Crowdmap applied to Geoturism: Case Study of Chapada Diamantina BA - Brazil

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Key-words: Smart Tourism; Geoturism; Crowdmap; Chapada Diamantina; Waterfall.

Introduction

With the development and internet access large-scale, to use means to have access to information has become everyday practice, especially through mobile computing , either through smartphones or tablets, enabling real-time user interaction with the surroundings. Social media has become easily accessible and popular for citizens who feel encouraged to experiment and interact with digital media. Further more, Geographic Information Systems (GIS) allow these interactions were geotagged enabling collecting information on the user location, preferences among other things, to allow preparation and analysis of complex data by providing knowledge of the environments. The user to assist in the decision making (Borges et al, 2015;. Borges et al., 2015.).

The term Smart has been used to qualify potential markets seeking to employ the use of technology to optimize and integrate systems across networks, and through health infrastructure, entertainment, communication, security and other systems that facilitate or improve quality of life, seeking to operate an intelligent way of life, covering many city dwellers as well as the tourists who come to visit and explore. To that end the Smart Tourism, seeks to ensure the user's interaction with the sites visited by supporting potential new user who could explore the site through technology and the promotion of the territory.

On the other hand the term Geotourism emerged to promote understanding and provide ease of services for tourists to acquire knowledge of geology and geomorphology of a certain place, becoming no longer mere spectators of an aesthetic beauty (Hose , 1995). So the idea is to aggregate scientific knowledge to the natural heritage in an understandable way, valuing it and generating sustainable tourism, rather than denigrate it. In short, the term geotourism can be defined as a form of sustainable tourism with a focus on nature's design (modified Dowling & Newsome, 2006).

The platform Crowdmap© is a product of Crowdsourcing, a term coined together by Jeff Howe in 2006 to refer to the acts by which businesses throw open small tasks to the general public (Howe,2008). It was launched in 2010, from this date until today, over 20,000 maps have been deployed, and more than 15,000 of those maps are using the hosted Crowdmap© platform (CrowdGlobe, 2012)

The aim of this article is to demonstrate the potential of using Crowdmap© as a tool associated with the concepts of Smart Tourism, to qualify the natural attractions of a region and to investigate how the user interacts with the local landscape, seeking the development of a sustainable local tourism with the participation users.

This kind of method has started with the firsts digital mobile maps, that has tended to focus just on the navigation task, but recent studies have done an emphasized to the need of support on all kind of categories of map-based tasks. In this point, the Crowdmap© does what it is proposed too, once the tourists can interact with the

platform. It is possible to do a number of interesting observations on the use of maps for tourists during a visit in a determinate area and report it for other, possible, tourists. (Brown and Chalmers, 2003).

A case Study

For this study was chosen as a case study the region of Chapada Diamantina - BA (Figure 1) , in order to apply the concepts of Smart Tourism with the active participation of local user through Crowdmap©.

The Chapada Diamantina is located in the central region in the State of Bahia - Brazil and consists of 58 municipalities. This region is the northern part of the Espinhaço mountain chain, a set of disjointed mountains, stretching from the state of Minas Gerais, towards the north until it reaches the trough of the São Francisco River (Misi & Silva, 1994) . Area with a wide range of vegetation that includes savannas, rocky fields , forests and scrublands with great diversity, with terrain characterized by altitudes of more than 500 m, in a very rugged, high, narrow and elongated hills (Juca et al., 2005.; Conceição & Pirani, 2005; Conceição & Pirani, 2007).

Thus, justifies the choice of this region for the case study, since it is a very visited place of great diversity of potential attractions for visitors, but few tourist references and opinions of the users in the virtual world, which is now a widely used platform for tourism. In addition, there is the importance of the region in the Brazilian tourism scene and its extreme relevance, in which its preservation should be done, without a conflict of interest - sustainable tourism x capitalist tourism - stand out.

