Web GIS for Geomarketing and Mobile Mapping: Peroni Beer Company Case Study

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Geomarketing is a natural extension of marketing able to take in consideration a very important aspect, the geography. Let's take into account how important it is for a company today to know where its customers, prospects and competitors are geographically located.
Using this information it can be properly decided where to locate a new store or how to enable more effective marketing strategies based on socioeconomic information in a certain area. These are only some of the possible applications of geomarketing but they are useful to perceive the enormous potential of this instrument.

The GIS lab of the Department of Economy Society and Territory of the University of Udine used a WebGis infrastructure made available by private companies to our Department:
- ADDRESSfinder, a WebGIS tool for normalization and geocoding;
- SITEfinder, a WebGIS tool that automatically optimizes and balances the zones depending on specified parameters and constraints;
- MARKETfinder a WebGIS geomarketing application allowing analysis, creation of thematic maps, modify zoning, ….;
- PATHfinder a WebGIS routing application that optimizes the agenda based on the parameters (time slots, costs, ...);
- PALMfinder, a tool on PDA to support the field activities of salesmen.

Using these tools we have been working with Peroni (the biggest Italian producer of beer) for:
- balancing and optimizing salesmen areas
- organizing the everyday agenda in order to visit the customer for the correct number of times per month in the right time window
- optimizing the routes of the salesman
- ....

In this document I will not go through the functionalities of GIS and geomarketing tools but I'll concentrate the attention on the one used in the project.

Common goal of ASH and ASW sales networks and description of tools

The goal of the geomarketing analysis was the Italian Peroni sales network which is divided into two networks called ASH (Account Supervisor Horeca) and ASW (Account Supervisor Wholesalers).
This division is related to the differences in the types of retail outlets served by the two networks. ASH comprises end distributors such as hotels, restaurants, café, etc., while ASW target are the wholesalers.

The aim of the project was shared by the two sales networks because it consisted in organizing the Peroni sales force, optimizing the working agenda and the everyday route for each salesman using geomarketing tools.

The optimization of the working agenda was implemented through the reduction of the driving time from one store to another and the increase of the presence in the customer store.
The analysis of sales network and the determination of the best agenda for staff has been done respecting specific parameters established by Peroni itself.

It was initially planned an identical method for ASH and ASW networks that can be summarized in the following phases:
1. normalization and geocoding of the database of the stores
2. definition of the salesman areas respecting the constraints of the company
3. optimization of everyday agenda and routes.

We will see that normalization and geocoding steps have been shared by the two networks while the optimization needed two distinct processes.

Normalization and Geocoding

The first activity has been the normalization and geocoding of Peroni data base using ADDRESS finder.
The normalization process is divided into two phases: a phase of normalization in which ADDRESS finder automatically selects and finds the correct address and a second phase of manual geocoding for addresses in which the ambiguities are such not to allow an automatic choice.
The tool, choosing from a standard data base of addresses (in this case Navteq), associates to each record the address written in the correct way.
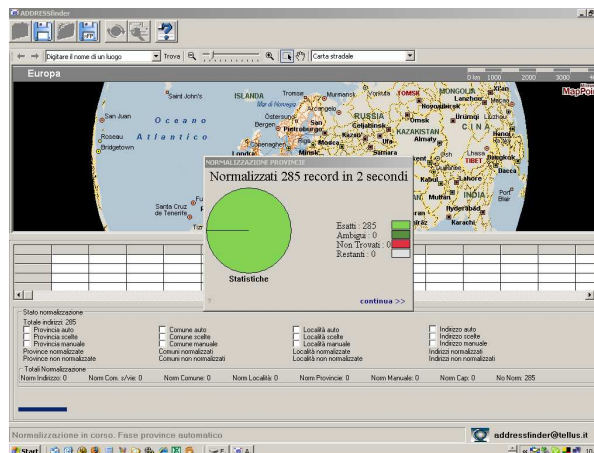
Automatic geocoding interface.

At this second stage ADDRESSfinder proposes alternatives which you can choose from, or allows to search the address on the map. The normalization phase provides this type of automatic and manual operations for each of the address token, starting with the province, followed by the postal code, town, village and ultimately street.
Obviously, if you do not find the match for one of the components, the address is normalized and later geocoded only at the level immediately preceding it. For example, if there is no match for the street the address is normalized at a municipality level.

