P-014

VOLUNTEERED GEOGRAPHIC INFORMATION ACCURACY ASPECTS IN CARTOGRAPHIC UPDATE

COUTINHO E.
Instituto Militar de Engenharia, RIO DE JANEIRO, BRAZIL

BACKGROUND AND OBJECTIVES

Volunteered Geographic Information (VGI) is changing the way we produce and share geographical data. The number of colaborators of VGI is growing at the internet: at OpenStreetMap community the contribution on the creation of nodes have growed by more than 9 times in the last 3 years [OSM, 11]. There the user has no need to register on the site to download maps. Also, geographical data is shared without any costs. Considering these two points, that considering all the wolrd it's possible that exists greater number of VGI data users than of official mapping data.

That is why many efforts related to VGI have been carried out. Such efforts include voluntary mapping initiatives such as the TrackSource [GPSTM, 11] and OpenStreetMap [OSM, 11] projects, which generate amongst other products, urban and road maps in cadastral scales. Several studies were performed regarding its social, cultural and economic aspects. Nowadays some questions regarding the source of the data as well as its credibility has been considered, but not much has been discussed about the correctness of such data, as required by the cartographic engineering point of view. But, as VGI is produced with no standardized procedures, analyze the quality of such data using traditional cartographic methods could not lead to accurate numerical results. Even because, maps that cover different regions could vary its precision in a no uniform way, once they are produced by different members of community.

On the other hand, the official cartographic bases in developing or under-development countries, are usually not present in small scales, or at least they are not updated frequently. The situation of the planimetric data is even more critical, once it is the theme more prone to significant changes through the time.

Despite of its limitations, VGI could be seen as a mean to aid the planimetric data update of the cartographic bases of such countries, even in a temporary and provisory way, since the publisher alerts the user about the resultant accuracy. And considering that some geographic data applications does not require the accuracy of traditional mapping solutions, the use of VGI could be a solution to such countries to solve temporarily the lacking in mapping data, at least until the official mapping bodies could perform a definitive update.

Considering the heterogeneity natural to VGI, we could only estimate the quality of products obtained by this technique, to illustrate the potential accuracy of VGI, aiming temporarily mapping update. To estimate the quality of the data produced using VGI principles, adapting the classification adopt by [Silva, 03] for systemathic mapping, we first could consider that it could be analyzed under four different aspects: its completeness (if all data of a theme is present for a given area), and its positional, thematic, and toponymy correction. We also consider that as many colaborators work in a region, more complete tend to be the map generated, once there are more people getting and correcting data. So, this work aims to illustrate the accuracy of VGI, analyzing its first aspect: its completeness.

APPROACH AND METHODS

To understand the completeness of a VGI generated base, we have compared it with a Ikonos orthoimage. In this work we have analyzed the mapping downloaded of OpenStreetMap over Rio de Janeiro downtown, in Brazil.

The vectorial map was converted to shapefile format and then it was overlayed to the Ikonos orthoimage. The area of analyze was subdivided in blocks (each one 4 times the size the smallers quarter found in this part of the city) and each one was verified to certificate that all features were represented.

In our study we have considered only planimetric data related to urban streets, avenues and roads, because of its use to navigation purposes. The scale of use of such data was considered between 1:2000 and 1:10,000, function of screen size of most of the GPS navigator devices.

RESULTS

We have analyzed portions of the city of Rio de Janeiro, mapped with OpenStreetMap project and, as expected, we encountered a wide variety of results, distributed over the city without a predictable pattern.

In the considered region, the final result was that 94% of the streets of the selected area was represented. Concerning about the geometrical aspects, 89% of them have its lines that remaining between the limits of the street in the orthoimage.

CONCLUSION AND FUTURE PLANS

With this work we have concluded that there is some incorrectness of VGI data, regard to information completeness. The method presented in this work could be used by producers to locate such lacks, when high resolution orthoimages became less expensive. Even so, we consider to be valid the use of VGI to improve the availability of geographic information in regions where no, or little, official data is available (as extracted via traditional methods). In the future, we expect to analyze the VGI data from positional correctness, thematic and toponymy correction, with regard to planimetric data and then to vegetation and hidrography, aiming at completing this study. We also want to analyze the completeness of such maps in another cities around the world and considering the methods used with each group of developers to control data quality.