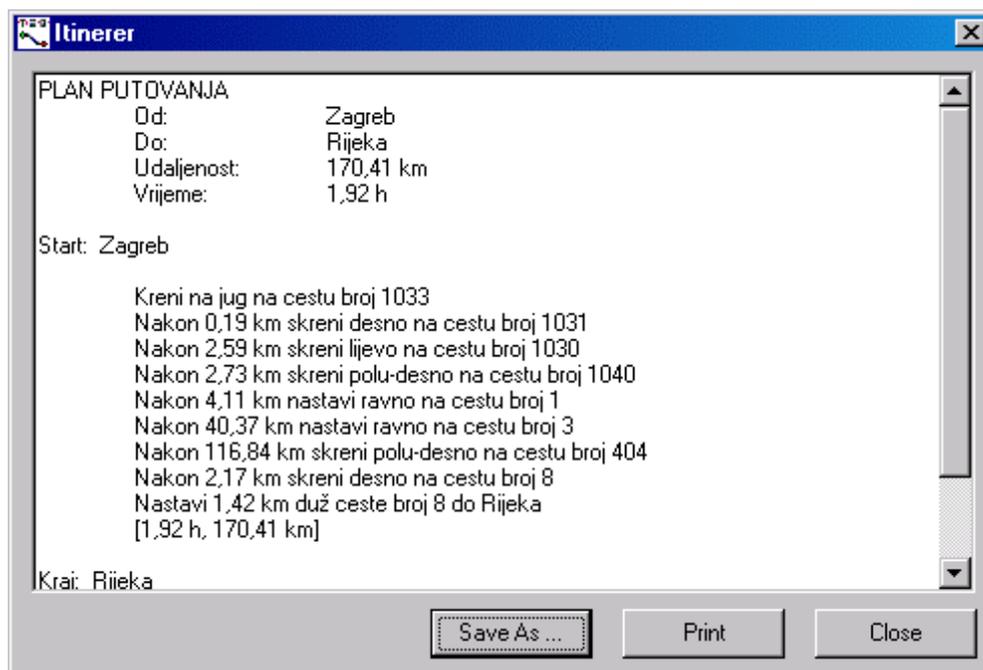


Figure 6. Textual itinerary

One Ways and Blockages

By default, the network model assumes that every edge is bi-directional. A bi-directional edge is one that can be traversed in either the forward direction or the reverse direction. In many cases, the transportation network is more confining. For example, some streets are one-way (uni-directional). Complete road network database is configured with real world situation, and it is not available for user side customization.

Also, at any time one or more streets might be temporarily blocked. A blockage might block the entire street (both ways), or only in one direction. Application is open for inserting temporary blockages, which is useful for simulating road closure due the traffic accident, closed road because of reconstruction or some other reason, and simulation for finding alternative routs is very fast and easy.

Future

Used in conjunction with GPS this system could not only be an in-car route finder, but could also provide the driver with detailed instructions on where to turn in what direction. It could also contain a lot of information on points of interest a driver might want to know with instruction how to reach them.

Desktop-based solution is restricted to have up-to-date database on every computer where the application is installed. The future is in web-based solution, with centralized road database on a server that reduces costs. Also the web-based solution does not require and installation on client side. Which lowers the price and increase productivity and usability.

Route planing

Abstract

How many times did you have to travel somewhere and you where not familiar with the route to your destination? How many times have you wonder yourself how far is your destination, or how much time do you need for travel to get there? This article demonstrates practical solution that finds the best route from point A to point B via desirable number of points with possibility to choose between shortest and fastest route, it calculates estimate time that is needed for that trip with possibility to customize driving speed for different road types (highways, state roads, other roads), and it finds alternative routes in the case of eventual blockages on the route (due the traffic accident, closed road because of reconstruction). And finally, it generates complete itinerary report with driving directions and other important statistical information.