

GEOMATICS WORKBOOKS 12



Free and Open Source Software for Geospatial

Open Innovation for Europe

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Index

Free and Open Source Software for Geospatial Arnulf Christl	1
Academic track	
LIMEWISE: A deterministic line-based interpolation methodology for a realistic multimodal accessibility representation Patrick Palmier	7
Dorning and Ross K. Meentemeyer. The integration of land change modeling framework FUTURES into GRASS GIS 7 Anna Petrasova, Vaclav Petras, Douglas A. Shoemaker, Monica A	21
Evaluation of wind, solar and hydro energy potential using GRASS Giulia Garegnani, Pietro Zambelli, Gianluca Grilli and Daniele Vettorato	25
A new open source DSS for assessment and planning of renewable energy: r.green Giulia Garegnani, Francesco Geri, Pietro Zambelli, Gianluca Grilli, Sandro Sacchelli, Alessandro Paletto, Giorgio Curetti, Marco Ciolli and Daniele Vettorato	39
The economic value of nature Leon van der Meulen, Bob Droge and Govert Schoof	51
Open Web Services: new tools for Medievalist Historians to manage and share their research work Daniela Carrion, Federica Migliaccio, Guido Minini and Cynthia Zambrano	55
Teaching R as a GIS: problems, solutions and lessons learned Robin Lovelace and Rachel Oldroyd	67
GIS-based multivariate statistical analysis for landslide susceptibility zoning: a first validation on different areas of Liguria region (Italy) Roberto Marzocchi, Agnese Rovegno, Bianca Federici, Rossella Bovolenta and Riccardo Berardi	73
Effective tools for supporting energetic policies: 3d urban models generation and analysis models supporting energetic policies Filiberto Chiabrando, Chiara Danna, Andrea Lingua, Francesca Noardo and Anna Osello	85

Promoting slow tourism through FOSS4G Web Mapping: an Italian-Swiss case study	99
Milan Antonovic, Maria Antonia Brovelli, Massimiliano Cannata, Mirko Cardoso, Candan Eylül Kilsedar, Marco Minghini and Giorgio Zamboni	
Reproducible computing with Tzar and Docker	105
Lucy Bastin, Javier Martinez-Lopez, Ascelin Gordon, Bill Langford and River Satya	
GIS of Traditional Folk Culture	113
Jiri Kozel, Pavel Bohumel, Petr Kovacs and Andrea Kynova	
Towards a decision support system for environmental emergencies management in poor settlements in the Kathmandu Valley (Nepal).	121
Marta Giambelli, Alfonso Vitti and Marco Bezzi	
Alpinescapes: making the Alpine fringes visible trough OpenData and Crowdsourced Cartography	133
Michele Ferretti, Daniele Villa and Paolo Tagliolato	
Operation-based revision control for geospatial data sets	139
Máté Cserép and Roberto Giachetta	
Land cover validation game	153
Maria Antonia Brovelli, Irene Celino, Monia Elisa Molinari and Vijaycharan Venkatachalam	
FOSS4G-based energy management system for planning virtual power plants at the municipal scale	159
Luis Ramirez Camargo, Roland Zink and Wolfgang Dörner	
 Library track	
Sharing geodata through university libraries: the case of Politecnico di Milano	165
Ilaria Muratori and Marcella Samakovlija	
Translating urban history, research and sources, into interactive digital libraries	175
Rosa Tamborrino and Fulvio Rinaudo	
Acquisition of audiovisual Scientific Technical Information from OSGeo by TIB Hannover: A work in progress report	185
Peter Loewe, Margret Plank and Paloma Marín-Arraiza	