The issues raised during the normalization can be traced to the following types:
• ambiguous addresses (eg. Via Garibaldi. The software gives two solutions, Anita Garibaldi or Giuseppe Garibaldi. The non-specific name leads to the impossibility of choice);

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- incorrect addresses or the generic (in many cases instead of the street was stated "at the shopping mall" or "at the industrial area");
- incomplete addresses (eg. When there is no postal code can be difficult to go back to it because very often the same road may fall into different postal codes);
- ....

This procedure has resulted in 93% of records geocoded at street-level and 7% at municipality level.
To correct these results, we have carried out a further phase of analysis between the addresses that could not be geocoded to the street level using also the white pages.
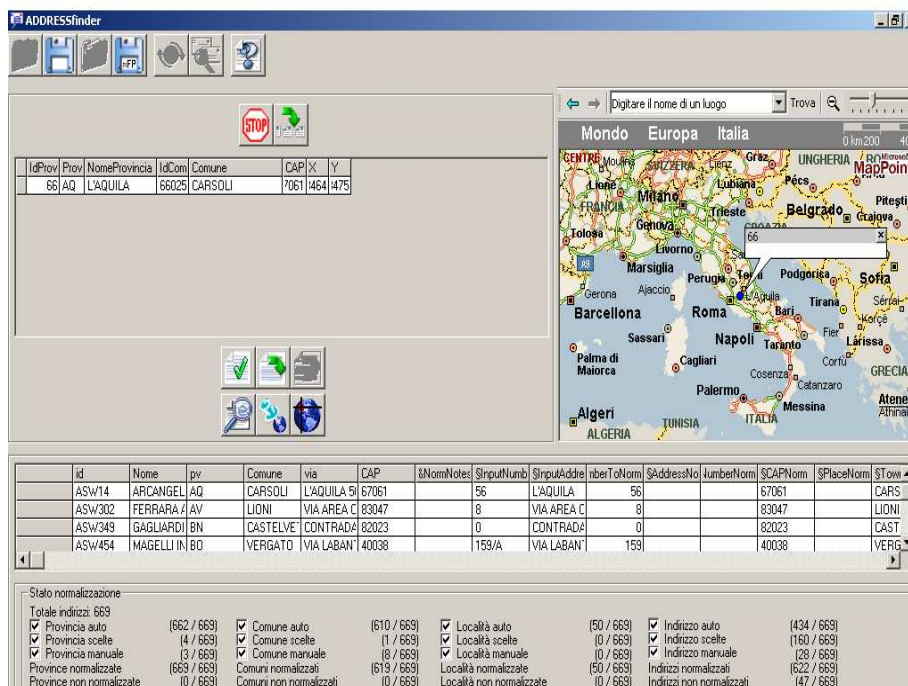
Sample of interface

ASH Sales Network

Basics and benchmark parameters

The ASH network of Peroni in Italy consists of 14,936 points of sale.
The objective was to determine the network ASH areas balanced according to the parameters indicated by Peroni which were:
- areas with no more than 120 PoS (Point of Sales);
- tripartite division of PoS in Gold, Silver and Bronze. The three types are identified based on the frequency assigned to each quarterly visit, 6 for Gold, 3 for Silver and 1 for Bronze;
- the duration of each visit to PoS is set at 35 minutes;
- each salesman should not travel more than 200 km per day;
- the monthly working days for each salesman is 14 with 8-hour workday. It's considered one hour lunch break while, in the computation of eight hours, it is excluded the trip from house to work;
- minimum number of daily visits of 10. During the project we managed to convince Peroni to reduce this parameter to 8, because to make 10 visits a day for 35 minutes means that each salesman is almost 6 hours per day in stores which is too much for the 8 hours working day.

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On the basis of zones created and the salesmen placement the best visiting routes for each salesman were then identified.

Zoning
Data normalized and geocoded have been loaded into MARKETfinder that generated a nationwide map with the representation of PoS in a different color depending on the salesman.

Based on the parameters set for the ASH network approximately 125 areas were assumed in accordance with the following calculation: (14,936 total PoS/120 PoS per salesman). At the same time it was considered important to respect the time parameter calculated in a range between 11,000 and 12,500 minutes.
This last parameter was determined by taking the 35-minute visit, multiplied by 42 working days (14 days per month for 3 months) and multiplied by the number of visits per day per salesman measured in the quarterly period.
The areas of responsibility have been balanced considering this parameter in time and according to that defined by Peroni of 120 to PoS per salesman.

