Using Python and PyQgis to make cool maps

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Kartoza

20 YEARS CELEBRATION PYCON US 23

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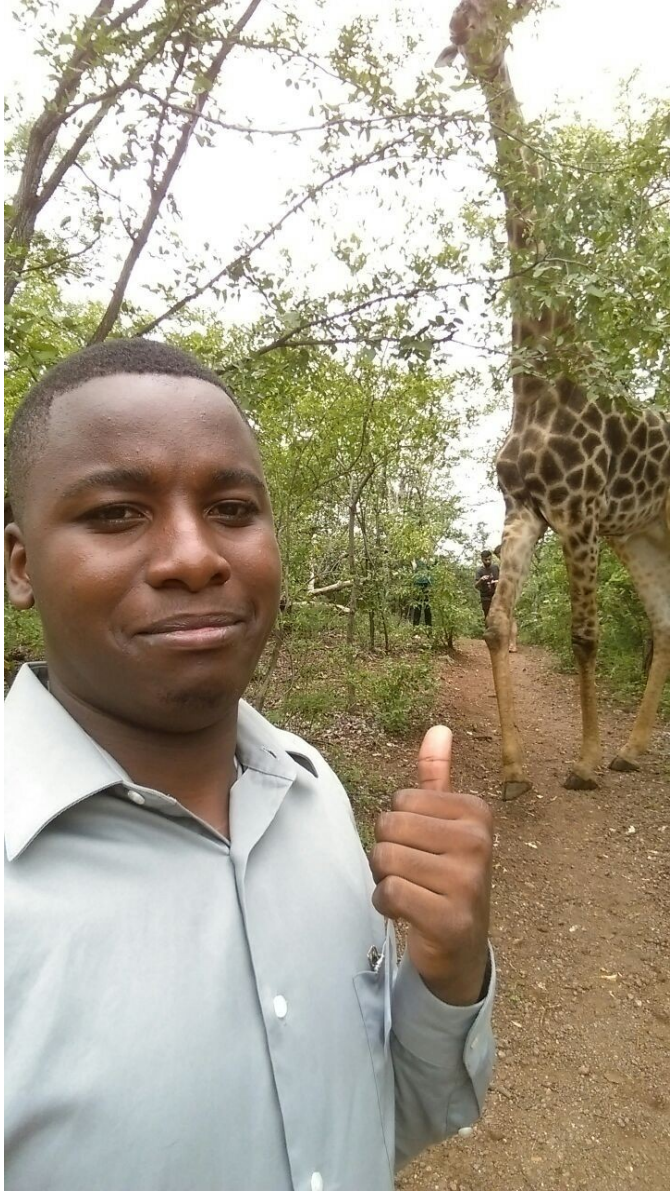
Software Developer, Kartoza

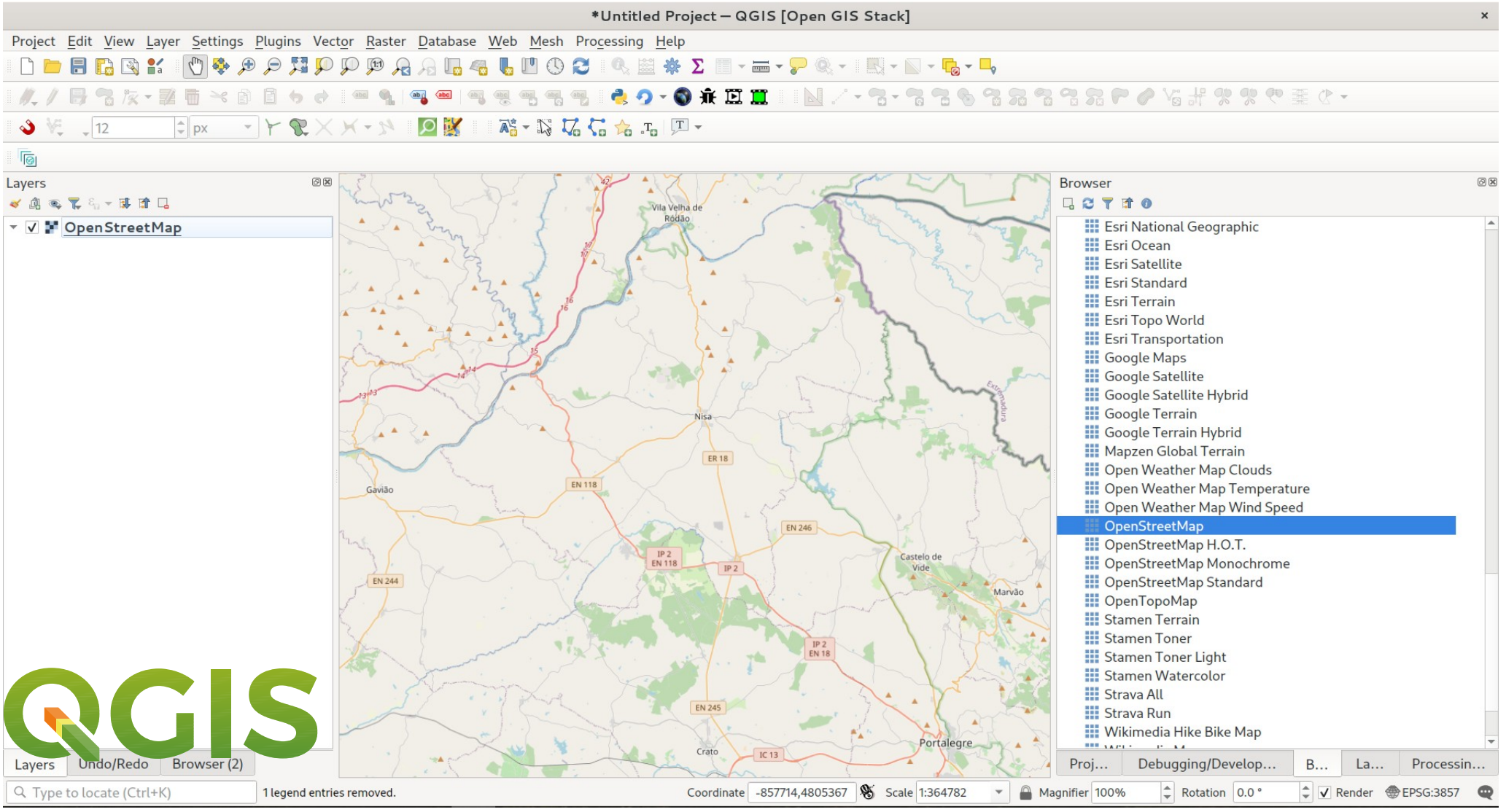
QGIS Core and python plugins developer

Dar es salaam, Tanzania



Topics

- Introduction to QGIS
- Making maps with QGIS
- QGIS and Python
- PyQgis API
- Python applications and plugins
- QGIS Temporal Controller
- Maps