An open-HGIS project for the city of Parma: database structure and map registration	189
Nazarena Bruno, Giorgia Bianchi, Andrea Zerbi and Riccardo Roncella	
Open data track	
Meteorological and Aviation Weather Open Data implementation utilising Open Geospatial Consortium (OGC) standards	205
Roope Tervo, Mikko Visa, Tero Koivunen, Jukka A. Pakarinen and Tarja Riihisaari	
Towards a Virtual Hub for a wider Open Data community	213
Mattia Previtali, Luigi Barazzetti, Raffaella Brumana and Branka Cuca	
Development of the open cadastre of protected areas in Ukraine	225
Daria Svidzinska, Oleksij Vasyliuk, Oleg Seliverstov, Daria Shyriaieva, Anton Biatov, Dmytro Diadin, Alevtyna Ponomarova, Oleh Sklyar, Svitlana Vinokurova, Ievgeniia Luchnykova and Alexander Kleshnin	
How is Prague opening geospatial data	233
Jachym Cepicky	
A FOSS4G-based procedure to compare OpenStreetMap and authoritative road network datasets	235
Maria Antonia Brovelli, Marco Minghini, Monia Elisa Molinari and Peter Mooney	
Fentrol.hu - The digital aerial photo archive	239
Péter Braunmüller, Krisztián Takács and Csaba Sandor	
Improving environmental monitoring against the risk from uncontrolled abandonment of waste containing asbestos. The DroMEP project.	243
Carmine Massarelli, Maria Rita Muolo, Vito Felice Uricchio, Nicola Dongiovanni and Ruggero Palumbo	
Towards Open Big Geospatial Data for geodata.gov.gr	247
Angelos Tzotsos, Michail Alexakis, Spiros Athanasiou and Yiannis Kouvaras	
Finding spatial open data via web: a SWOT analysis	259
Marco Piragnolo, Francesca Fissore, Alberto Guarnieri, Antonio Vettore and Francesco Pirotti	
A Data Scientist Exploration in the World of Heterogeneous Open Geospatial Data	267
Gloria Re Calegari and Irene Celino	

Open Data integration in context of Smart-Communities: a company's perspective	281
Consuelo Marini, Roberto Metelli and Francesco Pirotti	
IMAGO.gIS: an open solution to improve the fruition of public administration data	287
Oscar Campolmi, Gianluca Giori and Michele Beretta	
Roadmap to open geodata in Romania	295
Codrina Maria Ilie and Nadia H. Panchaud	
Open Community Data & Official Public Data in flood risk management: a comparison based on InaSAFE	307
Riccardo Pasi, Cristian Consonni and Maurizio Napolitano	
What is the Value of Open Data	323
Hans Gregers Petersen	
Positioning track	
Privacy in positioning - a review	327
Scott Cadzow	
Applying Archaeological and Forensic Science methods and experience to outdoor and indoor mapping	335
Alexander Cadzow and Scott Cadzow	
Contextual processing for pedestrian tracking in GPS-denied environments	343
Enrico de Marinis, Fabio Andreucci, Fabrizio Pucci and Michele Uliana	
Geotagging Software for media content based on EGNOS/GPS Location Based Service (LBS)	353
Angelos Anagnostopoulos, Anastasios Trypitsidis, Marc Bonazountas, Despina Kallidromitou and Nikolaos K. Papadakis	
Open source web tool for tracking in a low cost mobile mapping system	363
Francesca Fissore, Andrea Masiero, Marco Piragnolo, Alberto Guarnieri, Antonio Vettore and Francesco Pirotti	
Cohesive Routing Service for Indoor and Outdoor Navigation	367
Tao Feng, Joran Jessurun and Theo Arentze	
Network real-time kinematic GNSS positioning with tablets: the new frontier of the open source positioning and mapping	371
Paolo Dabove and Ambrogio Maria Manzino	

