

Abstract

Cell phone presence data and geomatics for the analysis of tourist behaviour

Keywords: presence cell phone data; geomatics; tourist behaviour;

Background of the study

Understanding human movement within a geographic area (city, country, world, ...) is crucial in many domains such as urban planning, transportation, emergency relief, marketing strategies, and of course TOURISM.

A new way of studying human movement and behaviour is through cell phone data. Mobile phone data trace very precisely human mobility and are absolutely relevant for mobility and transportation statistics. Study of tourism dynamics such as inbound and outbound, number of trips, number of days and nights spent, number of unique visitors, country of residence, main destination, secondary destination, transits pass and repeated visits can be analysed using phone data.

Some of the applications using mobile positioned data are related to business tourism and event monitoring, for example "Mobile Landscapes: Graz in Real Time", directed by C. Ratti, A. Shevtsuk et al., the experiment "Real Time Rome", conducted by MIT to study a Madonna concert in Rome and football match in Milan analysed by the Fraunhofer Institute.

Purpose of the study

The goal of the research is to use cell phone presence data to analyse the way tourists behave during events, holidays, trips, ... depending on weather and other environmental situations.

Questions that can be answered with this approach are: "are tourists sleeping in town after an event or are they going away?", "what's happening in a seaside resort during a summer rainy day?", "where are German tourists between 9 and 11 pm?", "where are today the Russian tourists arrived yesterday with the 5pm flight , ...

Methodology

Presence cell phone data (subdivided per country and typology of presence) are available every 15 minutes for cells of 150x150 metres.

These huge amount of data (35 million records daily for the Friuli Venezia Giulia region) have been stored and organized in a Geodatabase.

Development is now ongoing for a query and analyses highly parametric and user friendly WEB GIS that will transform this huge amount from DATA to INFORMATION.

The prototype has been applied to two different situations.

The first one is "Friuli DOC", the annual wine and food event held in Udine.

The analysis has been focused on the way Italian and foreign tourists behaved during those days, what they visited, where they slept, at what time they got to the event and at what time they left,

The second analysis regards the tourist behaviour in a summer rainy day in Grado, Friuli Venezia Giulia seaside resort.

Results

The results of both case studies have been very interesting and much appreciated by those who are in charge of the advertising and management of destinations and the ones that plan and organize events. For Friuli DOC the data comparison showed that Friulan people in town was +50% at 6pm and +200% at midnight, Italians from other regions +200% at 6pm and +500% at midnight. Absolute numbers

are growing for Italians from 6PM to midnight, while foreigner numbers are decreasing in the same interval because Slovenian and Austrian are going back home.

During the afternoon foreigners are visiting the Collio area where very good and famous wine cellars are located while Italians prefer wandering downtown.

As regards Grado case study the evidences are that during the rainy day the tourist population reduces 50% and while Italians are going to IKEA mall (Villesse) and to visit ARA PACIS (Medea) foreigners are going to IKEA, but also to Udine and Aiello, famous for hundreds of sundials.

Completely different behaviour for the seaside resort of Lignano, not far away from Grado.

It's a bigger city with shopping streets and nice pubs and covered area and gives more opportunities during the rainy days. For this reason, the percentage of tourists going out is less than 20%.

Conclusions

All this information on behaviour will help in better understanding how to organize services, advertise locations, suggest activities, make changes and updates in the tourist guides,

The decision makers demonstrate great interest because they realized that using common sense and approximate data often leads to a misunderstanding of the situations.

The work is moving on now to improve the procedures for storing cell phone presence data in a geodatabase, overlaying other geocoded data, retrieve and analyse data through GIS and statistic tool. Once this phase is completed, it will be very easy to apply the model to different case studies with a user friendly interface and there will be no need for the presence of expert users.

Research implications and limitations

The research rises many opportunities for the future, both in terms of theory development and concept validation. In order to proceed with the work, it is fundamental to have an updated real time presence data supply. For this reason, we are now working with the Friuli Venezia Giulia Regional government in order to start a collaboration and use the data they are receiving from the mobile providers.

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