

Understanding tourist behaviour in wide areas using GPS technologies

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Abstract

This document briefly describes the results of an experiment, conducted during summer-autumn 2008, of monitoring through GPS technology the spatial-temporal flows generated by tourists on Orta Lake. The objectives of the study are the territorial object of analysis, that is a large tourist region composed of 24 municipalities, and the comparison of two methodologies of studying tourist behavior: a traditional one and an innovative one. The methodology focused on three tourist variables: hospitality, accessibility and information. The experiment revealed that the GPS monitoring, both in terms of quantity and quality, had the best results compared to the traditional survey.

Keywords: tourist behaviour, GPS technologies, visitor-management.

1 Introduction

The "Visitor management" project, which began in May 2007 and is still in progress, has foreseen the activation of a series of analyses aiming at evaluating three different tourist variables, that are hospitality, accessibility and information: valuable variables within the complex scientific challenge of understanding the so-called "tourist experience". Within this project, carried out on behalf of the Piedmont Region Culture, Tourism and Sports Division, we have tried, amongst other things, to analyze the behavior and experience of tourists in Cusio (the area bordering Orta Lake, Mount Mottarone and the Strona Valley in the north east Piedmont) with two different methodologies: a traditional one and an innovative one. Regarding the traditional survey methodology, we used paper questionnaires, distributing them on site, which gave resulted in approximately 1000 interviews. The intercept survey asked questions about the reasons for choosing this destination, the means of transport and displacement, the preferred sites to visit, the accommodation, the tourist satisfaction

and loyalty. Through this analysis, we have obtained important statistical information about the tourists profiles (at a broad spectrum) on the Orta Lake region. The second methodology, inspired by the experiments conducted by Prof. Noam Shoval of the Hebrew University of Jerusalem, is based on the use of GPS technology, GIS systems and sequential alignment methodologies.

2 GPS monitoring

The monitoring through GPS technology took place by giving to each visitor a “data-logger”, that is a satellite receiver with a range up to 5 seconds, with an internal recorder of three-dimensional geographic locations and the speed reached by the tourists movements. The cost of the required tools was very small (about 70 U.S. \$ per data-logger) and the reliability of detection (which does not require active interaction of tourists) was very high. In addition, thanks to the cooperation of hoteliers of the area, the operations of delivery and return of equipment to tourists was easy and without involving costly management operations. Moreover, in the preliminary phases of the experimentation, it was decided to use this methodology due to its potential provides in terms of comparability with other territorial analysis in the same field. In particular, the possibility to cross the monitoring data with a parallel analysis carried out to evaluate on-site tourist signage and accessibility (from a mobility and transport point of view) of the tourist attractors: analysis conducted with the common support of GIS systems. The study area and the tourist context has several significant features, in particular the territorial extent (the area analyzed is composed of 24 municipalities) and the type of tourist fruition (very loyal international tourism). Moreover, the area concerned is in close synergistic/competitive correlation with the tourist environment of Maggiore Lake and Sesia Valley, due to its close proximity and similar tourist destination.

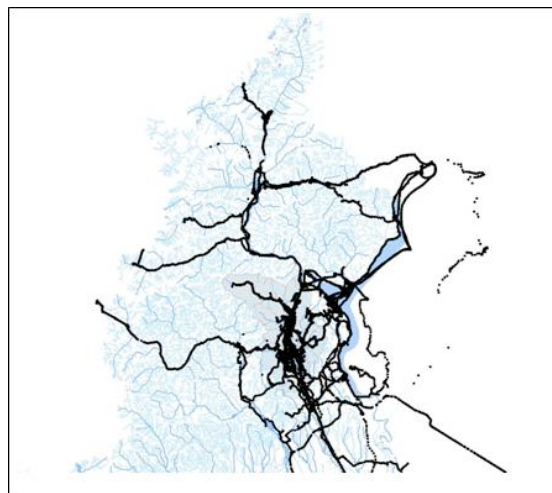


Fig. 1. Area studied, with overlapping of the recorded tracks.