The problem which emerged in this phase was the difficulty to balance the two parameters simultaneously, due to the uneven location of POS in the area.

For example, while a visit to Gold will have a frequency equal to 6 and accordingly will have greater weight in calculating the total minutes, a Bronze will have a frequency of 3 visits and thus less weight.
Contacted on the matter Peroni sets the priority to respect the constraint salesman 120 to PdV.
The imperative of respecting this constraint forced us to change strategy and working method.
For the ASH network two separate projects were then made:
• the first named Peroni ASH 1 in which 120 areas have been identified balanced according to the visit time;
• the second named Peroni ASH 2 in which we have identified 123 areas balanced according to the parameter 120 to PoS per salesman.
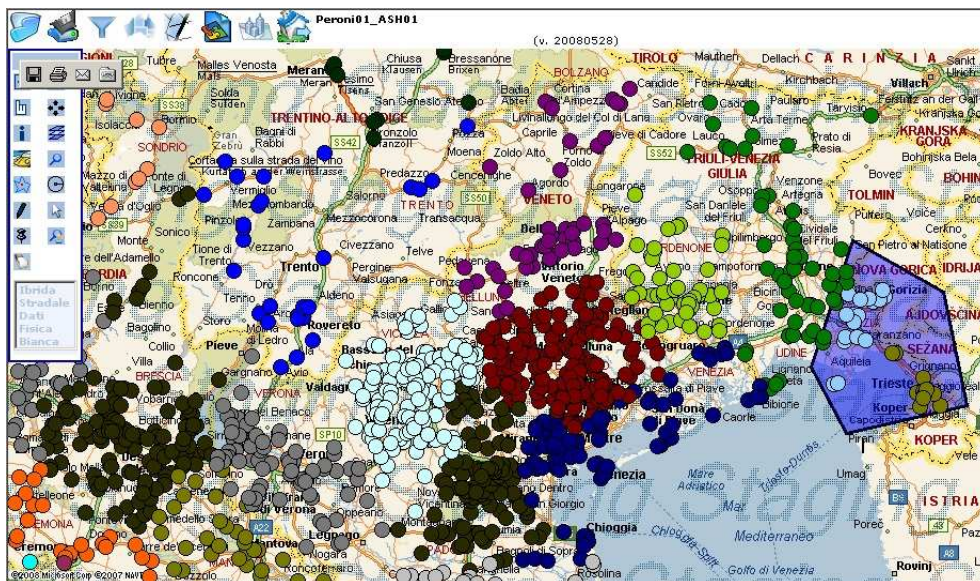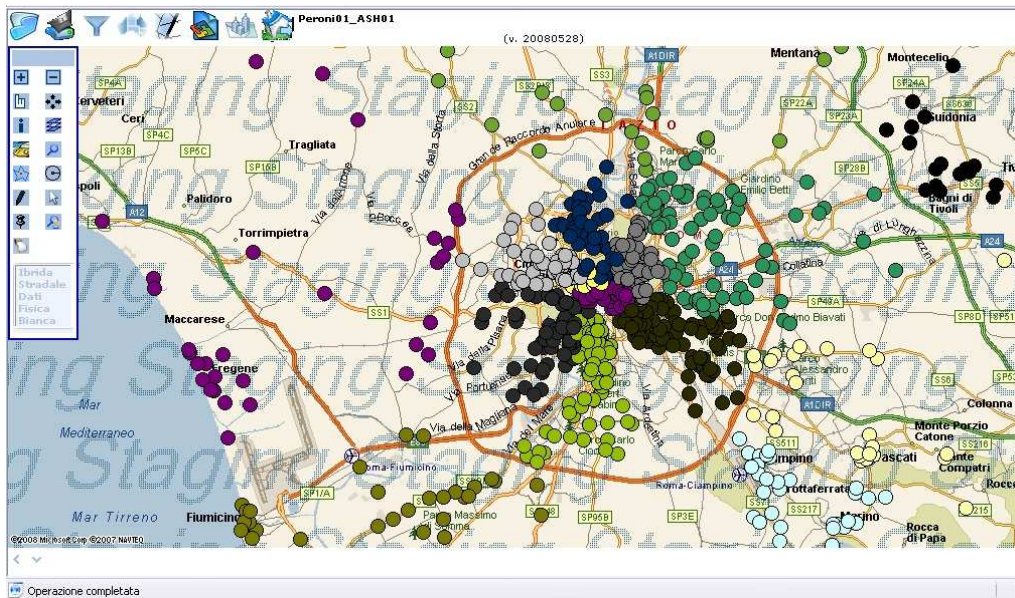

Balancing areas on the map

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Result of the activity for the Gorizia and Trieste provinces

Similarly, areas with a high density of PoS or PoS with a high frequency of visit were treated by creating, within them, smaller areas.


