

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

Good luck!



Submission

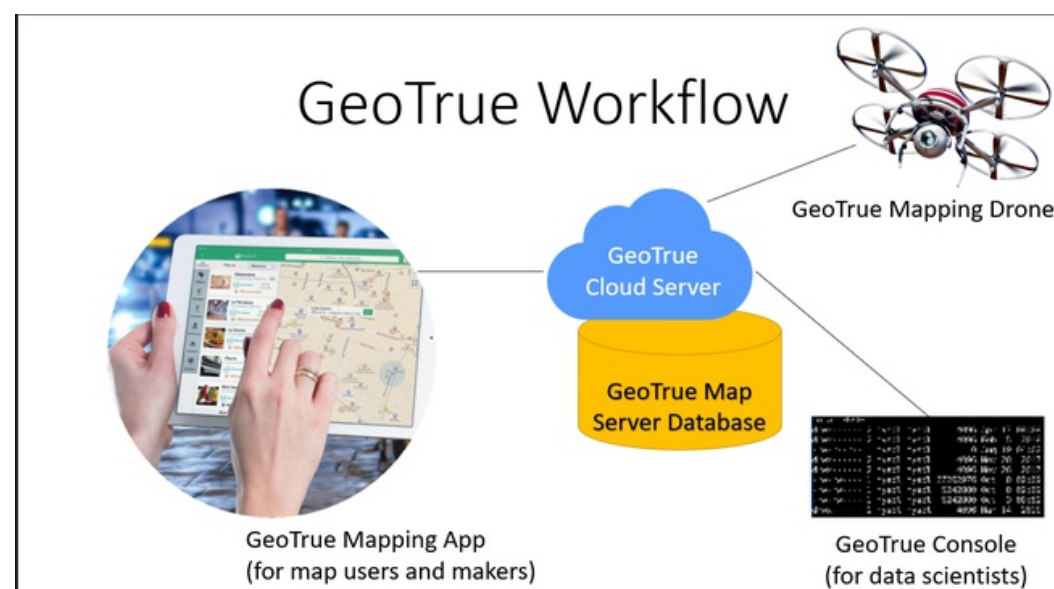
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Robin Rowe's team

Title

GeoTrue on Github



Short description

Open source implementation of the GeoTrue library for performing fast geodesic queries from C, C++, Java, R, Python, SQL, IoT and web apps.

Your Solution

If appropriate, you may copy and paste your answers from your Phase 1 submission form here.

What GIS problem does your solution solve for?

At minimum, your solution must apply to one of these problems. You will receive additional points in the judging criteria "Usefulness" if you address multiple. Check all that apply:

1. What is the geodesic distance?

- 1.1) Between a point and the closest edge of a polygon?
- 1.2) Between a point and another point?
- 1.3) Between the closest edge of a polygon to the closest edge of another polygon?

2. What is the network distance?

- 2.1) Between a point and the closest edge of a polygon?
- 2.2) Between a point and another point?
- 2.3) Between the closest edge of a polygon to the closest edge of another polygon?

3. Is a point inside or outside of a polygon?

- 3.1) Is the point completely within the polygon (not including features on the boundary) -- "completely contain within"?
- 3.2) Is the point within the polygon (including features on the boundary) -- "contain within"?
- 3.3) Is the point only touching the boundary (so neither in or out) -- Clementini?

Was your solution submitted in Phase 1? If so, please detail the name of your submission below, and if you have any changes to your solution for Phase 2.

GeoTrue, Open Source Map Routing and GeoTrue SQL Queries were submitted in Phase 1. Both received awards in Phase 1, thank you! In addition to the library and SQL interfaces described in Phase 1, adding a web API for Phase 2.

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



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 input?

Standard GIS and image file formats. SQL and CSV formats.

Please provide a link to your solution on github: <https://github.com/>

<https://github.com/robinrowe/geotruel>

Solution Language

What key language/s is your solution written in?

C++ library with C interfaces that can be easily accessed from Java, R, Python. C++ is fast, typically ten times faster than other other languages. Just about every software language in use today is built upon C++. Even when using Java or other languages, everyone is actually using C++ underneath.

Using C interfaces maximizes utility across all languages, a much better choice than writing code specific to Java or R or Python. Just about every language provides a mechanism to call a C library interface, offers a wrapper API that can call C. Using C++ offers the fastest performance and maximizes interoperability across languages.

What other, if any, languages are included in your solution?

A SQL extension for native geodesic queries in SQL.

A web API to let apps written in any language connect to a GeoTrue server to execute queries that return data in JSON format.

Design

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

We've chosen a design approach to maximize performance and compatibility across systems.

C++ has a deserved reputation as the technology running the fastest, most reliable and most scalable systems everywhere. For example, for a recent C++ project I wrote the networking that controls U.S. traffic signals, a real-time, safety-critical, embedded system, part of an upgrade to support autonomous vehicles. From high frequency trading systems, to national critical infrastructure, VR, blockchain, aerospace, medical devices, to every other popular programming language, C++ is the trusted underlying technology.

Our innovative approach is to design beyond a core library, to envision including support in SQL databases, web apps, IoT and desktop imagery tools. My experience in IoT includes working at GoPro as the architect of their IoT to cloud API. What's different about GeoTrue is not only the innovation of the parts, but the combination of providing everything one needs in one geodesic support package.

We have a lot of experience building libraries and open source tools. From that experience, I can see our goals are quite ambitious. Any engineering manager would say we need a bigger budget, that it doesn't match the size of our ambitions. All we can do is try using what we have and hope that our results will justify receiving more support.

Great software ships, but is never done because it gets better and better as development continues. We use Agile methodology with CI/CD (Continuous Integration/Continuous Delivery). We're building and testing code during the judging right up to February 19th announcement.

Have you intergrated your solution with KNIME as a node? If so please provide the name of your node, and a link to the repository:

KNIME nodes are Java, which offers an API to call C interfaces. When we add a KNIME node, it will be called GeoTrue.

Please upload a USAGE file documenting information on how to use your solution, and any necessary extra information:

[GeoTrueUsage.txt](#)

Testing

Has your solution been tested with the sample dataset to determine speed, or accuracy metrics? If so, what environment did you test your solution on and how did it perform? It is expected that the performance metrics you report will differ from the official test results due to variation in the testing environment and the test data used by TMA. Your scoring on the quantitative criteria will only be based on TMA's testing and not your self-reported m.

Not yet.

Has your solution been tested with other datasets of similar size and complexity? If so, please list below:

Not yet.

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Was this page helpful?

☐ Yes ☐ No