*Untitled Project — QGIS [Open GIS Stack]
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Processing Help
Layers
OpenStreetMap
Vila Velha de Ródão
Nisa
Gavião
Castelo de Vide
Marvão
Portalegre
Crato
ER 18
EN 118
EN 246
IP 2
EN 118
IP 2
EN 244
IP 2
EN 18
EN 245
IC 13
Extremadura
Browser
Esri National Geographic
Esri Ocean
Esri Satellite
Esri Standard
Esri Terrain
Esri Topo World
Esri Transportation
Google Maps
Google Satellite
Google Satellite Hybrid
Google Terrain
Google Terrain Hybrid
Mapzen Global Terrain
Open Weather Map Clouds
Open Weather Map Temperature
Open Weather Map Wind Speed
OpenStreetMap
OpenStreetMap H.O.T.
OpenStreetMap Monochrome
OpenStreetMap Standard
OpenTopoMap
Stamen Terrain
Stamen Toner
Stamen Toner Light
Stamen Watercolor
Strava All
Strava Run
Wikimedia Hike Bike Map
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Undo/Redo
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Debugging/Develop…
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Coordinate -857714,4805367
Scale 1:364782
Magnifier 100%
Rotation 0.0 °
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EPSG:3857

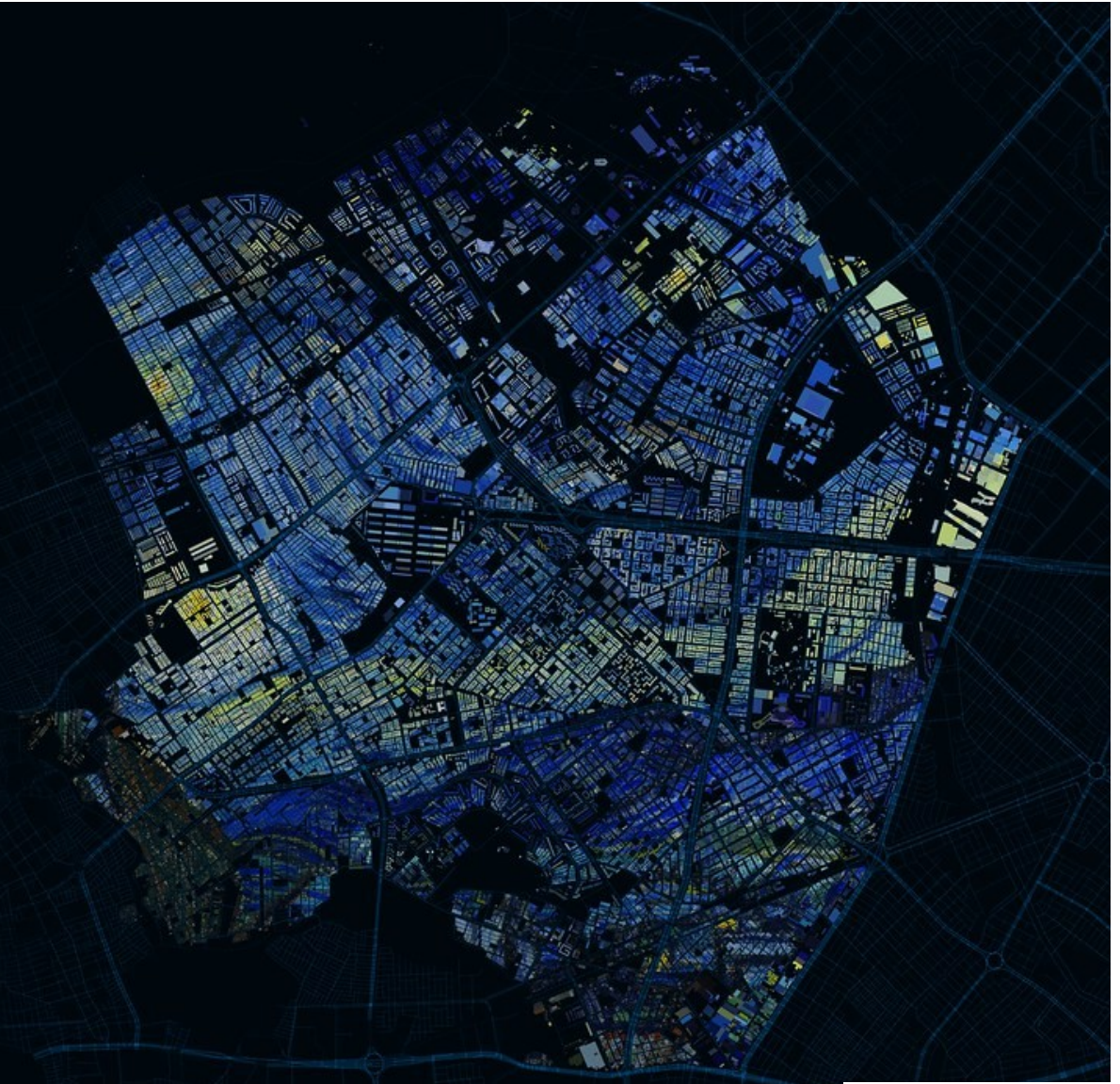
Serie
Bogotá una pintura

Localidad de Kennedy

La noche Estrellada
(Vincent Van Gogh)

Los lugares aquí mencionados hacen parte de la ciudad de Bogotá (Colombia). Los datos espaciales fueron proporcionados por "Datos abiertos Bogotá" y pueden ser consultados en su sitio web.