Balancing areas in Roma

For ASH 2 profile the same process of grouping the provinces was followed but in this case we have tried to create areas as uniform as possible under mandatory constraint of 120 visits per salesman.

The creation of two options was motivated by a desire to submit to Peroni, along with a project strictly subject to the constraint of 120 to PdV salesman, a project privileging the time parameter.

This need has arisen during the creation of areas, where certain anomalies emerged due to the distribution of PoS throughout the country, some very concentrated and so with short distances, other dispersed not allowing to strictly comply with the constraint of 120 without incurring at the same time an overrun of the bond mileage.
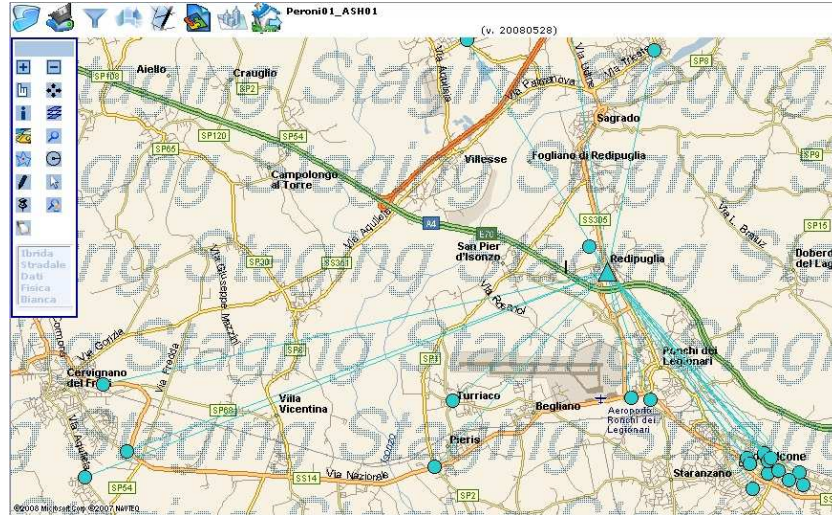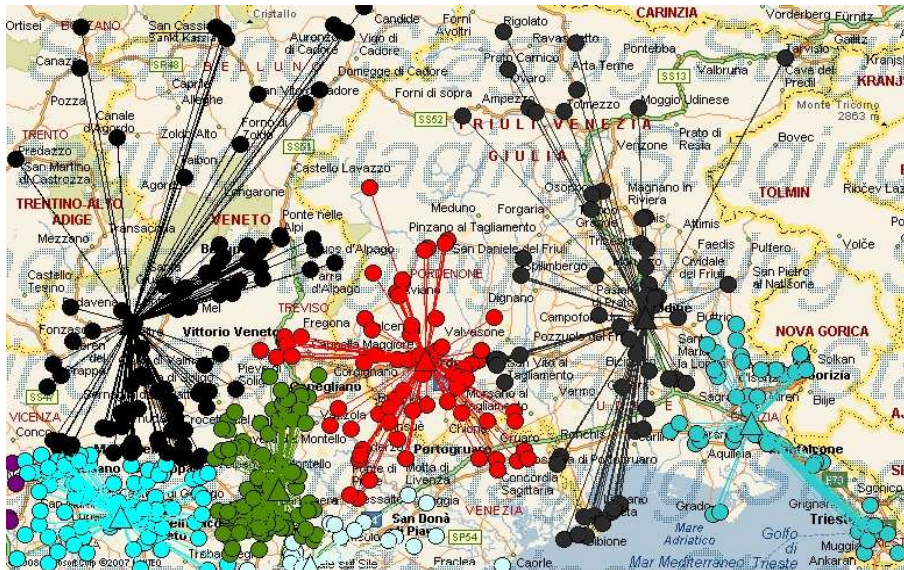

