MMQGIS

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Describes use of MMQGIS, a set of Python vector map layer plugins for Quantum GIS

Introduction

MMQGIS is a set of Python plugins for manipulating vector map layers in Quantum GIS: CSV input/output/join, Geocoding, Geometry Conversion, Buffering, Hub Analysis, Simplification Column Modification, Color Ramps, and Simple Animation. MMQGIS provides an alternative to the native QGIS vector plugin set and Sextente, with verbose progress reporting, an intuitive user interface, direct shapefile/CSV-file access, and some additional capabilities missing from other plugin sets.

MMQGIS assumes that input and output shapefiles and CSV files are encoded in the **UTF-8** character set. MMQGIS uses the standard Python CSV file interface functions, which do not handle Unicode or other multi-byte encodings. While files that use the lower 7-bits of the 8-bit Windoze character sets (ISO-8859-x) will generally be fine, unpredictable results and errors may occur with non-ASCII characters in non-UTF-8 character sets.

MMQGIS is free software and is offered without guarantee or warranty. You can redistribute it and/or modify it under the terms of version 2 of the GNU General Public License (GPL v2) as published by the Free Software Foundation (www.gnu.org). Bug reports or suggestions are welcome at the e-mail address above, but I cannot promise a prompt or mutually satisfactory resolution.

Installation

Contributed Repository: MMQGIS is included in the Quantum GIS Plugin Repository and should be readily available in the QGIS Python Plugin Installer (Plugins -> Fetch Python Plugins).

Manual Install If, for some reason, you do not wish to use the QGIS plugin installer, MMQGIS can be installed manually with the instructions below. QGIS and the associated packages for using Python plugins. On Fedora distros, those packages are:

```
        Python
        Qt
        PyQt
        PyQt-devel
        PyQt4-devel
        QGIS
        QGIS-python
```

On Debian distros, the packages are:

```
        qgis
        python-qgis
        python-qgis-common
        pyqt-tools
        pyqt4-dev-tools
```

Download the current version of MMQGIS**HERE**.

Unpack the zip file and move the mmqgis directory of files to the mmqgis plugin directory:

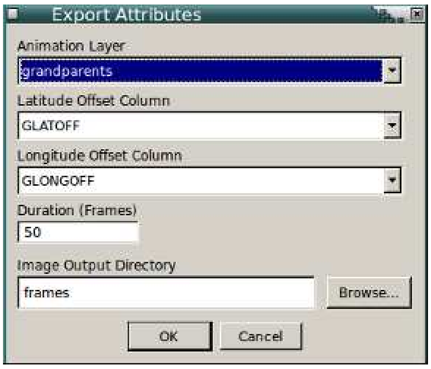
```
        unzip mmqgis.zip
        mv mmqgis ~/.qgis/python/plugins
```

Optionally, you may install MMQGIS in the shared system plugin directory if want to share the installation with other users on a multiuser system or simply do not want extra files clogging your /home directory

Enable MMQGIS by starting qgis and using the manage plugins utility (Plugins -> Manage Plugins). The utility pops up a list box of all available plugins and you should select the checkbox beside MMQGIS. After clicking OK, an MMQGIS option should be available on the PLUGINS dropdownn menu.

Animate Tools

Animate Columns



Export Attributes

Animation Layer: grandparents

Latitude Offset Column: GLATOFF

Longitude Offset Column: GLONGOFF

Duration (Frames): 50

Image Output Directory: frames

The Animate Columns tool permits animation of map features in a single layer. The objects are moved over the specified *Duration* number of frames in a straight line based on the offsets specified in the *Latitude Offset Column* and *Longitude Offset Column*. Individual PNG images for each frame are written to the specified *Image Output Directory*

The motion is specified with offsets rather than absolute X/Y values to permit animation of lines and polygons. The offsets must be specified in the Coordinate Reference System of the layer being animated. Offsets for points may be calculated by:

```
        offset_long = (end_long - start_long)
        offset_lat = (end_lat - start_lat)
```

If you need more control over paths, you should use the Animate Rows tool or Anita Graser's TimeManager plugin.

Images are sized with the main window and are exported using the QgsmapCanvas::saveAsImage() function. This does not permit access to the layout capabilites of the map composer, so any ornamentation (ex. north arrow, labels) must be placed on the main map using map features.

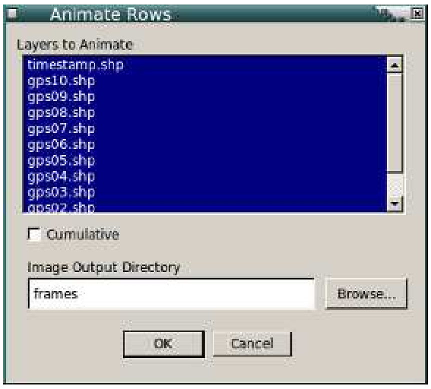
This tool can be slow and processing-intensive if animating a large number of features.