Andrés Felipe Lancheros Sánchez
www.aflanc.wordpress.com
Twitter: @MiniTigri
Facebook: Tigrillo Cartográfico
Qgis v 3.14



Map from https://aflanc.wordpress.com

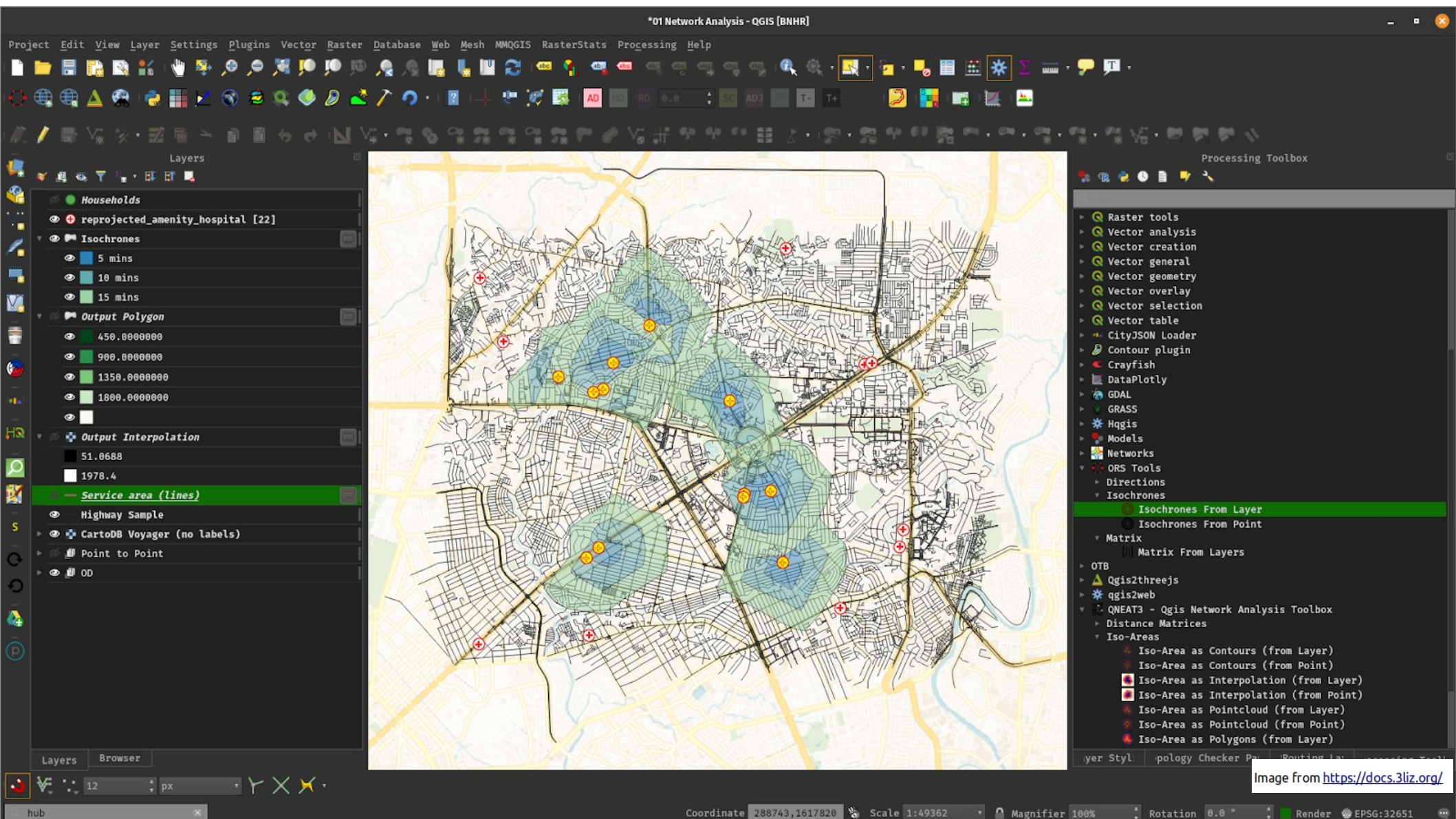
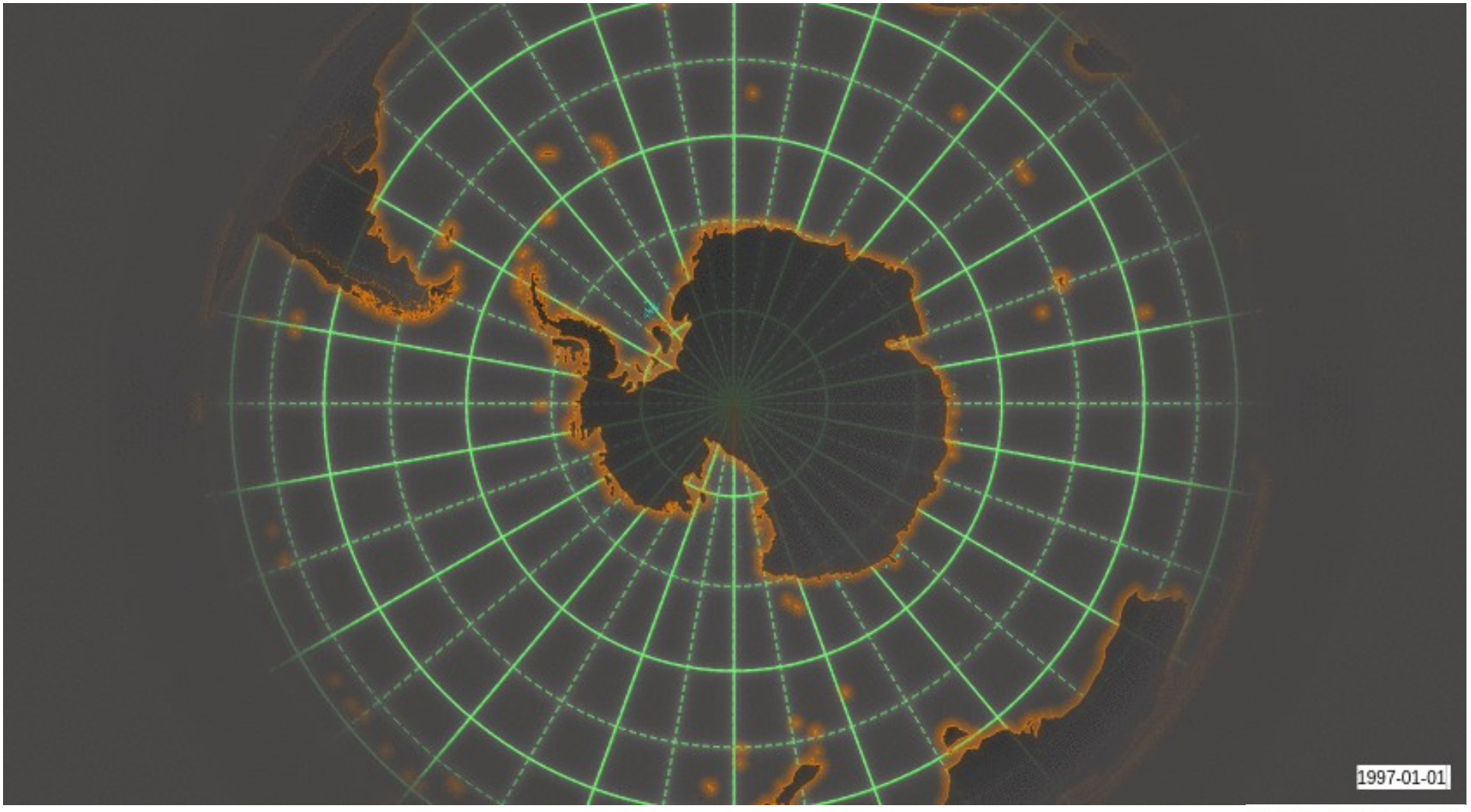