Geodetic monitoring experiment by low-cost GNSS receivers and goGPS positioning engine	377
Stefano Caldera, Eugenio Realini and Daisuke Yoshida	
Extending goGPS for Snapshot Positioning	383
Emanuele Ziglioli and Eugenio Realini	
GuideMe: an outdoor/indoor navigation app based on the i-locate open toolkit	395
Daniele Miorandi and Daniele Miorandi	
A Novel, User-Friendly Indoor Mapping Approach for OpenStreetMap	401
Thomas Graichen, Sven Quinger, Ulrich Heinkel and Marek Strassenburg-Kleciak	
Software Defined Receivers in GNSS scientific applications: variometric approach to exploit GNSS-SDR phase observations	405
Mara Branzanti, Javier Arribas, Carles Fernandez and Mattia Crespi	
The MEP project: Map for Easy Paths	417
Ludovico Biagi, Sara Comai, Florin Catalin Grec, Raffaella Mangiarotti, Matteo Matteucci, Marco Negretti, Secil Ugur Yavuz and Maria Grazia Visconti	
The first online portal for authoring of indoor mapping data and indoor graphs as IndoorGML standard	421
Catalin Popa, Lucian Brancovean and Pietro Elisei	
i-locate - Indoor/outdoor LOCation and Asset management Through open gEodata	425
Stefano Piffer, Nicola Dorigatti and Giuseppe Conti	
Indoor location and sensor technology to improve quality of life and independency of elderly people	429
Leonardo Plotegher and Giuseppe Conti	
Local monitoring by low cost devices and free and open sources softwares	431
Ludovico Biagi, Florin Catalin Grec, Maria Grazia Visconti and Marco Negretti	
Water track	
ADO: a prototype of African Drought Observatory for drought monitoring and forecasting	437
Luana Valentini, Paulo Barbosa and Diego Magni	

Cloud computing application for water resources based on open source software and open standards - a prototype	449
Blagoj Delipetrev and Dimitri Solomatine	
Definition of hydrogeological tectonic blocks into Guarani/Serra Geral Integrated Aquifer System using QGIS	455
Leônidas Luiz Volcato Descovi Filho, Arthur Schmidt Nanni and Luiz Fernando Scheibe	
SITGAP2, a decision support system for floods management based on open source and open standards	459
Massimiliano Cannata and Milan Antonovic	
Information richness and reach in hydrological web applications	463
Arjen Vrieling	
Disaster Risk Management: Urban Flooding and heatstress	467
Leon van der Meulen, Mark Verlaat, Floris Boogaard, Govert Schoof and Jeroek Kluck	
A FOSS approach to Integrated Water Resource Management: the case study of Red-Thai Binh rivers system	471
Carolina Arias Muñoz, Maria Antonia Brovelli, Simone Corti, Marco Micotti, Enrico Weber and Rodolfo Soncini Sessa	
GRASS GIS processing to detect thermal anomalies with TABI sensor	477
Carmine Massarelli, Raffaella Matarrese, Vito Felice Uricchio and Michele Vurro	
FloodRisk: a QGIS plugin for flood consequences estimation	483
Leonardo Mancusi, Raffaele Albano and Aurelia Sole	
Looking through the changes: an analysis of the buried watercourses of Como	497
Maria Antonia Brovelli, Candan Eylül Kilsedar, Marco Minghini and Daniele Oxoli	
The r.inund.fluv tool for flood-prone areas evaluation in GRASS GIS: application to the terminal reach of Magra River	501
Ilaria Ferrando, Bianca Federici, Domenico Sguerso and Roberto Marzocchi	
RUSLE model application with GRASS GIS: Rio Centonara catchment	509
Elena Mezzini, Livia Vittori Antisari, Francesca Ventura and Federico Magnani	

General track

MapboxGL + Protobuf + d3.js = liquid fast massively scalable interactive web map & data visualization!	523
Ben Wyss	
Microservices and Geo - yeah it's that good	525
Steven Pousty	
BruGIS, a webGIS for Brussels Urban Planning. Past, present and future	527
Grégoire Vandenschrick and Laurence Micha	
QGIS Server Python Plugins	529
Alessandro Pasotti	
GIS.lab - news from development of technology for rapid deployment of complete geospatial infrastructure with supercow features	531
Ivan Minčík	
Let's get parallel	533
Graeme Bell	
What happens when you put 1 billion points into Postgis Topology ?	535
Lars Aksel Opsahl	
Ice: lightweight, efficient rendering for remote sensing images	537
Julien Michel and Gabriele Facciolo	
Web services at the State Office for Spatial Information and Land Development, Baden-Württemberg, Germany	539
Alexander Schmidt and Andreas Schmidt	
S2P: a new open-source stereo pipeline for satellite images	541
Julien Michel, Carlo De Franchis, Enric Meinhardt-Llopis and Gabriele Facciolo	
Spatial tools for LiDAR based watershed management and forestry analysis	543
Silvia Franceschi, Andrea Antonello, Giustino Tonon and Francesco Comiti	
Use of indexes on geospatial database with the PostgreSQL DBMS	545
Giuseppe Broccolo	
GDAL 2.0 overview	547
Even Rouault	

