

# Chapter 6

## Emotional and Subjective Volunteered Geographical Information

**Jiri Panek**

*Palacky University in Olomouc, Czech Republic*

### ABSTRACT

*Crowdsourcing of emotional information can take many forms, from social networks data mining to large-scale surveys. The author presents the case-study of emotional mapping in Ostrava's district Ostrava-Poruba, Czech Republic. Together with the local administration, the author crowdsourced the emotional perceptions of the location from almost 400 citizens, who created 4,051 spatial features. Additional to the spatial data there were 1,244 comments and suggestions for improvements in the district. Furthermore, the author is looking for patterns and hot-spots within the city and if there are any relevant linkages between certain emotions and spatial locations within the city.*

### INTRODUCTION

The mapping of emotions and sentiments was once a neglected practice in cartography, nevertheless with the rise of volunteered geographical information (VGI), citizen science, neocartography and crowdsourcing it is growing in popularity among researchers, representatives of the local administration and community leaders. They all understand that places are strongly linked with emotions (Mody, Willis, & Kerstein, 2009) and can be considered safe or unsafe, pleasant or ugly, popular or boring, among other responses (Korpela, 2002). Subjective perceptions of the city can be a valuable source of information for city planners and local administration, and citizens can become engaged in community building processes. Emotional mapping can therefore be considered as an active form of public participation in local decision making processes.

Participatory mapping and qualitative GIS (sometimes also called GeoParticipation) allow city planners and decision makers to deploy new tools and methods that can collect qualitative and quantitative data about cities, their dynamics and the people who live there (Kloeckl, Senn, Di Lorenzo, & Ratti, 2011).

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Most geospatial applications rely on objective data only, although there can be a discussion concerning the extent to which GIS data are objective, as there is always a level of generalisation, uncertainty and authorial bias (Pickles, 1995). The call for a more humanised and participatory approach to geospatial information and technologies has been heard since the publication of the *Ground Truth* more than twenty years ago (Pickles, 1995), and it currently echoes humanistic alternatives to GIS (Byrne & Pickard, 2016; Knowles, Westerveld, & Strom, 2015).

The author acted as an action researcher and, together with the local administration from the Ostrava-Poruba<sup>1</sup> neighbourhood, collected and analysed VGI subjective emotional data divided into seven categories. The data were collected as both paper and electronic emotional maps and the outcomes can be seen as a version of a Gould-style mental map (Gould, 1986; Gould & White, 1974).

The aim of this chapter is to present the methodology and deployment of the stand-alone web-based application for collecting VGI emotional data. The tool PocitoveMapy.cz is designed as a web-application based on Leaflet library. Similar to other web-based tools for crowdsourced mapping, it allows users to collect spatial data on a slippery map background. Unlike Ushahidi, Umap, ArcGIS Online and many others, PocitoveMapy.cz does not require the registration or installation of any specific software, plug-in or virtual server. The data collected through the crowdsourcing tool are saved in the GeoJSON format, which can be later exported to shapefile.

The tool used in the case-study allows for the duplication of the research methodology in other regions, as well as its implementation in various topics such as safety mapping (Pánek, Pászto, & Marek, 2017), the analyses of citizens' preferences for bicycle routes and neighbourhood revitalisation plans (Pánek & Pászto, 2017).

## **Emotions on Maps**

In the past ten years several projects have dealt with georeferenced emotions and the methods used to gather emotional data can be divided into three technological groups: (1) biometric measurements (Bergner, Zeile, & Papastefanou, 2011; Nold, 2009), that use a Galvanic Skin Response (GSR) recorder, which is a simple indicator of emotional arousal, in conjunction with a user's geographical location. The outcome (map) visualises points of high and low emotional arousal, but gives no explanation as to what happened at each location. (2) extraction from user generated content, often called sentiment analysis, gathers data from services such as Twitter, Flickr, Facebook, etc. (Biever, 2010; Bollen, Mao, & Zeng, 2011; Mislove, Lehmann, Ahn, Onnela, & Rosenquist, 2010; Quercia, O'Hare, & Cramer, 2014; Quercia, Schifanella, & Aiello, 2014) and uses language processing and text analysis to identify and extract subjective/emotional information from source materials. This form of research often uses a lexicon-based approach (Taboada, Brooke, Tofiloski, Voll, & Stede, 2011) to assign values to words extracted from the source and to assess their emotional background. (3) surveys (Huang, Gartner, Klettner, & Schmidt, 2014; MacKerron & Mourato, 2010; Mody et al., 2009). The author's approach can be considered to be a survey.

Griffin and Mcquoid (2012) distinguish three categories when talking about maps and emotions. These categories are (1) maps of emotions, (2) using maps to collect emotional data, and (3) emotions while using maps. The case study described in this chapter is a combination of the first two categories. Maps were used to collect the emotional information, and also to visualise the emotional data. Emotions are one of the defining characteristics of every human being and yet their presence on maps and spatial

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