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Community Geography: Addressing Barriers in Public Participation GIS

P. 5-13

Jonnell A. Robinson, Daniel Block & Amanda Rees

Abstract

Early advocates of Public Participation Geographic Information Systems (PPGIS) envisioned a future in which members of the public (broadly) and members of marginalized communities (specifically) would utilize geographic information and spatial technologies to affect positive change within their communities. Yet in spite of the emergence and success of PPGIS, open source geospatial tools, and the geoweb, access barriers recognized by proponents of PPGIS in the mid-1990s persist. As a result, PPGIS facilitators continue to be instrumental in addressing access barriers to geospatial technologies among resource poor organizations and marginalized groups. 'Community geography', is a growing area of academic geography that leverages university community partnerships to facilitate access to spatial technology, data, and analysis. Experiences from community geography programmes at three universities (Chicago State University, Syracuse University, and Columbus State University) demonstrate the benefits and challenges of a facilitated model of PPGIS.

Cartographica incognita: 'Dijital Jedis', Satellite Salvation and the Mysteries of the 'Missing Maps'

P. 14-23

Catherine Turk

Abstract

Like Participatory Geographic Information Systems (PGIS) and Public Participation Geographic Information Systems (PPGIS) crowdsourced collaborative mapping is often imagined as an alternative to conventional cartographic practice. This paper examines collaborative mapping projects designed to assist in humanitarian work and respond to catastrophes. These projects, their technological complexity and wide range of collaborators, including affected locals, international Non-Government Organisations (NGOs) and anonymous online contributors, invite closer consideration. In this article I unpick the gnarly question of how the remote sourcing of information through cloud collaboration and satellite imagery jostles with grounded work encouraging local control of local geoinformation. My critical analysis of these projects explores: (1) justifications for action – what is being promised through digital mapping as aid or satellite salvation?; (2) forms of participation – the role of 'hotties' 'noddies' and 'digital jedis'; and (3) contingencies of mapping practices and the assemblages of actors within which they are embedded – as the mysteries of the 'missing maps'. The conclusion considers differing approaches towards the inclusion of local knowledges within participatory digital aid mapping and identifies remote mapping practices that are both incognito and incognisant.

Cartographic Design Matters – A Comparison of Thematic Polygon Design

P. 24-35

Andreas Kiik, Marcus Nyström & Lars Harrie

Abstract

The number of web services providing cartographic data is increasing. A main challenge is to enable a user to combine these services, not only from a technical perspective, but also from a cartographic one. One common use case for these services is to create mashups based on thematic polygons on top of background maps. In this study we compare four

cartographic designs of thematic polygons: only boundaries, transparencies, hatches and icons. The aim of the comparison is to investigate whether the designs are good for identifying the extent of the polygons and if the design disturbs the reading of the background map. The comparison is based on an eye-tracking study, where 24 participants performed polygon identification tasks as well as background search tasks. The study revealed that hatches were more efficient than the other designs for polygon identification. Hatches had significantly shorter total fixation times as well as scanpath lengths, possibly since the participants were able to identify the extent of the polygon solely based on the interior (i.e. the hatches), while for the other designs the participants were extensively reliant on the boundaries. However, the results also indicate that the hatches design disturbs the reading of the background map more than the other designs; hatches also appear visually unpleasant for many users. Since each design had its strengths and weaknesses, we recommend producers of services for thematic data to provide several designs so users can select an appropriate design for their own use cases.

Grouping Rules for Effective Legend Design

P. 36-47

Zhe Qin & Zhilin Li

Abstract

The legend is an important map component. Legend design is one aspect of map design, which forms an important topic in cartography. From the literature, it is found that only one study was dedicated to the building of cartographic rules for effective legend design, and no systematic investigations into the building of grouping rules for proper determination of the grouping of legend features (symbols+text descriptions) had been carried out. This study is therefore devoted to the building of grouping rules based on Gestalt laws. An experimental evaluation of these developed rules was designed and conducted. The results indicate that a legend designed by considering these new rules is significantly more efficient than the others violating these rules.