Classifier to map the burned areas in the Canary Islands with MODIS data	549
Jose R. Garcia-Lazaro, Jose A. Moreno-Ruiz, Manuel Arbelo, Pedro A. Hernandez-Leal and Alfonso Alonso-Benito	
Earning Your Support Instead of Buying it: A How-to Guide to Open Source Assistance	551
Ian Turton	
Mapping Mangroves and Coastal Wetlands	553
Christopher Dubia, Kent Lewis and Andy Long	
An Overview of OpenSensorHub for Sensor Webs and IoT	555
Mike Botts and Alex Robin	
Using Free and Open Source Solutions in Geospatial Science Education	557
Vaclav Petras, Anna Petrasova, Keren Cepero Perez, Markus Neteler, Luca Delucchi, Martin Landa and Helena Mitasova	
Processing, serving and rendering huge point clouds on Mobile devices and Web pages	559
Manuel de La Calle Alonso and Diego Gómez-Deck	
Shortest Path search in your Database and more with pgRouting	563
Daniel Kastl	
How Open Source and INSPIRE can be used as a tactical weapon for economical growth in Europe	565
Dirk Frigne, Torsten Friebe and Giacomo Martirano	
Sunlumo - open source spatial data management platform	567
Dražen Odobašić	
Implementing INSPIRE with HALE	569
Simon Templer and Thorsten Reitz	
Push it through the wire!	571
Jachym Cepicky	
School on the Cloud - implementing Cloud-based FOSS4G technologies in education to support digital citizenship development	573
Elzbieta Woloszynska-Wisniewska, Panos Papoutsis, Karl Donert, Luc Zwartjes, Kostis Koutsopoulos and Sofie De Cupere	
Flow analysis using sUAS and lidar data	575
Helena Mitasova, Justyna Jeziorska, Anna Petrasova, Vaclav Petras and Thomas Zajkowski	

3D virtual representation of drones' flights through Cesium.js and Oculus Rift	577
Matteo Di Paolantonio, César González, Manuel José Latorre and Félix Pedrera	
GeoGigTools: OpenLayers plugin for versioned geodata	579
Francesco Bartoli	
mapmap.js: A High-Level Client-Side API for Interactive Thematic Maps	581
Florian Ledermann	
Satellite Snow Cover Products Evaluation and Validation Platform Developed Entirely with FLOSS Software	583
Vasile Crăciunescu, Anișoara Irimescu, Gheorghe Stăncălie and Simona Catană	
LiDAR data as a tool for forest fuel classification	585
Alfonso Alonso-Benito, Alejandro Lorenzo-Gil, Manuel Arbelo, Pedro A. Hernandez-Leal, Jose R. Garcia-Lazaro and Jose A. Moreno-Ruiz	
Integrating FOSS4G into an enterprise system for labour management	587
Daniel Urdă and Florin Iosub	
Sensor Widgets: Configurable graphical components for your SOS data	589
Oscar Fonts and Martí Pericay	
How to get your entire university excited about (open) spatial data and tools: The untold story of a tiny geo-technology startup at the University of Groningen	591
Leon van der Meulen and Govert Schoof	
Mapbender3 Geoportal Framework	593
Astrid Emde	
QGIS Graphical Modeler on topographic beach surveys	595
Lucas Terres de Lima, Cristina Bernardes and Paulo Baptista	
Sharing software for INSPIRE implementation, use and reuse	597
Robin S. Smith, Michael Lutz and Leda Bargiotti	
ERSAF's audiovisual heritage of historical land use data for EXPO 2015	599
Marco Cicala, Franco Guzzetti, Marco Stevan and Paolo Viskanic	
Advanced Cartographic Rendering in GeoServer	605
Andrea Aime and Simone Giannecchini	