The experiment was developed through 3 different phases: the preparatory, the operational and the processing phases. The preparatory phase, lasting about 6 months, involved several local partners, that gave invaluable and irreplaceable support for the experimentation, such as the Cusius Eco-Museum Board and some hotel managers. The operational phase, conducted between July and August 2008, included all the data collection directly on-site. Lastly, the processing phase, held in Autumn 2008 at the Politecnico di Torino, produced the results to which we refer in this document.

In particular, from the operational point of view, monitoring was developed through 4 phases:

- Involvement and awareness of the importance of the experiment to local tourism operators (accommodation managers) also occurred within the thematic focus groups mobilized for the understanding of the issues expressed by the local tour operators;
- Selection - depending on the typology, class and location - of 5 accommodations facilities to be used as “bases for the survey”, that is places where to propose to tourists to take part in the monitoring in order to have an equitable geographical distribution of the surveys starting points;
- Monitoring with GPS technology of about 180 groups, 470 tourists selected according to a stratification of the population by origin, and distribution of questionnaires (matched the distribution of data-logger to tourists) to deepen the research profiling tourist behavior on the basis of their socio-economic characteristics;
- Processing of the data obtained with GIS systems and sequential alignment methodology.

The GPS data loggers, were distributed at 5 different accommodation facilities; the obtained recordings contain the feature / problem of the polycentrism of the generation points of the observed tourist routes. The obtained output can be quantified in a total of 1393 hours of detection divided into tracks with an average size of about 9 hours. The distributed GPS data logger were set to record a statement every 5 seconds, therefore each track - the monitoring of a entire day of a single tourist - is on average composed of 3240 points, of which we know the latitude, longitude, altitude and partial speed. The distribution of the GPS data logger to the tourists took place together with the distribution of a synthetic questionnaire aiming to define certain socio-cultural characteristics in order to create profiles from the obtained results. In particular, the questionnaire revealed details such the destination choice, of the means of transport and mobility, of the visit arrangements, of the accommodation cost and of the tourist satisfaction.

3 Some obtained (and/or obtainable) results

The results obtained from the experiment, which are presented below, represent confirmation elements, although partial and in some case to be analyzed more in depth, if not of the validity of the experimented methodology, at least of the direction taken in terms of scientific research.

The analysis consisted essentially of two types: one related to the intensity of visits recorded in the single resorts of the territory (carried out through GIS tools) and the other concerning the development of the travel route and their sequencing (carried out through the method of the sequential alignments and by using the Clustal G software). To analyze the intensity of visits, we looked at the entire sample and at 8 sub-samples segmented according to the following variables: costs incurred during the day of visit, reasons for visiting and logistic choices for the visit (means of transport and use of GPS). It seems interesting to us to note that the segmentation described above produced different ways of visiting the area only with regard to the variables of "costs" and logistics, while there are no significant differences with regard to the "reasons". Therefore, is this answer to the questionnaire to be understood as an index of artificial auto-representation, without real evidence within the visit experience, announced by tourists to adhere to a conventional pattern of use?