House of the salesman connected to customers

Both Proposal have been made available to Peroni via the Internet using the Asp geomarketing MARKETfinder tool in order to allow them to check and modify the work done.
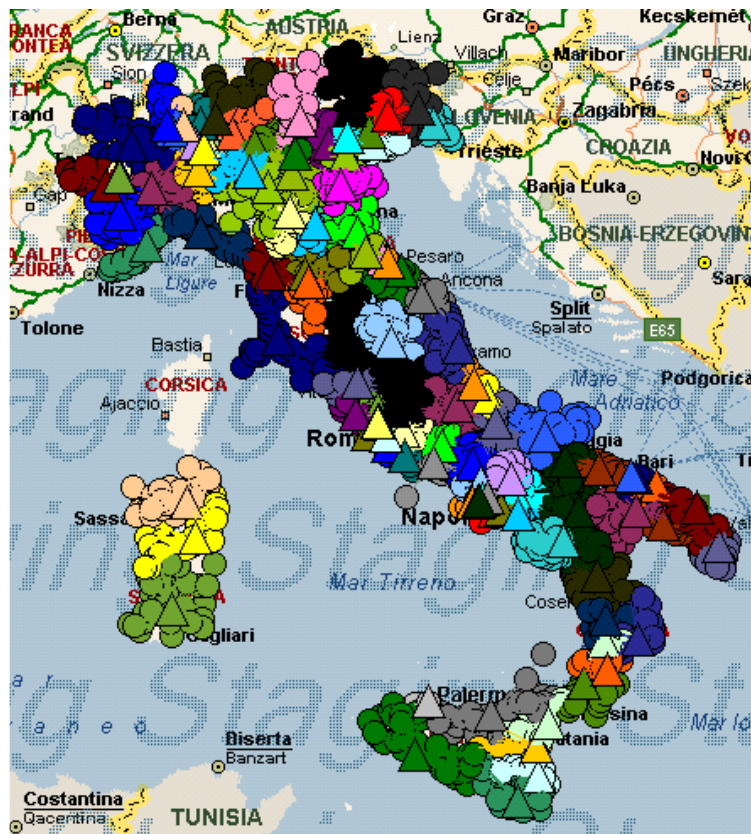
Salesmen areas and starting points (houses)

Follows a detail of north-east Italy

Analysis and definition of agendas
This data have been loaded in PATHfinder that generated for each of 120 areas the best visiting routes for the 42 working days in the quarterly period. The application automatically calculates the routes, time and sequence of visit, reducing costs and respecting the parameter set.

Weekly planning for an salesman

Working day for an salesman

At this stage the parameters considered are the eight hours per day, days worked in the quarter and, for each route of visits, the respect of the maximum distance of 200 km.

The routes have been optimized for this sales network, in accordance with the total number of visits provided within 42 working days every three months amounted to 40,625 and obtained: (6.215Bronze * 1) + (2.749Silver * 3) + (5.972Gold * 6) = 40,625.

The parameter of a minimum of 10 visits per day per salesman was later reduced to 8. In the daily working practices are found cases of days with a number of visits lower than the minimum benchmark that must be considered inevitable if you want to avoid slippages in the arrival times and then overtime.

Results
The result is the agenda of each salesman daily visits with the optimal sequence respecting frequency of intended visits to the three types of PoS, time spent at the POS (35 minutes), working hours including lunch break (1 hour), starting points and the maximum distance traveled by each salesman per day (200 Km).

The conformation of the territory and the constraints on 8 working hours, on up to 200 km per day have meant that compliance with the constraint of minimum 8/10 daily visits per salesman has been observed in 50% of cases.

For each salesman are therefore specified day by day (the time period is 42 days):
• the total cost and cost of travel;
• length of the routes;
• total time, time slot, departure and arrival time;
• the number of actual visits.

At the further stage of verification and control the output thus obtained revealed overruns for some staff time and maximum km that can be attributed in most cases to the configuration of the land (mountains, connection with islands, ...).

Salesman of National Park of Cilento

Salesman for Eolie islands

Sales Network ASW

Basics and benchmark parameters

The Peroni ASW sales network consists of 669 distributors/wholesalers.
The main objective was to determine areas balanced according to the parameters specified by Peroni, which are:

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- creation of areas of expertise of some 20 PoS;
- the length of the visit is 90 minutes;
- maximum of 3 visits per day;
- each salesman should take a maximum of 300 km per day.