Managing MetOc and Remote Sensing data with GeoServer Simone Giannecchini and Andrea Aime	607
Managing Web GIS maps using the Geomajas Deskmanager Oliver May	609
Management and publication of geospatial public data using GFOSS: the case study of Vicenza municipality Roberto Marzocchi, Roberta Fagandini, Lorenzo Beggiato, Eugenio Berti, Rosario Ardini, Marcello Missaglia and Tiziano Cosso	611
Publication of wind and wave monitoring and forecasting geospatial data using GFOSS: the "Wind, Ports, and Sea" project Roberta Fagandini, Roberto Marzocchi, Tiziano Cosso, Massimiliano Burlando, Patrizia De Gaetano, Marina Pizzo, Maria Pia Repetto and Giovanni Solari	613
DATE OSSIM PlugIn: a new open source tool for digital automatic terrain extraction Martina Di Rita, Andrea Nascetti and Mattia Crespi	615
The OpenQuake Integrated Risk Modelling Toolkit Paolo Tormene	617
IMPACT: Portable GIS Tool for Image Processing and Land Cover Mapping Dario Simonetti	619
An open source framework for processing daily satellite images (AVHRR) over last 28 years Sajid Pareeth, Luca Delucchi, Markus Metz, Nico Salmaso and Markus Neteler	621
ODK for public transport Laura Carcano, Barbara Li Gregni and Annarita Polacchini	623
Distribution of OSGeo software in the INSPIRE ecosystem Friebe Torsten, Goerke Sebastian	625
deegree webservices - essential open source for INSPIRE Goerke Sebastian, Friebe Torsten	627
Raster Data in Django Daniel Wiesmann and Michael Flaxman	629
istSOS: latest developments and first steps into the OSGeo incubation process Massimiliano Cannata, Milan P. Antonovic, Mirko Cardoso and Priska Pietra	631
Debian and Ubuntu GIS Johan Van de Wauw	633

OpenQuake: an Open Platform for Earthquake Risk Awareness and Assessment	635
Paul Henshaw	
QGIS Support for Map Projection Distortions Visualization	637
Dra?en Tuti?	
Intelligent SDIs with MapMint 2.0	639
Nicolas Bozon, Gérald Fenoy and Venkatesh Raghavan	
From mobile weather sensors to open weather data communities	641
Julien Le Glaunec, Jérôme Freyre, Daniel Rappo and Olivier Ertz	
Managing the Flemish Functional Cycle Network: a FOSS4G solution	643
Karel Dieussaert and Jan Pelckmans	
OL3-Cesium: 3D for OpenLayers maps	647
Guillaume Beraudo	
What is this new Rust language and why should a GIS developer care about it?	649
Alex Morega	
Fire and ice - 3d visualisation of seismic activity during the 2014-2015 Bárðarbunga volcanic eruption	651
Tryggvi Hjörvar	
3D Application for Animal Tracking	653
Joan Sala and Laia Romero	
Landslide risk forecasting based on Unique Conditions Units	655
Marco Cibrario, Andrea Giuseppe Stralla, Valentina Marin, Paola Salmona and Gerardo Brancucci	
MAppERS for crowdsourcing. Citizens and volunteers as human sensors	657
Simone Frigerio	
Collecting and Processing Land Surveyors' Sensor Data	659
Zoltan Siki	
vOL3 - OpenLayers 3 for Vaadin 7	661
Martin Stypinski	
New QGIS functionality for Pros	663
Sandro Mani	
A RESTful API for linking geodata	665
Francesco Bartoli	