Inferring Spatial Scale Change in an Isoleth Map

P. 48-60

J. Lin & R. Cromley

Abstract

This study reunites areal interpolation with the isopleth mapping process to construct an inferred larger scale isopleth map. Intelligent areal interpolation is used to construct two types of population density surfaces that are used as inputs for pycnophylactic interpolation of an isopleth surface. One is a target zone population density surface (TZPDS) and the other is a control zone population density surface (CZPDS). Results suggest that an inferred isopleth map with remote sensing control data is a better surface depiction than an isopleth map without any control data, and the quality of such an isopleth map is further improved by enhancing the remote sensing data with residential parcel information. A CZPDS-derived intelligent isopleth map also has more peaks and variations in population distribution patterns than does a TZPDS-derived one due to the larger scale of the control data.

A Practical Algorithm for the External Annotation of Area Features

P. 61-76

Maxim Rylov & Andreas Reimer

Abstract

One of the subtasks of automated map labelling that has received little attention so far is the labelling of areas. Geographic areas are often represented by concave polygons which pose severe limitations on straightforward solutions due to their great variety of shape, a fact worsened by the lack of measures for quantifying feature-label relationships. We introduce a novel and efficient algorithm for labelling area features externally, i.e. outside their polygonal boundary. Two main contributions are presented in the following. First, it is a highly optimized algorithm of generating candidate placements utilizing algorithms from the field of computational geometry. Second, we describe a measure for scoring label positions. Both solutions based on a series of well-established cartographic precepts about name positioning in the case of semantic enclaves such as islands or lakes. The results of our experiments show that our algorithm can efficiently place labels with a quality that is close to the quality of traditional cartographic products made by human

Requirements Elicitation for Geo-information Solutions

P. 77-90

Claudia Robbi Sluter, Corné P. J. M. van Elzakker & Ivana Ivánová

Abstract

Geo-information solutions can achieve a higher level of quality if they are developed in accordance with a user-centred design that requires definition of the user requirements in the first step of solution construction. We treat a geo-information solution as a system designed to support human-based activities in a specific context through which solutions to contextual problems can be achieved via geographic knowledge. Geographic knowledge is a result of geo-data exploration, analysis, interpretation and dissemination with a given geo-information system. Taking the characteristics of geo-information systems into account, existing methods and techniques of requirements engineering may be applied for the design and implementation of geo-information solutions. Based on these considerations, here we present a generic framework that can aid geo-information experts, geo-informaticians and cartographers in the design and construction of more efficient, effective and satisfactory solutions.

Cartographic Design and Usability of Visual Variables for Linear Features

P. 91-102

Petr Kubiček, Čeněk Šašinka, Zdeněk Stachoň, Zbyněk Štěřba, Jiří Apeltauer & Tomáš Urbánek

Abstract

This article addresses the measurement and assessment of response times and error rates in map-reading tasks relative to various modes of linear feature visualization. In a between-subject design study, participants completed a set of map-reading tasks generated by approaches to a traffic problem. These entailed quick and correct decoding of graphically represented quantitative and qualitative spatial information. The tasks first involved the decoding of one graphic variable, then of two variables simultaneously. While alternative representations of qualitative information included colour hue and symbol shape, the quantitative information was communicated either through symbol size or colour value. In bivariate tasks, quantitative and qualitative graphical elements were combined in a single display. Individual differences were also examined. The concept of cognitive style partially explains the variability in people's perception and thinking, describing individual preferences in object representation and problem-solving strategies. The data obtained in the experiment suggest that alternative forms of visualization may have different impacts on performance in map-reading tasks: colour hue and size proved more efficient in communicating information than shape and colour value. Apart from this, it was shown that individual facets of cognitive style may affect task performance, depending on the type of visualization employed.