Location of salesmen and zoning

For the ASW network 32 areas of competence were created which meet the parameters set, we compared the number of PoS, equal to 669, the number of dealers, of 20, and in this way we determined the potential number of salesmen.

The normalized and geocoded data were loaded into SITEfinder that automatically determined the ideal position of the best starting points for the salesmen.

The results thus obtained were then loaded into MARKETfinder that generated a map of the country with the representation of the 669 PoS symbolized by dots of different colors depending on the area.

Initially there were 33 areas estimated by the ratio between the number of PoS and assigned number of dealers, the next phase of manual balancing areas led to the cancellation of an area of expertise and its salesman in Sardinia, where the two remaining salesmen were enough to serve all the PoS.

The remaining areas were balanced with about 21 PoS in such a way as to allow, while respecting the parameters of up to three visits per day, the organization of seven-day working visit (21PoS/3=7 days).


Areas and salesmen
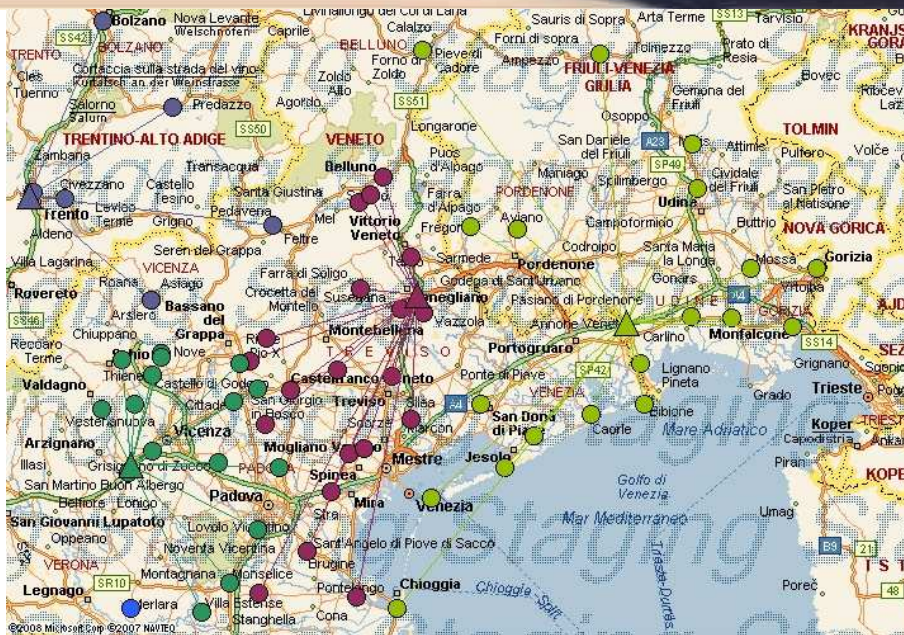
Salesmen in north east italy

Analysis and calculation of visiting tours
The ASW network data were loaded into PATHfinder that generated for each of the 32 areas the visiting tour starting from the salesmen house by calculating the route, time and sequence of visit.

Results
The output of the operation has produced the work of each salesman organized daily and the optimal sequence respecting frequency of visits (3 per day), time spent at the PoS (90 minutes), working hours including lunch (1 hour), starting points and the distance traveled by each salesman each day (300 Km).
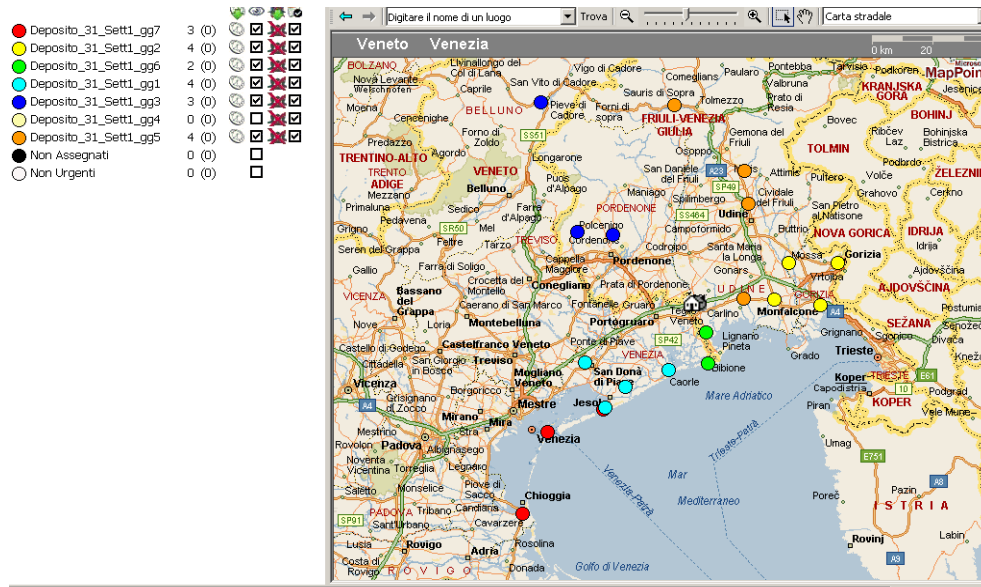
PATHfinder interface