Image from https://docs.3liz.org/



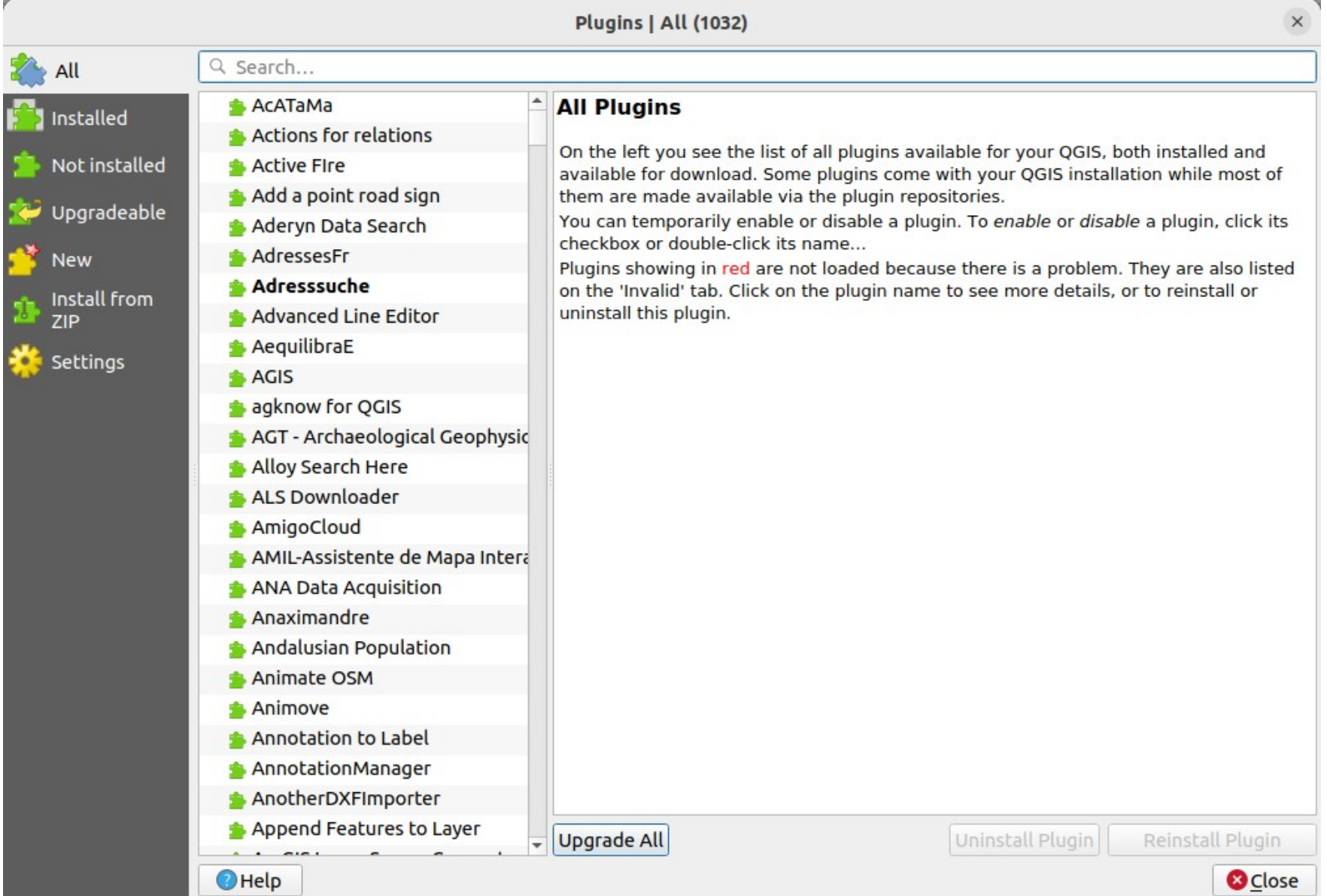
Map from http://github.com/qgis/QGIS

QGIS Usage

- Analyse and publish geospatial information
- Create maps, edit and visualize them
- Free to download and use
- Team effort

