

Introduction

Sextant is a web-based and mobile ready application for exploring, interacting, and visualizing time-evolving linked geospatial data. Sextant has been designed with the aim of being flexible, portable, and interoperable with other GIS tools.

The core feature of Sextant is the ability to create thematic maps by combining geospatial and temporal information that exists in a number of heterogeneous data sources ranging from standard SPARQL endpoints, to SPARQL endpoints following the standard GeoSPARQL defined by the Open Geospatial Consortium (OGC), or well-adopted geospatial file formats, like KML, GML and GeoTIFF. In this manner we overcome the main disadvantage of existing semantic web tools that allow the visualization of a single SPARQL endpoint, and provide functionality to domain experts from different fields in creating thematic maps, which emphasize spatial variation of one or a small number of geographic distributions. Moreover we go beyond and present a map ontology that assists on modeling these maps in RDF and allow for easy sharing, editing and search mechanisms over existing maps.

One of our goals was to build a tool that is interoperable with GIS tools. To achieve that we try to support some of the most promising file formats used in the GIS area. Two are the main categories of these file formats according to the way the information is represented in the files. These are the raster and the vector file formats. In Sextant we currently support the visualization of KML, GML, GeoTIFF and WMS layers and provide tools for interaction with these layers, such as the colorization of geometry features according to specific values to create color maps for better understanding of the various aspects of layers. Another important feature is the utilization of the temporal dimension. Implementation of the valid time component of stRDF and stSPARQL in system Strabon allows us to query both the spatial and the temporal dimension. Enriching our results with temporal information allows us to create layers with valid time. Using the SIMILE Timeline widget we can make these layers appear and disappear from the map according to their valid time. This feature allows the creation of thematic maps that change over time and can assist experts in the fields of agriculture, biodiversity, climate, disasters, ecosystems, energy, water and weather, in visualizing temporal maps that help them understand the evolution of data.

Apart from visualizing the spatial and temporal dimension, statistical charts play an important role in understanding the various measures of datasets. Statistical data is a foundation for policy prediction, planning and adjustments and underpins many of the mash-ups and visualizations we see on the web. There is strong interest in being able to publish statistical data in a web-friendly format to enable it to be linked and combined with related information. At the heart of a statistical dataset is a set of observed values organized along a group of dimensions, together with associated metadata. The Data Cube vocabulary enables such information to be represented using the W3C RDF standard and published following the principles of linked data. We demonstrate how to utilize the Data Cube vocabulary to enhance existing datasets and allow the creation of charts through Sextant in an intuitive way that does not involve the use of SPARQL from the user point of view.

Sextant Homepage

The homepage of Sextant may be accessed at <http://sextant.di.uoa.gr>. There you can find links to download the application in desktop or mobile version and access demo maps that illustrate the capabilities of the application.

How to build and run Sextant from command line

Assuming you have already installed Maven (<http://maven.apache.org/download.html>), downloaded Sextant and you are in the top-level directory of the source code, issue the following commands to build it from command line:

```
$ cd JerseyServer
$ mvn clean package
```

After you have successfully built Sextant, you can find the .war file in the target folder under JerseyServer, to deploy in Tomcat(6+) server.

Getting Started

Using Sextant is now easier than ever using the in-built manual pages. Click the help button at any screen to view a help page for this feature and navigate in the manual pages to find detailed information for all features.

Developer Guide

Assuming that you are familiar with Maven, the following steps need to be followed in order to use Sextant in Eclipse:

1. Install Maven from <http://maven.apache.org/download.html>.
2. Install Eclipse from <http://www.eclipse.org/downloads/>.
3. Install the m2e plugin for Eclipse from <http://www.eclipse.org/m2e/>.
4. Install the MercurialEclipse plugin for Eclipse from <http://javaforge.com/project/HGE> .
5. From Eclipse, go to File --> Import --> Git --> Projects from Git --> Next --> Clone URI. In the URI textarea paste the following URL: <https://github.com/zefyros/Sextant.git> and then press Next --> Next --> Next --> Finish. Right click on the project and select Configure --> Convert to Maven project. Eclipse will enable Maven dependency management for the project, download any dependencies and build the project.

Publications

You can learn about Sextant by reading the following publications:

- Charalampos Nikolaou, Kallirrois Dogani, Konstantina Bereta, George Garbis, Manos Karpathiotakis, Kostis Kyzirakos, Manolis Koubarakis: "Sextant: Visualizing time-evolving linked geospatial data". Web Semantics: Science, Services and Agents on the World Wide Web, 34(C)
- G. Stamoulis. Master Thesis: Visualizaing and exploring time-evolving linked geospatial data. National

and Kapodistrian University of Athens. Athens, June 2015 [pdf: <http://sextant.di.uoa.gr/data/thesis.pdf>]

- C. Nikolaou, K. Kyzirakos, K. Bereta, K. Dogani, S. Giannakopoulou, P. Smeros, G. Garbis, M. Koubarakis, D. E. Molina, O. C. Dumitru, G. Schwarz, M. Datcu: "Improving knowledge discovery from synthetic aperture radar images using the linked open data cloud and Sextant". In Informal Proceedings of the Image Information Mining Conference: The Sentinels Era (ESA-EUSC-JRC 2014), Bucharest, Romania, 5-7 March, 2014. [pdf: <http://cgi.di.uoa.gr/~charnik/files/pubs/2014/iim2014.pdf>]
- Konstantina Bereta, Charalampos Nikolaou, Manos Karpathiotakis, Kostis Kyzirakos, and Manolis Koubarakis: "SexTant: Visualizing Time-Evolving Linked Geospatial Data." In the 12th International Semantic Web Conference (ISWC 2013), Sydney, Australia, October 21-25, 2013. [pdf: <http://www.strabon.di.uoa.gr/files/sexTant.pdf>]
- Charalampos Nikolaou, Kallirroï Dogani, Kostis Kyzirakos, and Manolis Koubarakis: "Sextant: Browsing and Mapping the Ocean of Linked Geospatial Data." In the 10th Extended Semantic Web Conference (ESWC 2013), Montpellier, France, May 26-30, 2013. [pdf: <http://www.strabon.di.uoa.gr/files/sextant.pdf>]

Contributors

The system Sextant has been developed by the following members of our team:

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Support

We are always trying to improve Sextant and are looking forward to hearing from you comments and suggestions that will help us improve the available features and add new ones, to assist you in visualizing and exploring linked geospatial data using the advantages of semantic web technologies.

Contact info:

- gstam@di.uoa.gr
- Strabon-users, is used as a communication channel for Strabon users. To subscribe to the mailing-list, please visit page <http://cgi.di.uoa.gr/~mailman/listinfo/strabon-users>. To post e-mails to Strabon-users mailing-list, write to strabon-users@di.uoa.gr.

Bugs

Please report bugs to:

- gstam@di.uoa.gr
- Strabon-users, is used as a communication channel for Strabon users. To subscribe to the mailing-list, please visit page <http://cgi.di.uoa.gr/~mailman/listinfo/strabon-users>. To post e-mails to Strabon-users mailing-list, write to strabon-users@di.uoa.gr.

Known Issues

There are no issues that we are aware of.

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<http://sextant.di.uoa.gr>

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- In the beginning of Java source code files paste the following statement: `/**`
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