Census-Driven Maps
EXPLORING GEOSPATIAL CENSUS DATA WITH AN INTERACTIVE WEB-MAPPING TOOL

Michael Markieta · Bachelor of Arts Candidate · Geographic Analysis · Ryerson University · michael.markieta@ryerson.ca

Objectives

Web-mapping has become an increasingly popular method for analyzing and visualizing geospatial data and spatial phenomenon. With the advent of web 2.0, popular Internet browsers such as Mozilla Firefox and Google Chrome started supporting AJAX or Asynchronous JavaScript and XML. This enabled web-mapping technologies to grow rapidly, as previous generations were limited to static representations of geospatial data in the form of images or downloadable content (Murugesa, 2007). Currently, OpenLayers is the most popular web-mapping library due to its development cycle length, large user base and support for legacy applications and services. Relatively new web-mapping libraries, such as Leaflet, offer novel approaches to creating web-map mash-ups on the internet. The Leaflet JavaScript library allows developers to utilize cloud-based geospatial databases, as well as render vector feature layers that are queryable by the user through interactive methods such as click, hover and query (Boulos et al, 2010).

Context & Purpose

The final product of traditional use-case examples of GIS and cartography is the printed map; an image that is explored with the user’s eyes. Maps use visual elements such as choropleth colouring, dot densities and graduated symbology, to display the variability in the underlying data (Fisher et al, 1993). However, printed maps are limited by the amount of data that can be displayed at any one time, which creates a hurdle that the traditional process cannot overcome. Web-mapping technologies combine the user’s intuitive modern instincts and geographic senses for map panning, zooming, feature identification and exploration through standard GIS protocols in an internet browser. The ability to incorporate GIS exploratory tools in simple web-mapping applications creates a new and improved medium for the traditional map.

Web-Mapping Canvas - HTML5 & CSS3

The tool is accessible online, where it is hosted on a standard HTML5 page. It utilizes CSS3 for page styling and jQuery for user interactivity. This web-map mash-up enables geospatial exploratory to users without a background in GIS. The Leaflet JavaScript library produces a map, which the user interacts with, and the jQuery JavaScript library provides the interactive legend and navigation.

Cloud-Based Open Source Development

Industry, organizations and individuals that consume GIS software, hardware or infrastructure, will benefit from cloud-based computing and storage. Cloud geospatial data and spatial phenomenon. With the advent of web 2.0, popular Internet browsers such as Mozilla Firefox and Google Chrome started supporting AJAX or Asynchronous JavaScript and XML. This enabled web-mapping technologies to grow rapidly, as previous generations were limited to static representations of geospatial data in the form of images or downloadable content (Murugesa, 2007). Currently, OpenLayers is the most popular web-mapping library due to its development cycle length, large user base and support for legacy applications and services. Relatively new web-mapping libraries, such as Leaflet, offer novel approaches to creating web-map mash-ups on the internet. The Leaflet JavaScript library allows developers to utilize cloud-based geospatial databases, as well as render vector feature layers that are queryable by the user through interactive methods such as click, hover and query (Boulos et al, 2010).

Identify Information

Map representation provides a graphical channel to users trying to understand geographic data. The underlying data is important to users and providing an ability to query it remains an indispensable tool in the geographer’s toolbox. By clicking on a census tract, the tool queries the underlying data from the CartoDB database and displays relevant information (eg. Map below). CT query.

Highlight Ranges

To enhance the exploration and visualization of population density ranges, the user can hover their mouse over a range bucket and highlight those census tracts on the map. Not only is this concept user-friendly, it also provides a quick feedback loop to users who want to identify the spatial distribution of certain population density ranges (eg. Map below). Highlight high density areas only.

Navigate by CMA

Although zooming and panning are familiar concepts to most map-users, the spatial extent and disparity in census tract coverage in Canada creates cumbersome map exploration. Census-Driven Maps includes a navigation panel that enables users to fly to any census metropolitan area in Canada through a single click of the mouse.

Cloud-Based Open Source Development

- Poster presented to Ryerson University in partial fulfillment of the requirements for Professional Geographer (GEO871).

Cloud-Based Open Source Development

- Objectives: This research project utilizes the Leaflet, JavaScript library to produce an interactive web-mapping tool, which aims to visualize the recently released Statistics Canada 2011 Census of the Population. The data is hosted in an open-source cloud-based geospatial database, CartoDB, which serves our data storage and retrieval needs. CartoDB is based on the PostgreSQL database and spatial extension PostGIS, which utilizes SQL and a variety of other tools. The jQuery JavaScript library provides the interactivity between the user and map-environments. This project also explores both client-side user functionality and server architecture. A framework for the tools, libraries, and interactivity between all elements is sketched below. We name our tool “Census-Driven Maps”, to play on the terminology “Data-Driven Documents”, which is often used in infographics and data visualizations.

Web-Mapping Canvas - HTML5 & CSS3

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- Frame Work: Census-Driven Maps utilizes server and client technology to produce a web-mapping tool. The census data is hosted in a CartoDB database and are served to the map as vector map layers. The base layers are hosted in the cloud and are served to the map as web map services (WMS). The Leaflet JavaScript library produces a map, which the user interacts with, and the jQuery JavaScript library provides the interactive legend and navigation.

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MORE INFORMATION

- Live Tool: http://www.spatialanalysis.ca/projects/census-app.html
- Sources: Statistics Canada; 2012 Census of the Population Leaflet/Cloudmade; GeoIQ; Stamen; OpenStreetMap; GeoJason; CartoDB.

REFERENCES