



DEVELOPMENT OF THE ATHENS REAL-TIME TRAFFIC MAP Phase II



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Athens real time traffic Congestion & Volume map

Raw data covering traffic volumes and occupancies are selected by [sensors](#) and arrive to the NTUA CSST (Control Strategy Selection Tool) communication handler every 90 seconds. These data are compiled to a file, which is passed on to the APOLLON center. All data are batch processed, with a combination of specific tools and algorithms. The process produces, among others, statistical data and conclusions concerning the overall traffic in Athens (e.g. 15-minute traffic volumes and occupancies).

For an observer, numerical data doesn't make immediate sense without some analysis. On the other hand, it is well known that graphical representation of numerical data is much easier to absorb and is more meaningful to the human comprehension. Therefore, it makes better sense to represent the traffic volumes in Athens by means of graphics. Pie charts and bar graphs are easy to understand, but in this case, it is much more meaningful and practical to integrate the graphical representation of the traffic volume data in the actual Athenian road map.

The first step is to graphically represent the Athens road network. To do this, a CAD model of Athens is used. Since the network is fixed, this step is required only once. A set of points in a Cartesian (x,y) space is used to designate each and every node of the road network. Each node represents a physical node of the Athens road network. A road in the network is thus defined by the nodes it connects. Two files, the first containing the node coordinates, the second containing all links between nodes, completely define the network on which all information is gathered and will be presented.

The analysis of the processed data yields a quantitative estimation of the traffic between nodes in the network. In order to depict the freshly collected data, a file containing this numeric information is generated every quarter of an hour. The magnitude of a traffic volume in each link is represented by a number, which is translated to a color using the following table:

Numeric Code	Color	Traffic Volume (vehicles/hour)
7 or 0	gray	background color
10	green	$V < 500$
14	yellow	$500 < V < 1000$
3	blue	$1000 < V < 1500$
13	magenta	$1500 < V < 2000$

12	red	>2000
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The magnitude of a traffic congestion in each link is represented by a number, which is translated to a color using the following table:

Numeric Code	Color	Congestion Level (Occupancy, %)
7 or 0	gray	background color
10	green	$x < 25$
14	yellow	$25 < x < 45$
3	blue	$45 < x < 70$
13	magenta	$70 < x < 90$
12	red	$x > 90$

The processed data files are then transmitted using FTP procedure from the batch processing environment to the UNIX based Silicon Graphics Web Server of the NTUA Faculty of Civil Engineering (FCE) via the NTUA telematics (ISDN) network.

Combining all the information contained in the data files, ten GIF images are generated. These are included in Web Pages in the NTUA Faculty of Civil Engineering Web Server giving access to information on the traffic situation in Athens to any Internet user. The first GIF image contains the whole of the central Athens area. The remaining eight GIFs are blown-up parts of the network, which are generated along with the main image, every quarter of an hour via a UNIX script. Anyone can have access to those blown-up parts by clicking on a part of the main image in the Web Page. These images are generated once and for all during the shell process to gain time. The ANSI-C language was used for the development of the application and known graphic libraries were used to read and write the GIF images.

Generating a zoomed image using the first image requires processing time which can be better used otherwise. It also helps gain in image quality, since during the zooming process, some quality is lost. Also, since the images are to be accessible via the Internet, they must be as compact as possible, in order to minimize downloading time.

We decided that the generated images ought to be 600 pixels wide by 400 pixels long 256 color GIF files. The dimensions of the image are dictated by the fact that we designed them to be visible by VGA screen users. The generated GIF graphics file format, which is a standard practice on the Internet, gave a file size of only 18Kb.

The final result is accessible to any Internet user at the address:

<http://www.transport.ntua.gr/map/>

On the user's screen, the map is internally divided in four regions. With the technique of Image Mapping, the user can click on any one region to view a blown-up image of the selected region.

An implementation of a version of this site suitable for use with cellular phone is also available at:

<http://www.transport.ntua.gr/map/en/mobile.html>

Other Web Pages in HTML format, authored by Netscape Gold 2.0 (TM) and containing text and graphics, present general information on the NTUA FCE and can be found at:

<http://www.transport.civil.ntua.gr/transport/>

Athens travel time traffic map

Providing users with more information regarding travel time is considered to be an important element for travelers' route choice decisions, and can lead to the improvement of the network efficiency.

As a first attempt to approach the drivers needs, a time horizon of 15 minutes has been considered as a considerable time to give pre-trip information, taking also into account that this same interval is used for the network conditions update.

To do this 6 origin points have been defined at the major city entrances from which a total of 17 possible (commonly used) routes have been considered.

Speeds and travel times along these 17 routes are being estimated using solely the relevant available flow and occupancy data from the UTC controllers by developing an algorithm, which is now assessed.

We have chosen to represent the estimated times in a graphical way that is better absorbed by human comprehension rather than simply giving numerical results.

All travel time GIF images are generated in a similar way as those of the Athens real-time traffic map. The first image is a visual representation of the Athens road network with 6 traffic lights representing the selected entrances. By clicking on a traffic light the traveler is informed about the 15-minute travel range after the time he enters the entrance. The range is color coded in green and the relevant routes in yellow-gold.

The reaction of users to this ambitious goal of in real-time journey time estimation along with the evaluation of the whole pilot program is performed on-line (<http://www.transport.ntua.gr/MapEval/>).

The final result is accessible to any Internet user at the address:

<http://www.transport.civil.ntua.gr/map/en/route.html>

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Sensor data provided by the Ministry of Environment, Planning and Public Works /UTC Center, maintained by SIEMENS Greece.