The assessment that emerges from the resulting output cannot be separated from the stress that, in some areas, is imposed by the parameter which sets a maximum 3 visits per day and which is found to be too

binding. For this reason another simulation was created whose objective is to see what changes, positive or negative, arise from the elimination of the bond above mentioned.

Comparing the two simulations it can be seen that not to put any parameter on the number of visits allows to reduce the minutes of overtime, ie time that exceeds the working hours indicated and that translates to the company in an additional cost to be incurred.

Week day	Driving distance	Total time	Time window	Starting time	Arrival Time	Number visits
Sett1_gg1	318,129	11:09	09:00-18:00	09:00	**20:09**	3
Sett1_gg2	148,124	07:19	09:00-18:00	09:00	16:19	3
Sett1_gg3	222,341	08:22	09:00-18:00	09:00	17:22	3
Sett1_gg4	162,917	07:39	09:00-18:00	09:00	16:39	3
Sett1_gg5	299,673	08:51	09:00-18:00	09:00	17:51	3
Sett1_gg6	249,465	09:00	09:00-18:00	09:00	**18:00**	3
Sett1_gg7	222,363	08:25	09:00-18:00	09:00	17:25	3
Total	**1623,012**	**60:49**		**63:00**	**123:49**	**21**

Salesman with maximum number of visit parameter

Week day	Driving distance	Total time	Time window	Starting time	Arrival time	Number visits
Sett1_gg1	217,750	08:28	09:00-18:00	09:00	17:28	3
Sett1_gg2	161,587	08:47	09:00-18:00	09:00	17:47	4
Sett1_gg3	292,989	09:22	09:00-18:00	09:00	18:22	2
Sett1_gg4	253,707	08:55	09:00-18:00	09:00	17:55	3
Sett1_gg5	251,360	09:09	09:00-18:00	09:00	18:09	3
Sett1_gg6	165,646	07:33	09:00-18:00	09:00	16:33	3
Sett1_gg7	222,363	08:25	09:00-18:00	09:00	17:25	3
Total	**1565,402**	**60:42**		**63:00**	**123:42**	**21**

Salesman without maximum number of visit parameter

As you can see from the two tables above we can obtain the same number of visits done during the week but shortest distance, less working hours, less overtime if we don't specify the total number of visits per day.

PALMfinder

Through this application, installed on the personnel PDA, the agenda is sent to the salesman.

He could use the SatNav to reach the customers and could use the application to insert the data collected during the meeting.

These information are transferred in real time to the company information system.

The company has the possibility to compare the work done with the planned one in order to be able, eventually ... ... the ... ... ca ... pro ...

Through this application the company is also able to account and certify the workability of the salesman (working hours, km driven, stops, activities ...).

Thematic analysis on Peroni data

The project developed for Peroni has had its primary goal in the organization of sales networks using geomarketing functions for balancing, planning and optimizing.

The potential of geomarketing is not exhausted in the optimization of logistics aspects, but it is also very useful for thematic analysis on business data aiming to highlight aspects of the market that are not detectable with ordinary tools (data mining, datawarehouse, …).

For this reason thematic analysis were conducted on Peroni data to determine the market penetration on the national territory, thus providing an additional means of information from which assessments and any additional marketing initiatives may arise.

To highlight the penetration of the market we have prepared a first theme representing the percentage of active over potential customers.