QGIS and Python

Image from https://gisgeography.com


Plugins | All (1032)
All
Installed
Not installed
Upgradeable
New
Install from ZIP
Settings
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Actions for relations
Active FIre
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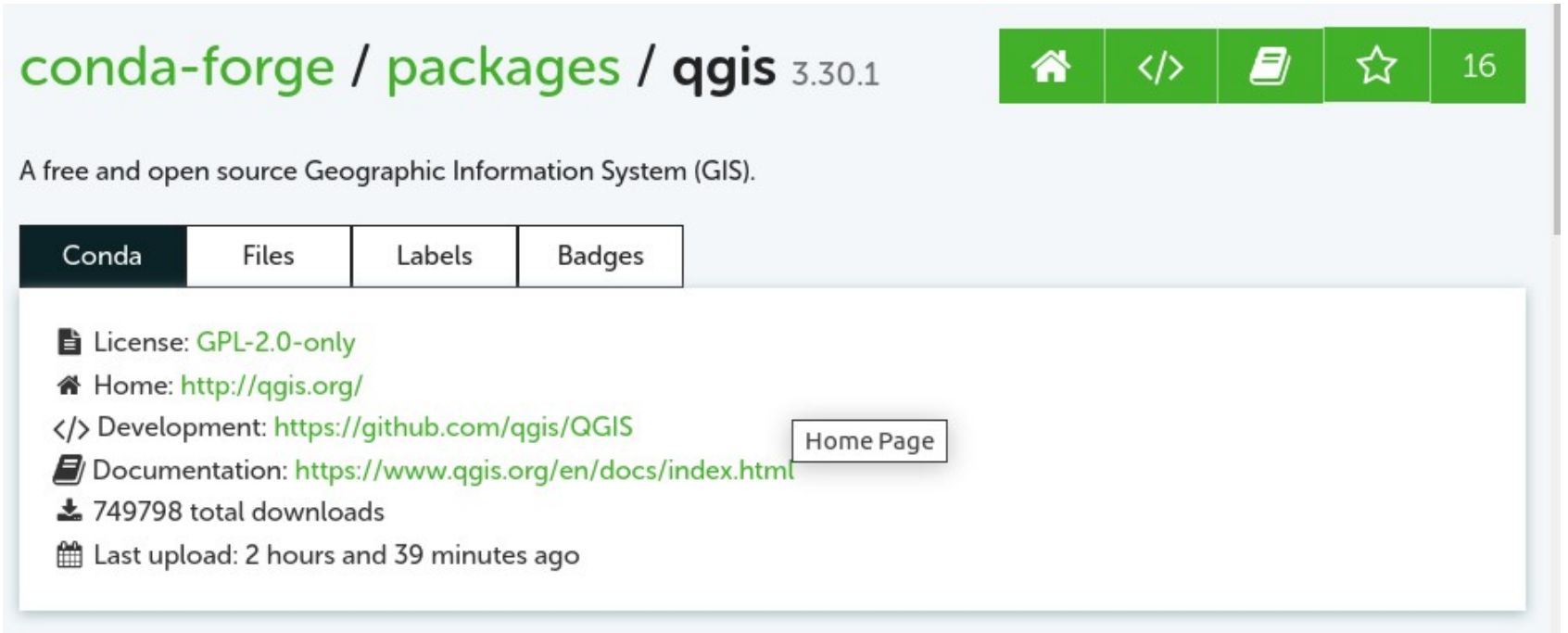
Adresssuche
Advanced Line Editor
AequilibraE
AGIS
agknow for QGIS
AGT - Archaeological Geophysic
Alloy Search Here
ALS Downloader
AmigoCloud
AMIL-Assistente de Mapa Intera
ANA Data Acquisition
Anaximandre
Andalusian Population
Animate OSM
Animove
Annotation to Label
AnnotationManager
AnotherDXFImporter
Append Features to Layer
All Plugins
On the left you see the list of all plugins available for your QGIS, both installed and available for download. Some plugins come with your QGIS installation while most of them are made available via the plugin repositories.
You can temporarily enable or disable a plugin. To enable or disable a plugin, click its checkbox or double-click its name...
Plugins showing in red are not loaded because there is a problem. They are also listed on the 'Invalid' tab. Click on the plugin name to see more details, or to reinstall or uninstall this plugin.
Upgrade All
Uninstall Plugin
Reinstall Plugin
Help
Close