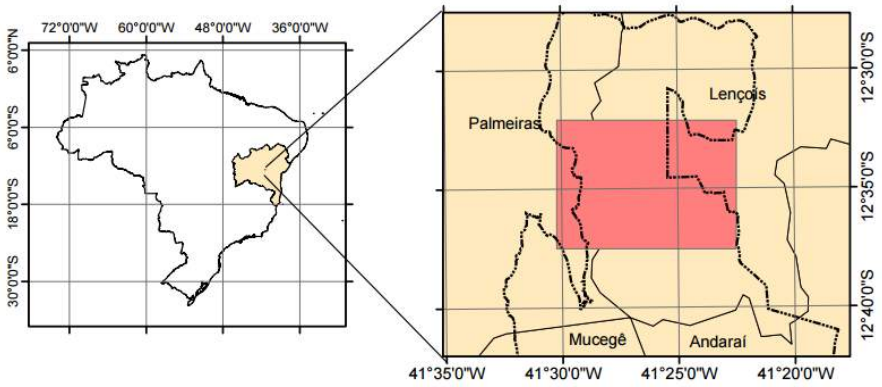


Fig. 1. A case study; localization of the Chapada Diamantina in Brazil and the red rectangle is the main area of study - where are the Waterfalls and the Cavern of Lapão (Modified from Casagrande, et al., 2015).

Methodology

When using the tool Crowdmap©, which is a collaborative platform in which users can interact with the site providing different information about it for other web users. In this way, we seek to ensure the interaction between user and the visited site through an active tourism, in which it was possible for the user to grade the waterfall trails and contribute with information for new users (Borges et al., 2015).

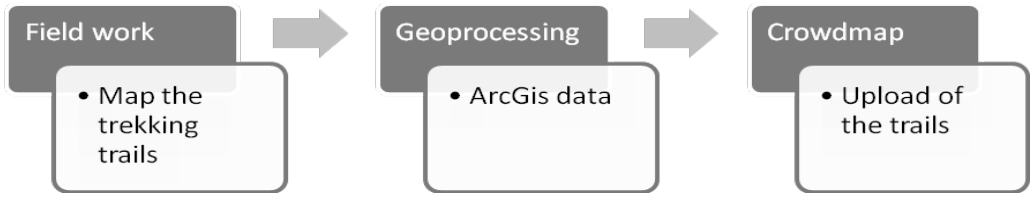


Fig. 2. Methodology.

Thus, the methodology was divided into three steps: (1) field stage for mapping the trails and acquisition of GPS data, (2) then processing the data using the software ArcGIS© and (3) lastly construction of platform in Crowdmap© with the data acquired in the previous steps . The field stage was conducted in January 2015 using GPS GARMIN 62s and aerial photographs of the site, made available by the Brazilian Geological Survey (CPRM) .

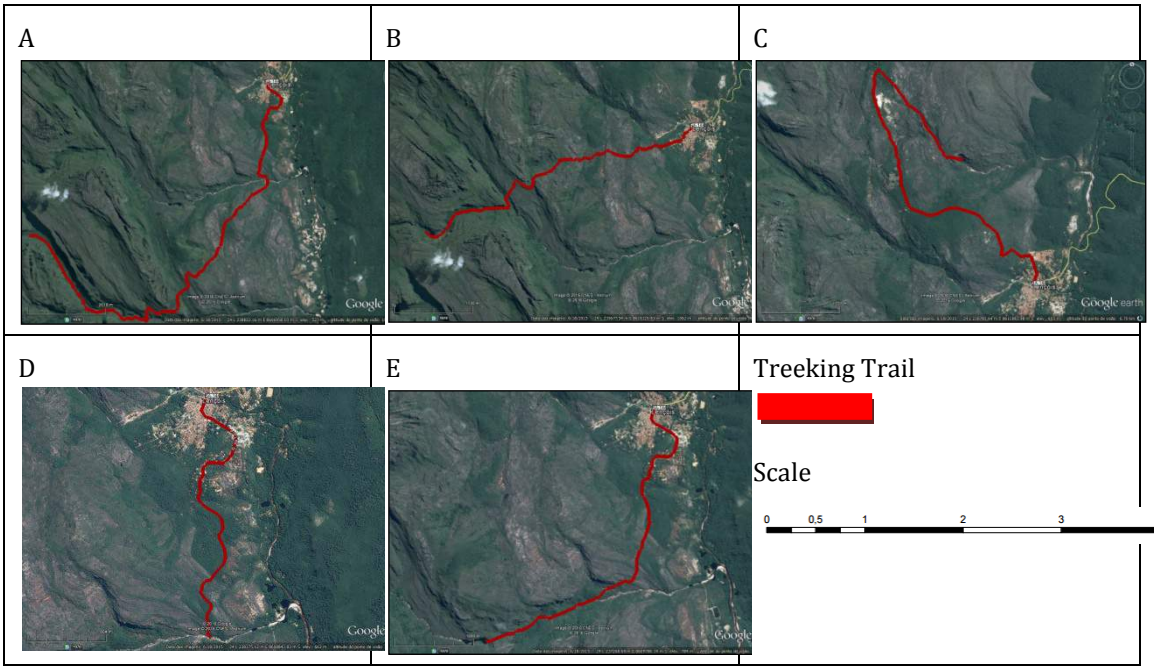


Fig. 3. A) Track to the Fumaça waterfall; B) Track to the Fundão and 21 waterfall; C) Track to Lapão cave; D) Track to the Ribeirão do Meio creek; E) Track to Sossego waterfall.

