Thanks for submitting your entry for the GIS Solutions Challenge, we've got it safe and sound.

Good luck!

Submission

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Robin Rowe's team

Title

GeoTrue, Open Source Map Routing

Short description

Given a map and input parameters, calculate the geodesic and network distances between points. Calculate if a point is within a region.

What problem does your solution solve for? Please check all that apply:

What is the geodesic distance between two features?
What is the network distance between two features?
Is a point inside or outside a polygon?

A primary goal of the GIS Solutions Challenge is to create a tool that is useful to a non-data scientist in decision making (i.e., produces a business insight). Who would use your tool and what would it tell them? What problem does your solution solve for the decision-maker?

Given a map and present location, GeoTrue calculates the geodesic and route distance and provides written directions to follow the suggested route. It's a generic solution suitable for all types of mapping solutions. It is also a map-making system with a GUI that enables users to create maps. A user may import a JPEG image taken with a drone and convert that into a map or may draw a map freehand. The drawing package builds on CinePaint, an existing open source paint program with features similar to Photoshop.

What is the output of your solution? Can this output be interpreted by a non-data scientist?

The output is a numeric answer, a set of waypoints, written routing directions (in English or other languages), or map images, as appropriate. Easy for a non-scientist to understand.

What input files are required? Are any additional formats accepted as an input?

Standard GIS and image file formats accepted.

Please describe a sample workflow for your solution (i.e. steps to achieve an output):

Input from a tablet or at the command line with a text file that specifies the map file and the relevant points and type of calculation desired. Program reads the instructions and outputs the desired result as text or in JSON format or as PNG or JPEG images. Use as a library call from a web server or any computer application. Integrates with existing tools.

Please upload a diagram of your sample workflow

GeoTrueWorkflow.png

Preview Download

Please describe what language/s your solution involves

Standard C++ with a C api that is compatible with all languages. Standard SQL or NoSQL databases to hold map data. JSON HTTP API compatible with all languages. In particular, for use with cloud apps and web node.js servers.

Please list any existing packages your solution involves

Using libunistd (on github), an open source POSIX library we created that is used to make C++ source code compatible across Windows, MacOS and Linux. CinePaint open source high fidelity painting software.

What existing open source tools/programs would be able to use your solution?

Suitable for use with all open source tools/programs. Integration with open source painting tool CinePaint, an open source project we lead. CinePaint is used for high fidelity image manipulation in the film industry. It was used in the making the Harry Potter films and the Lord of the Rings films. It will make an excellent starting point for viewing and editing maps.

How did you arrive at your solution? What research, or existing tools did you use? How feasible do you think your solution is to implement based on modern open source GIS capabilities?

Extensive GIS experience, have worked in GIS for 20 years. Very feasible to build modern open source. Project manager at aerospace company AeroVironment for commercial drone mapping, the most active drone mapping service in the United States, flying missions weekly. Architect of a map viewer for the BBC. Architect of a GIS system to map the locations of those served by community services for the Girl Scouts of America. Data and maps was used to quantify and justify government grants and non-profit status for the Girl Scouts. Architect of IoT/cloud API at GoPro.

How will your solution handle large amounts of data?

Yes. Experience building high performance servers and real-time systems. For example, architect of real-time, 120fps, motion-capture animation system Mattel uses to produce their hit cartoon series Barbie Vlogger.

How is your solution different from existing tools? (i.e. This can be in regards to speed, accuracy, scalability, innovate approach, new design, etc.)

Fast. Accurate. Server, GUI and API. Open source. We like vector-based geodesy and can correct for the ellipsoid shape of the Earth. That can be an accuracy improvement of several meters compared to conventional mapping algorithms that don't correct.

What's special about us is our success building open source software and our significant GIS software design experience. We know how to build open source from scratch and how to integrate with existing open source.

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Yes No