Writing Python applications and plugins for QGIS

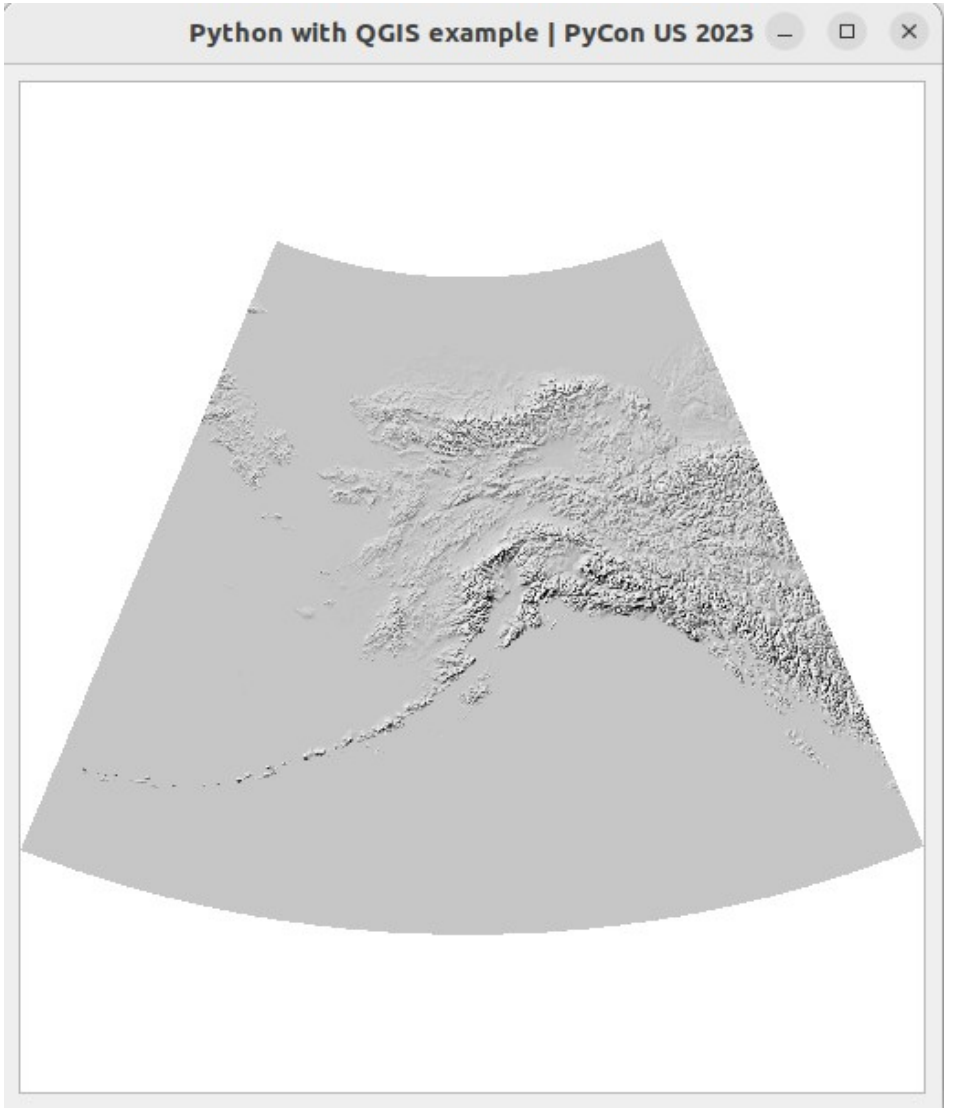
Installation using QGIS downloads page

https://www.qgis.org/en/site/forusers/download.html

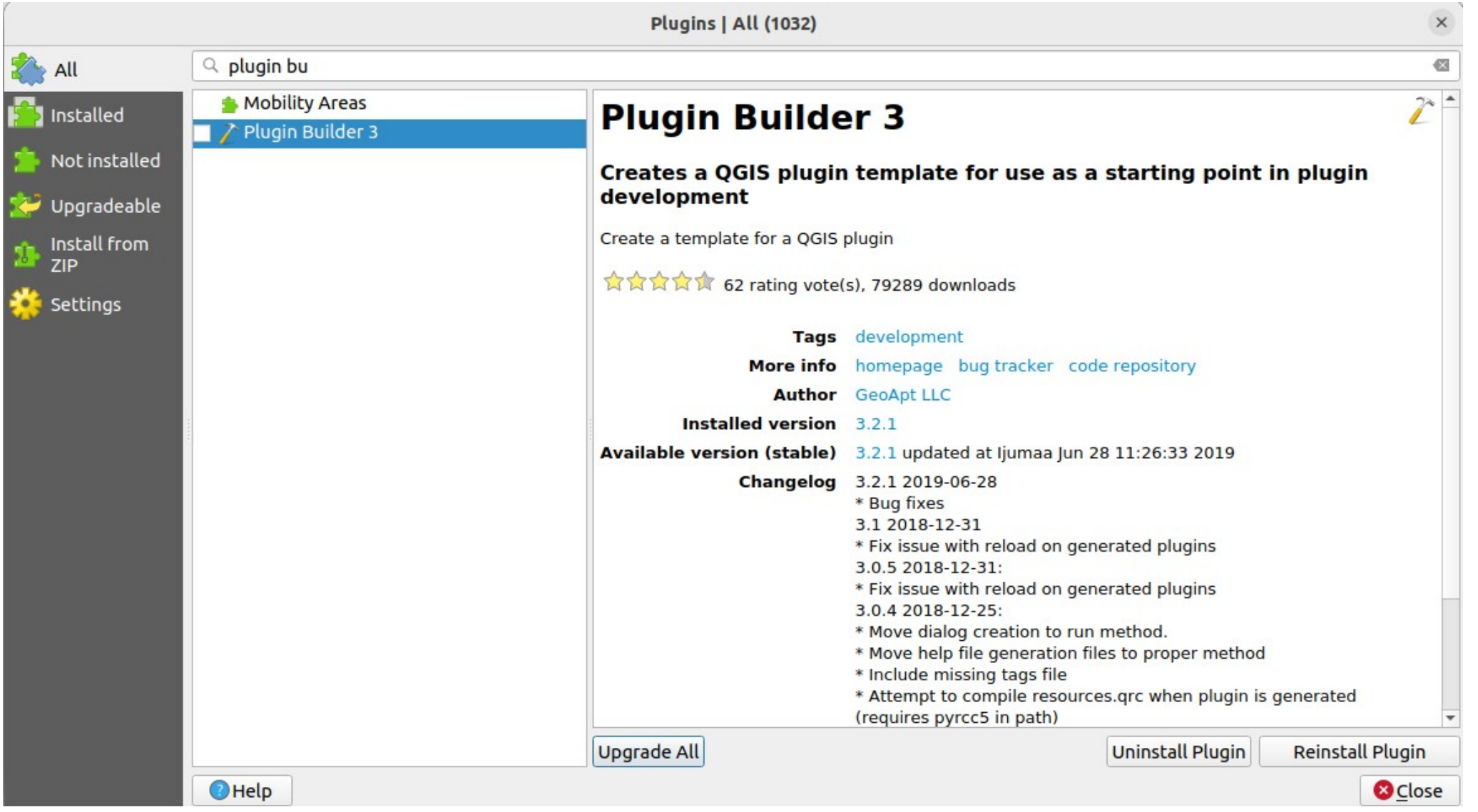
Installation using conda



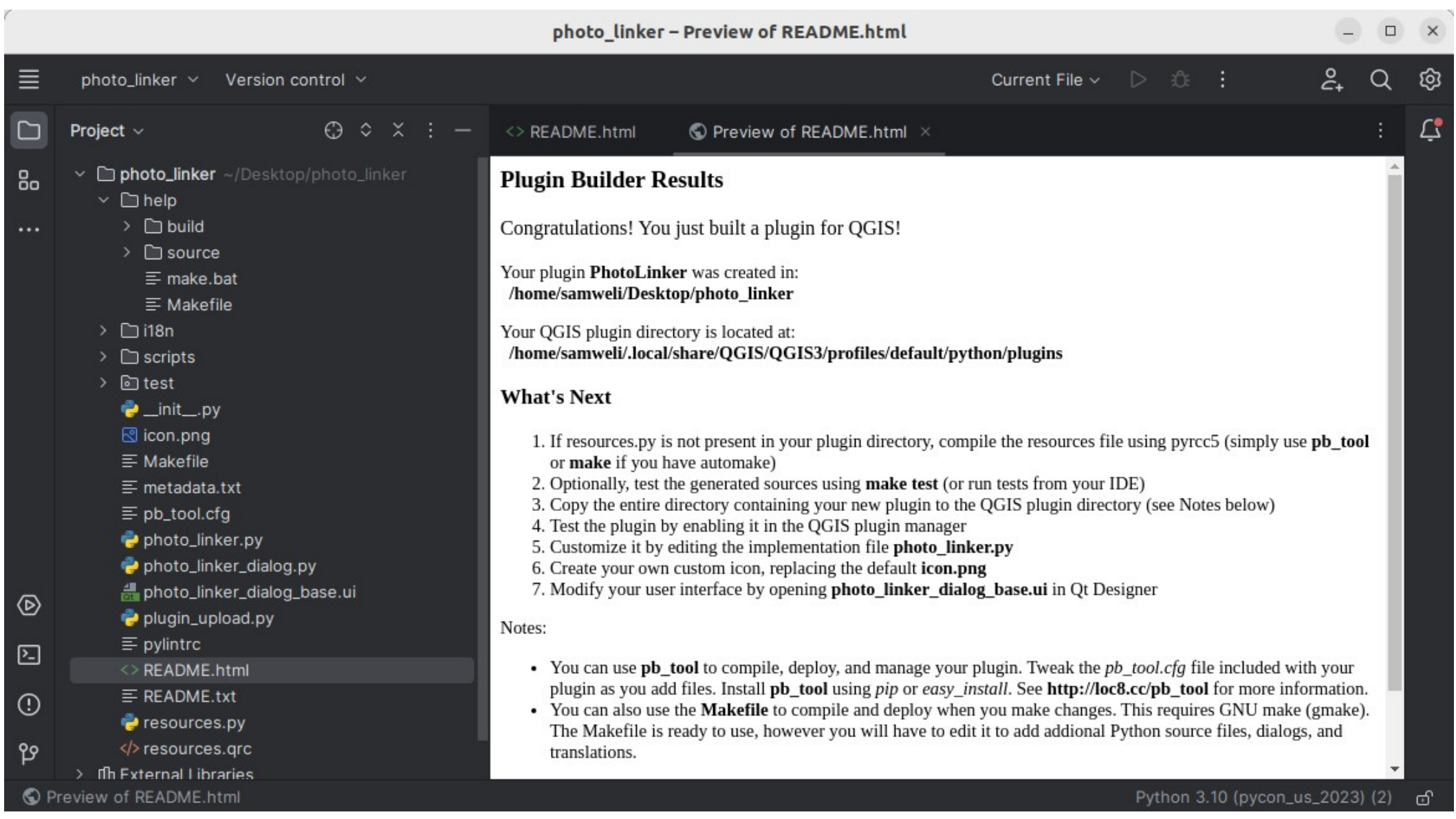
```python
from qgis.core import *
from qgis.gui import QgsMapCanvas
from qgis.PyQt.QtWidgets import QFrame, QGridLayout, QMainWindow

application = QgsApplication([], False)

QgsApplication.setPrefixPath('/usr', True)
QgsApplication.initQgis()

main_window = QMainWindow()
main_window.setWindowTitle(
    "Python with QGIS example | "
    "PyCon US 2023"
)
frame = QFrame()
main_window.setCentralWidget(frame)
layout = QGridLayout(frame)

map_canvas = QgsMapCanvas()
layout.addWidget(map_canvas)

raster_file_uri = 'https://github.com/qgis/QGIS-Sample-Data/' \
                  'blob/master/qgis_sample_data/raster/' \
                  'SR_50M_alaska_nad.tif?raw=true'

raster_layer = QgsRasterLayer(raster_file_uri, 'test_layer')

QgsProject.instance().addMapLayer(raster_layer)
map_canvas.setLayers([raster_layer])
map_canvas.setExtent(raster_layer.extent())

main_window.show()
application.exec_()
```