To determine the potential customers we have uploaded a database of potential customers with bars, cafes, restaurants, hotels, fast food, pubs, nightclubs and piano bar.


Market share

The thematic analysis indicates that the regions colored in red, in particular the center-south, are areas where the market share is higher. On the contrary, the regions of central and northern Italy show a worst market share.

This simple analysis can be the base for promotions and advertising in order to increase active customers in northern regions.

A second thematic map has been created to investigate in more detail the market share in the provinces of Emilia Romagna and Tuscany region limiting the inquiry only to clubs.
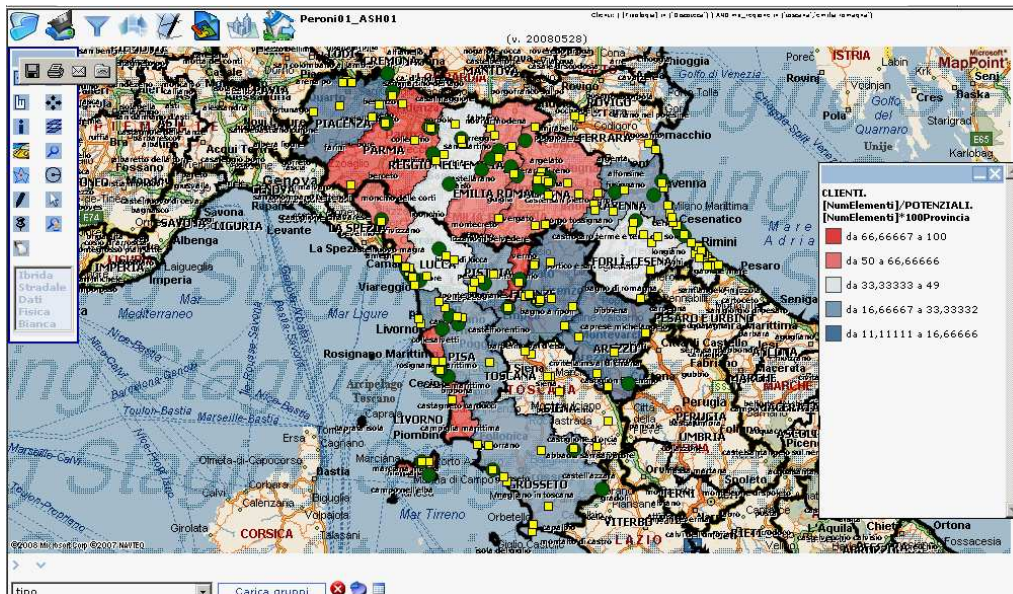
It can be noted that the provinces of Ferrara and Siena are characterized by a complete absence of customers "disco".

Similarly, areas of the coast of Rimini and Cesenatico are areas with a potential market still untapped by Peroni attesting to a low level of active customer "disco".

Project Peroni evaluation

As far as the project developed for Peroni SpA we can draw some considerations concerning the working method adopted.

We consider very positive the continuous contact established from the beginning between the company, which commissioned the Work Force Management project, and those who put it into practice.

This was particularly aided by the fact that all the applications used were WebGIS easy to use and allowing a easy sharing of data, maps, simulation and analysis.

This has not only allowed a continuous updating of Peroni regarding the project steps but also a constant dialogue with it to allow the solution of the issues that have arisen during the various stages of work by comparison and not by unilateral decisions.

The case study described allows us to "generalize" the quality of those tools that can become an opportunity for companies aiming to improve their services and who want to gain a gap over competitors.

This direct experience made us realize that despite the use of sw tools in such a complex process unpredictable difficulties may emerge which require high problem solving capabilities that only human experience and intuition can grant.

Brief Biography

Researcher in GIS and geomarketing at the University of Udine, lecturer in Italian (Modena, Treviso, Venice, Florence) and foreign (EAST London, Uppsala, Caen, Murcia, Sofia, Tunis and Cairo) universities. President of Udine Servizi SPA (company owned by Udine municipality), Vice President of SAF Autoservizi FVG spa (public transportation company of Udine Province), member of CARTESIO (Research Centre in GIS and Remote Sensing), member of the Didactic Council for the Masters in GIS of the University of Udine, President of Tellus SPA, GIS company founded in 1997. Currently working on GIS projects in the geomarketing and logistic field.