Fast Cache, Fresh data. Can we have it all? Thomas Ellett von Brasch	667
Development of Environmental Impact Assessment Tools Using Mobile Devices for Location-Based Services Seungwoo Son and Jeongho Yoon	669
Detection of potential updates of authoritative spatial databases by fusion of Volunteered Geographical Information from different sources Stefan Ivanovic, Ana-Maria Olteanu-Raimond, Sébastien Mustière and Thomas Devogele	671
pycsw project status report Angelos Tzotsos, Tom Kralidis and Jeff McKenna	673
Project-Based Learning Using FOSS4G for a Global Earthquake Forecast System Ron Fortunato and Levi Purdy	675
NASA World Wind Visualization Technology for Spatial Data Patrick Hogan, Tom Gaskins and David Collins	677
ZOO-Project 1.5.0: news about the Open WPS Platform Gérald Fenoy, Nicolas Bozon and Venkatesh Raghavan	679
GeoSmartCity: Open geo-data for innovative services and user applications towards Smart Cities Lluís Vicens, Josep Sitjar, Gemma Boix, Piergiorgio Cipriano and Roderic Molina	681
SHOGun as WPS-Client: Orchestrating Geodata-Services, Users and Geo-Applications Till Adams	683
Geo-SEE Institute activities for using FOSS through the Quantum GIS training courses Bashkim Idrizi and Radife Neziri	685
Assessing social vulnerability to earthquake hazard: from statistical to spatial analysis Ivan Frigerio, Daniele Strigaro, Matteo Mattavelli, Silvia Mugnano and Mattia De Amicis	687
WebGL technology for three-dimensional geological data visualization using three.js JavaScript library Cesare Comina, Andrea Filipello, Giuseppe Mandrone, Luciano Masciocco and Daniele Strigaro	689

Improving public health delivery in northern Nigeria using open source technologies	691
Dami Sonoiki and Kazeem Owolabi	
PyWPS 4 - The new Python implementation of the Web Processing Standard 1.0 and 2.0	693
Luís de Sousa, Calin Ciociu and Ulrich Leopold	
Smart City Platform - An OGC based decision support platform for Smart City Planning to stimulate Open Data in Urban areas	695
Matteo De Stefano, Luís de Sousa, Ulrich Leopold, Christian Braun and Rui Martins	
Real-time projection visualisation with Indicatrix Mapper QGIS Plugin	697
Ervin Wirth and Péter Kun	
MapServer Project Status Report	701
Thomas Bonfort and Stephan Meißl	
OPENGIS.ch Qfield - A native user interface for mobile touch devices	703
Marco Bernasocchi and Matthias Kuhn	
Geographic information for the management of flood risk insurance	705
Franco Guzzetti, Alice Pasquinelli, Paolo Viskanic	
Vector tiles for the Swiss Federal Geoportal	717
Ingensand Jens, Marion Nappetz, Cédric Moullet, Loïc Gasser, Sarah Composto	
A GIS Tool for Reduction Day Precipitation to Subday	725
Martin Landa, Petr Kavka	

Alpinescapes: making the Alpine fringes visible through OpenData and Crowdsourced Cartography

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Abstract

A recent redefinition of the Landscape concept promoted by EU institutions (European Commission, 2000), (JPI Cultural Heritage, 2010) stresses the importance of its social dimension, and of societal efforts in its construction and production (Castiglioni, 2009). Similarly, Societal Challenges permeate the debate around Cultural Heritage (European Commission, 2014). According to these documents such issues can be tackled by a combination of ICT technologies, applied to more transparent and participatory models of territorial governance (European Commission, 2014).

Building upon these premises, the Alpinescapes project poses itself as a novel tentative to link such multiple dimensions, by the means of FOSS4G (Free and Open Source Software for Geospatial), OpenData and Open licensing to collect, provide access and ultimately contribute to, the existing open content on the alpine landscape of Valsassina valley in Northern Italy.

Apart from building an easy-to-use platform for promoting tourism in the area, this experience sets an example in bridging the gap between the Users/Citizens and the Public Administration, in the collective representation of a territory, by the means of FOSS4G tools and OpenData.