The trails were recorded on five tracks, in which the trails left from the center of one of the municipalities that make up the Chapada Diamantina, known as Lençóis, so track (A) 15.3 km to the Fumaça waterfall; (B) 8.7 km to the Fundão & 21 waterfalls; (C) 8.5 km to the Lapão Cave; (D) 3.8 km to the Ribeirão do Meio creek; and (E) 6.0 km long to Sossego waterfall.

With the user integration using the platform. It was observed a classification of levels defining the difficulty of the trails and comments in relation to the landscape. It then become possible to begin assigning rates to the trails and what are their true levels, because of the large pool of feedback and classifications available.

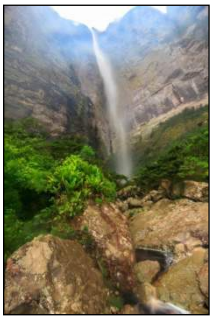
A	B	C
		
Comment: " What a fantastic water-slide" Level: Easy	Comment: "What a beautiful and quiet track" Level: Medium	Comment: "The Best and most wonderful that exist" Level: Hard

Fig. 4. A) Ribeirão do Meio creek; B) Sossego waterfall; C) Fumaça waterfall.

From the data entered in Crowdmap© it has enabled a systematic analysis of the difficulty levels to create the final rating for each trail. The study is in the process of development, the platform is active and receiving feedback from users.

Results and discussion

With the implementation of the methodology, it has been possible to establish the geotagging of the trails leading to the waterfalls Fumaça, Fundão & 21, and Sossego, Ribeirão do Meio Creek and Lapão Cave, which did not have this data , in addition, after Crowdmap© it was possible to enable the user interaction the place visited , qualifying trails and difficulty levels found on site with other web user.

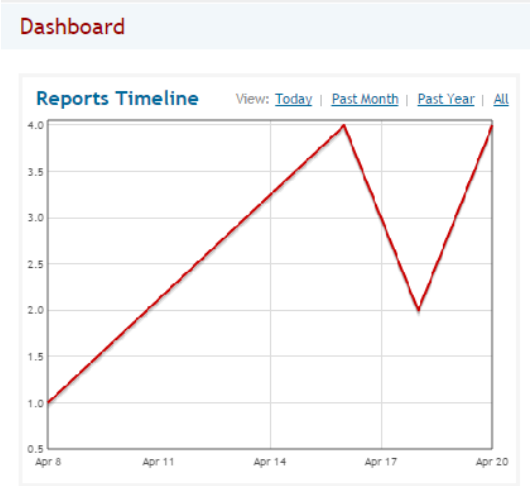


Fig. 5. Report graphic from april 08 until april 20 - https://chapadadiamantina.crowdmap.com/admin/dashboard.

Being an ongoing study, the first data and platform results are under evaluation, to further assess their contribution to the user viewing the information on the platform and confirm or not the information found on the site, but this is a next stage of the research. To date, presented graphs (figure 5) pictures how user participation is important for the evaluation of future users who want to visit the region, which also pointed to improvements in the service found in the region could be revised or proposed.

Conclusions

The user interaction by Crowdmap© through the evaluation of trails and access shows its great potential for the local tourism, may it be for improvement of services , either by creating new demands that may appear with the accentuation of tourism on local. In addition, user participation that visited the site, enables new users to have a real local concept and update of the conditions of the trails and access to be covered, in a collaborative platform, and instruct the user about the potential fitness level requirement to be able to hike the trails.

Thus, the platform, the user can generate a relevant rating for the authorities and tour guides in relation to the functionality of each trail, aiming at sustainable tourism and more knowledge about the obstacles that will meet on the trail.

Acknowledgments

With the support of Master and PhD scholarships - CAPES/DS, with the support of UFMG – Federal University of Minas Gerais. With the support of Lençóis Tourism Office. We thank CPRM (Brazilian Geological Service) for authorizing the use of data (aerophotography) to academic anda research use.

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