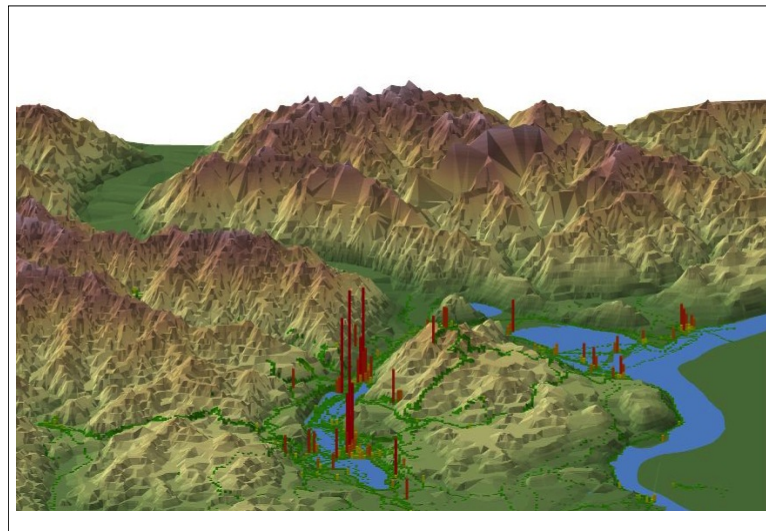


Fig. 2. Example of processing linked to the visual intensity

Monitoring results appear interesting to us, or at least worthy of examination, also taking into account the differences between the collected data with the traditional methodology - paper questionnaires – analyzing the behavior of tourist demand. In particular, significant differences emerged between the visit preferences from the questionnaire answers and the behaviors observed by GPS: if in the questionnaires the choices were for conventional visit itineraries (the area "must to see") and of intellectual orientation (museums and cultural heritage) the GPS recordings describe visits to be much more personalized and more leisure oriented (beaches, parks and natural attractors).

Moreover, there were also differences between the questionnaire answers about transport and mobility and the actual data recorded by GPS: if in the questionnaires one third of the sample declared to travel within the territory by means of low

environmental impact (bicycles, road public transport, train and on foot) the data obtained by GPS experimentation show how this value substantially drops is approximately one-fifth of the sample.

These last two considerations suggest that there is a tendency for tourists to represent themselves and their behavior as similar as possible to a conventional and "politically correct" ideal. If these considerations were confirmed by other studies, the scientific and investigation values of the GPS methodology would assume a significant importance: if the traditional instruments are not able to neutralize the factors of artificial self-representation and excessive subjectivity of the perceptions of the interviewees, the methodologies based on the use of GPS can provide a more objective and reliable method of investigation; it is acknowledged that GPS results are limited since it is not able to detect opinions and feelings, that are useful to understand the tourists' experience.

Further analyses were performed using a kind of segmentation of the entire sample, observed following time slots: 08.00 / 12.00, 12.01/14.00, 14.01 / 19.00, 19.01 / 21.00 and 21.01 / 24.00. These studies have led to the drawing of some thematic maps that made it possible to analyze and understand the displacements of tourists according to the time of the day: thus we have obtained important indications about the most visited places in the morning and afternoon, about the places most commonly used for eating, about the evening activities and clusters of attractiveness of the Nightlife.

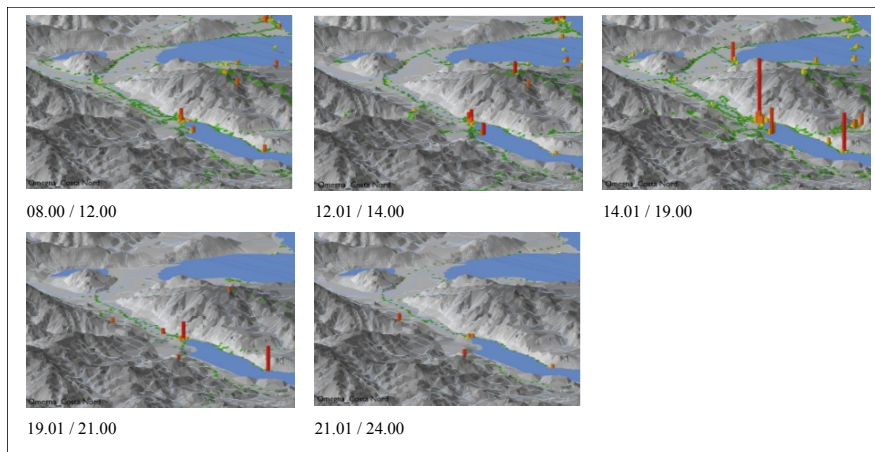


Fig. 3. Example of processing linked to the segmentation according to the time

In conclusion, we can affirm that the information given succinctly above makes clear the significant amount of information that could be reported using GPS technology: it wouldn't be possible to obtain the same information using a traditional methodology, such as a questionnaire, without a significant expenditure of resources and, even then, the results are limited by the subjectiveness of the respondents.