Keywords

OpenStreetMap, OpenData, Cultural Heritage, Crowdsourced GIS, OpenGovernment, Web-mapping

1 Introduction

Seminal documents such (European Commission, 2000) and (JPI Cultural Heritage, 2010), posed a crucial milestone in underlining the Social dimension of Landscape, considered at the same time construct and product of contemporary societies, in a circular process in which citizens perceive, (re)construct and ultimately influence with their narratives, the Landscape. Such duality in the role of society becomes pivotal in the preservation and reproduction not only of the physical features of an area, but also of its culture and heritage (Castiglioni, 2009). The tight interconnections among these three

components (Society, Landscape and Heritage) is further stressed by H2020 3rd pillar *Societal Challenges*, which advocates for a combination of new ICT methodologies for harvesting modern fluid forms of data, in conjunction with innovative, open, paradigms of Governance (European Commission, 2014). From this premises follows that, for any action pertaining to territorial transformations, societal involvement in the form of civic participation becomes paramount.

Against this background the *Alpinescapes* project has been established with the aim of valorising and preserving the Landscape and Cultural Heritage of *Valsassina*, an alpine valley within the *Grigne* mountain range in the province of Lecco (Northern Italy). Despite the beauty of its landscape, Valsassina, in particular its innermost municipalities, suffers from a relative uneasiness of access (due to the geo-morphological connotations of its surroundings). This condition partially threatens the diffusion of a tourism based economy, which is on the contrary a flourishing sector in nearby territories, such as the world renowned Lake Como Riviera.

Henceforth, to conjugate EU's directives with the needs of a local community, this case study has chosen Open Geospatial Technologies and Open (geo)Data not only to act as a mere background or simply as a medium for collecting and representing already present information about the landscape, but as its entire foundation. Open community efforts such as OpenStreetMap and Wikipedia are in fact projects that, by virtue of their characteristics, can be considered the most suitable to allow a participatory process in which the end-user become at the same time sensor/producer, as well as consumer, of the information thus gathered (Goodchild, 2007).

2 Materials and Methods

Given the two main aims of the project (allow the exploration of the alpine landscape and contribute to open databases) a crucial part in devising the application has been the choice of its architecture, which had to exhibit an agile and open structure, allowing for a constant insertion and update of data (hopefully also produced by its users).

To reach such goals the project has been built with a lean format: At its core it's a single-page web-app, built on top of the open source project *icì* (Summers, 2014), with the relatively straightforward anatomy of a client-side application. It's built with FOSS geospatial javascript libraries, such as LeafletJS (<http://leafletjs.com>), able to retrieve JSON data via *HTTP GET* requests, and to serve them using the latest *HTML5*-compliant technologies. In this sense, the application becomes almost a "container" for displaying external data. This configuration, without the direct inclusion of any server or back-end applet not only avoids the complexity of maintaining and updating such infrastructure in face live ecosystems, such as the OpenStreetMap Database (OSM), but also accounts for the aforementioned flexibility in connecting multiple data sources.

With such characteristics in mind, the application offers mashups of geo-referenced information from heterogeneous data sources: 1) *Wikipedia* offers geo-tagged crowd sourced articles 2) *OpenStreetMap (OSM)*, from which ad hoc

geographic features are fetched, related to the mountainous environment, i.e. hiking and MTB trails, alpine refuges etc. 3) geo-referenced information about the local area history and heritage from *Comunità Montana della Valsassina*, a territorial public body. A fourth database, which at the moment of the writing is undergoing an evaluation finalized to its release in an open format (the licensing should be compatible with the other above mentioned data sources), is constituted by layers of environmental interest from the Geographic Database of Lecco Province. These data, which will eventually be imported into OSM, will serve to enrich the map with more detailed landscape elements, not already traced.

To access the open data archives the application uses standard *HTTP GET/POST* protocol requests, connecting to the APIs of different query engines, such as Overpass API (<http://overpass-api.de>) in the case of OSM, or MediaWiki (<https://www.mediawiki.org>) for Wikipedia. The requests responses, obtained in plain *(Geo)JSON* are injected in real-time in the web-page, according to the features chosen by the user, and listening for his interaction with the map (panning/zooming, geolocation..). In order to achieve cross-browser and cross-platform compatibility standards, the web-application is written within the framework of Twitter Bootstrap (<http://getbootstrap.com>) and makes use of libraries such as JQuery (<http://jquery.com>) and Modernizr (<http://modernizr.com>). This combination ensures a responsive, mobile-first application, making *de facto* useless the implementation of different viewers to experience the content on multiple screen sizes.