Using PyQgis in QGIS


Plugins | All (1032)
All
Installed
Not installed
Upgradeable
Install from ZIP
Settings
plugin bu
Mobility Areas
Plugin Builder 3
Plugin Builder 3
Creates a QGIS plugin template for use as a starting point in plugin development
Create a template for a QGIS plugin
62 rating vote(s), 79289 downloads
Tags development
More info homepage bug tracker code repository
Author GeoApt LLC
Installed version 3.2.1
Available version (stable) 3.2.1 updated at Ijumaa Jun 28 11:26:33 2019
Changelog 3.2.1 2019-06-28
* Bug fixes
3.1 2018-12-31
* Fix issue with reload on generated plugins
3.0.5 2018-12-31:
* Fix issue with reload on generated plugins
3.0.4 2018-12-25:
* Move dialog creation to run method.
* Move help file generation files to proper method
* Include missing tags file
* Attempt to compile resources.qrc when plugin is generated (requires pyrcc5 in path)
Upgrade All
Uninstall Plugin
Reinstall Plugin
Help
Close

QGIS Plugin Builder - 3.2.1
QGIS Plugin Builder
Class name
e.g. PhotoLinker
Plugin name
e.g. Photo Linker
Description
e.g. This plugin links points to photos
Module name
e.g. photo_linker
Version number
0.1
Minimum QGIS version
3.0
Author/Company
e.g. Acme widgets Inc.
Email address
e.g. jack@qgis.org
Help
<Previous
Next >
Cancel


photo_linker – Preview of README.html
photo_linker
Version control
Current File
Project
photo_linker ~/Desktop/photo_linker
help
build
source
make.bat
Makefile
i18n
scripts
test
__init__.py
icon.png
Makefile
metadata.txt
pb_tool.cfg
photo_linker.py
photo_linker_dialog.py
photo_linker_dialog_base.ui
plugin_upload.py
pylintrc
README.html
README.txt
resources.py
resources.qrc
External Libraries
README.html
Preview of README.html
Plugin Builder Results
Congratulations! You just built a plugin for QGIS!
Your plugin PhotoLinker was created in:
/home/samweli/Desktop/photo_linker
Your QGIS plugin directory is located at:
/home/samweli/.local/share/QGIS/QGIS3/profiles/default/python/plugins
What's Next
1. If resources.py is not present in your plugin directory, compile the resources file using pyrcc5 (simply use pb_tool or make if you have automake)
2. Optionally, test the generated sources using make test (or run tests from your IDE)
3. Copy the entire directory containing your new plugin to the QGIS plugin directory (see Notes below)
4. Test the plugin by enabling it in the QGIS plugin manager
5. Customize it by editing the implementation file photo_linker.py
6. Create your own custom icon, replacing the default icon.png
7. Modify your user interface by opening photo_linker_dialog_base.ui in Qt Designer
Notes:
• You can use pb_tool to compile, deploy, and manage your plugin. Tweak the pb_tool.cfg file included with your plugin as you add files. Install pb_tool using pip or easy_install. See http://loc8.cc/pb_tool for more information.
• You can also use the Makefile to compile and deploy when you make changes. This requires GNU make (gmake). The Makefile is ready to use, however you will have to edit it to add addional Python source files, dialogs, and translations.
Preview of README.html
Python 3.10 (pycon_us_2023) (2)

Upload a plugin

Plugins

- Featured
- All
- Stable
- New Plugins
- Updated Plugins
- Experimental
- Popular
- Most voted
- Top downloads
- Most rated
- QGIS Server plugins