The user interface is further devised according to common UX/UI practices: The app presents itself with a full screen map, which is a version of Mapbox Terrain layer customized with Studio (<https://www.mapbox.com/mapbox-studio>). A simple responsive navigation toolbar is present on top of it. The actual map-controls menu, featuring functions such as the geolocation and a geocoder, a LeafletJS plugin built on OSM Nominatim (<http://wiki.openstreetmap.org/wiki/Nominatim>), is present on the left-hand side of the screen, while a togglable content menu is present on the right-hand side. From this menu the user can display the paths and points of interest, as well as further refine his search, by selecting the features contained within a fixed-radius (500m) dynamic geographic filter, provided by MapboxJS APIs (<http://mapbox.com>). This option conveys an impression of the closest elements without the need to actually perform server-side spatial queries. Lastly, to foster contribution towards the open databases onto which is built, the app offers an "Edit in OSM" button, which directly links to OSM, as well as is able, with a functionality inherited by Summers (2014), to discriminate the eventual lack of references/images within a Wikipedia article, warning the user and asking for his help.

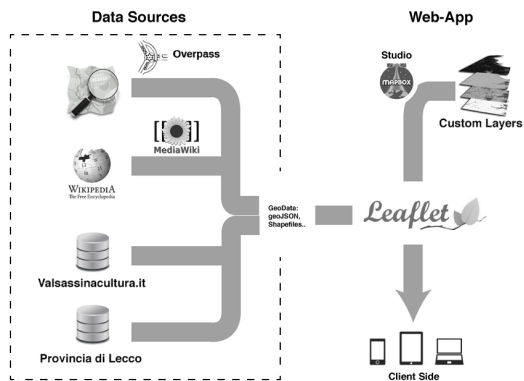


Figure 1 - App Conceptual Architecture

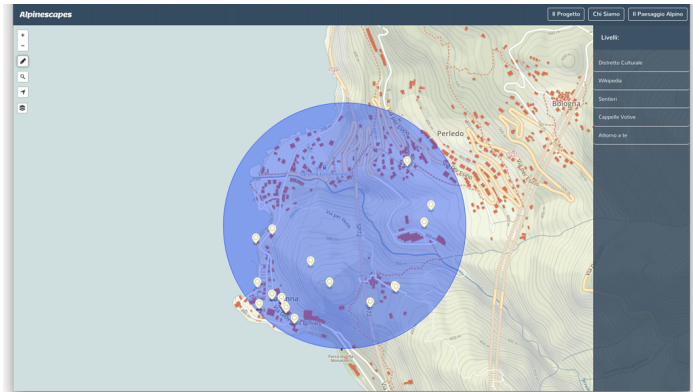


Figure 2 - User Interface (detail: geo-search radius)

3 Partial Conclusions

Alpinescapes thus poses itself in the wider disciplinary tradition of approaches exploiting user-generated content (Ratti, Pulselli, Williams, & Frenchman, 2006) and VGI (Goodchild, 2007) mixed with mobile computing, to render and translate complex ecologies of Information into more easy to access and interactive geo-visualizations. This let the users, to paraphrase Amoroso, Hudson-smith, Phillips, & Speed (2013), "*become instrumental in how the changing landscape is interpreted, rather than being passive viewers of the represented landscape*". Despite the straightforwardness of its architecture, the web-app further presents a rather positive initiative combining different datasets into an agile and open architecture, mainly suited for interacting with open licence databases. This operation is strategic in illustrating to the public sector, with a proven, factual example, the feasibility and the convenience of operating with such kind of data, and in particular with FOSS tools. An operation that should be especially relevant for the public sector in times of increasing expectations yet decreasing resources (European Commission, 2014).

4 Acknowledgements

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