Plugin Tags

QGIS Python Plugins Repository

Download latest

STAC API Browser

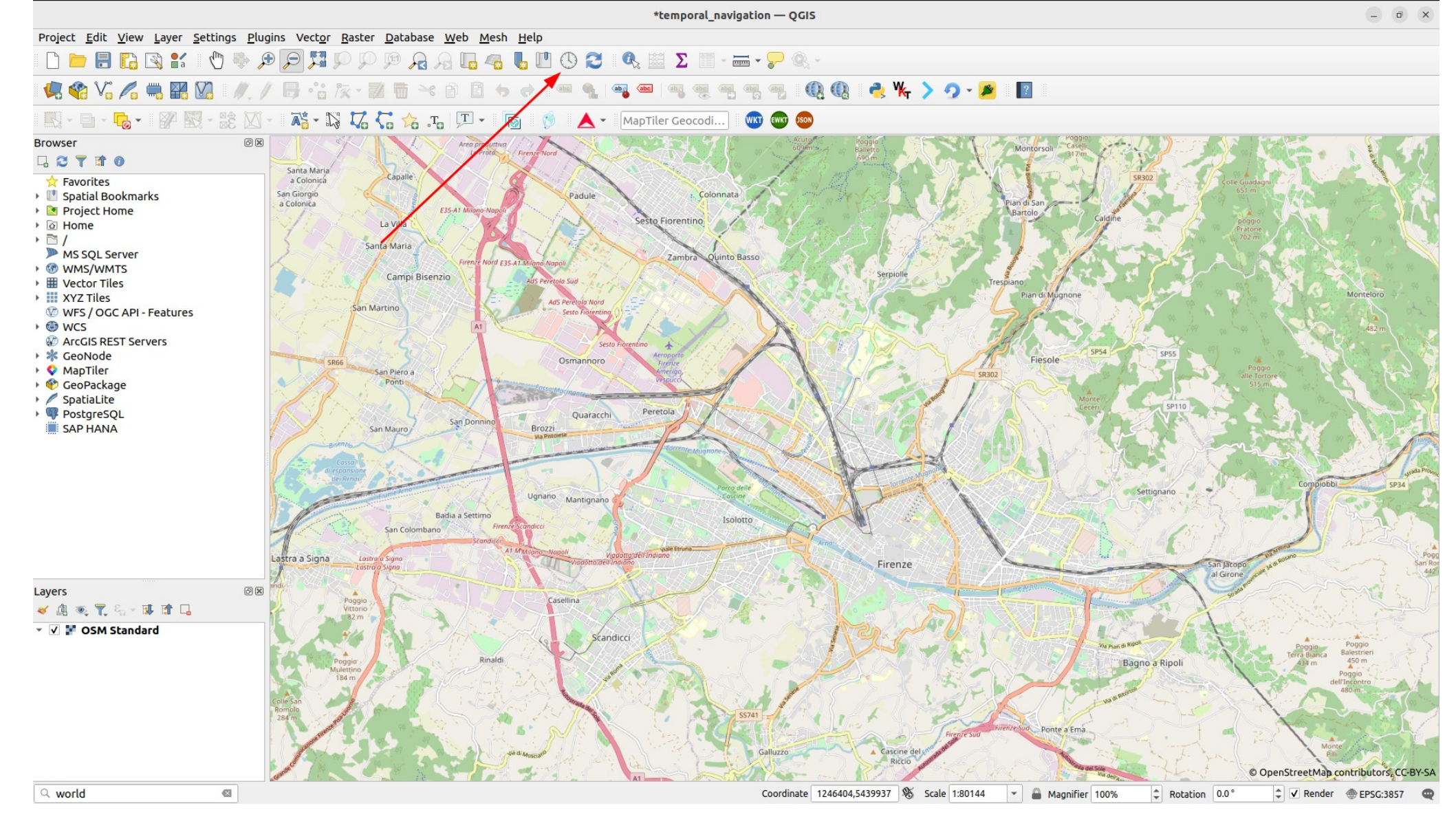
(4) votes

> QGIS plugin for reading STAC API catalogs

About Details Versions

Version	Experimental	Minimum QGIS version	Downloads	Uploaded by	Date
1.1.1	no	3.0.0	3112	samtwesa	Aug 24, 2022, 12:55 PM GMT+3
1.1.0	no	3.0.0	345	samtwesa	Jul 19, 2022, 04:17 PM GMT+3
1.0.0	no	3.0.0	1286	samtwesa	Jan 20, 2022, 11:36 AM GMT+3

QGIS Temporal Controller and its Python API


*temporal_navigation — QGIS
Project Edit View Layer Settings Plugins Vector Raster Database Web Mesh Help
MapTiler Geocodi...
Browser
Favorites
Spatial Bookmarks
Project Home
Home
/
MS SQL Server
WMS/WMTS
Vector Tiles
XYZ Tiles
WFS / OGC API - Features
WCS
ArcGIS REST Servers
GeoNode
MapTiler
GeoPackage
SpatiaLite
PostgreSQL
SAP HANA
Layers
OSM Standard
Firenze
Sesto Fiorentino
Osmannoro
Peretola
Quaracchi
Brozzi
Campi Bisenzio
Scandicci
Lastra a Signa
Bagno a Ripoli
Fiesole
Settignano
Compiobbi
Monteloro
Pian di Mugnone
Trespiano
Serpiolle
Zambra
Quinto Basso
Colonnata
Padule
Capalle
Santa Maria
San Martino
San Donnino
San Mauro
Ugnano
Mantignano
Isolotto
Badia a Settimo
San Colombano
Casellina
Rinaldi
Galluzzo
Ponte a Ema
Cascine del Riccio
San Jacopo al Girone
Montorsoli
Caldine
Pian di San Bartolo
Monte Ceceri
Poggio alle Tortore 515 m
Poggio Pratone 702 m
Colle Guadagni 651 m
Poggio Balletto 690 m
Poggio Vittorio 82 m
Poggio Mulettino 184 m
Colle San Romolo 284 m
Poggio Terra Bianca 434 m
Poggio Balestrieri 450 m
Poggio dell'Incontro 480 m
Monte Pili
© OpenStreetMap contributors, CC-BY-SA
world
Coordinate 1246404,5439937
Scale 1:80144
Magnifier 100%
Rotation 0.0 °
Render
EPSG:3857

QGIS API Documentation 3.27.0-Master (7a37085df7)

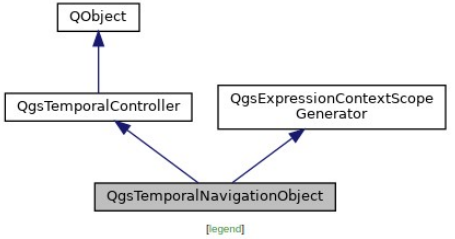
QgsTemporalNavigationObject Class Reference

core library

Implements a temporal controller based on a frame by frame navigation and animation. More...

```
#include <qgstemporalnavigationobject.h>
```

Inheritance diagram for QgsTemporalNavigationObject:



Public Types

enum **AnimationState** { Forward , Reverse , Idle }

Represents the current animation state. More...

enum **NavigationMode** { NavigationOff , Animated , FixedRange }

Represents the current temporal navigation mode. More...

Public Slots

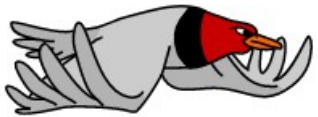
void **next** ()

Advances to the next frame. More...

void **pause** ()

Animated Maps

QGIS Animation Workbench



Welcome to the QGIS Animation Workbench (QAW). QAW is a QGIS Plugin that will help you bring your maps to life! Let's start with a quick overview. Click on the image below to view a 14 minute walkthrough on YouTube.

QGIS Developers locations across the World

Support and Contribution

Repository

https://github.com/qgis/QGIS

Issues

https://github.com/qgis/QGIS/issues

Resources

- QGIS Python API - https://qgis.org/pyqgis
- Presentation materials - https://github.com/Samweli/pycon_us_2023
- QGIS - https://qgis.org

Questions?

Special thanks

Thank you!