Images may be combined into a single animated GIF using Gimp.

Images may be combined into video files using the **mencoder** program that comes with mplayer. For example, the following creates a 15 FPS silent MPEG4 file in an AVI container:

```
mencoder mf://*.png -mf w=640:h=480:fps=15:type=png -ovc lavc -lavcopts vcodec=mpeg4:mbd=2:trell -oac copy -o output.av
```

Animate Rows

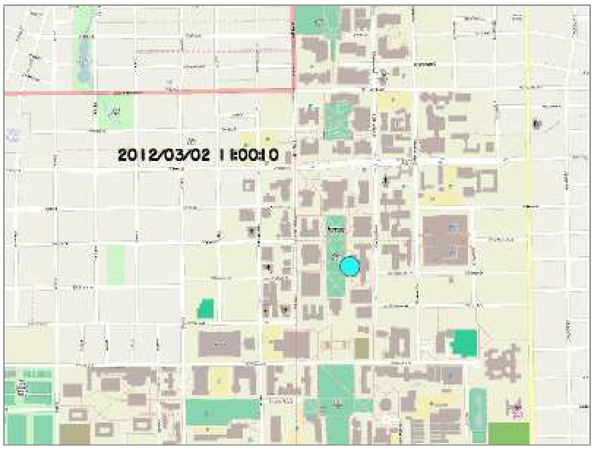


Animate Rows

Layers to Animate:
timestamp.shp
gps10.shp
gps09.shp
gps08.shp
gps07.shp
gps06.shp
gps05.shp
gps04.shp
gps03.shp
gps02.shp

☐ Cumulative

Image Output Directory: frames



The Animate Rows tool permits animation of map features in one or more layers. The features are moved by plotting successive rows in each layer selected in the *Layers to Animate* list box. The *Cumulative* checkbox causes features from previous rows to remain on the map. Individual PNG images for each frame are written to the specified *Image Output Directory*

If multiple layers are being animated simultaneously, the timing of rows in each layer will be the same. There is no capability for interpolating, frame skipping or frame duplication between layers of dissimilar length. If there are fewer rows in one animated layer than in another animated layer, no features from the shorter layer will be displayed after all rows in the shorter layer have been displayed.

If text display of timing is desired, a layer must be created with a column that has the desired display text, and that layer must be mapped with features labeled.

If you need fine-grained control by specific times or a less cumbersome way of displaying current time, you may want to consider using Anita Graser's TimeManager plugin.

As with Animate Columns, images are sized with the main window and are exported using the QgsmapCanvas::saveAsImage() function. This does not permit access to the layout capabilites of the map composer, so any ornamentation (ex. north arrow, labels) must be placed on the main map using map features.

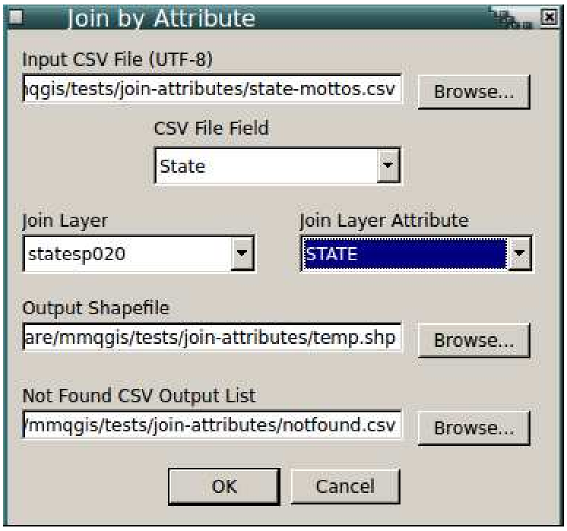
Images may be combined into a single animated GIF using Gimp.

Images may be combined into video files using the **mencoder** program that comes with mplayer. For example, the following creates a 15 FPS silent MPEG4 file in an AVI container:

```
mencoder mf://*.png -mf w=640:h=480:fps=15:type=png -ovc lavc -lavcopts vcodec=mpeg4:mbd=2:trell -oac copy -o output.av:
```

Combine Tools

Attribute Join from CSV File



Join by Attribute

Input CSV File (UTF-8): ıqgis/tests/join-attributes/state-mottos.csv

CSV File Field: State

Join Layer: statesp020

Join Layer Attribute: STATE

Output Shapefile: are/mmqgis/tests/join-attributes/temp.shp

Not Found CSV Output List: /mmqgis/tests/join-attributes/notfound.csv

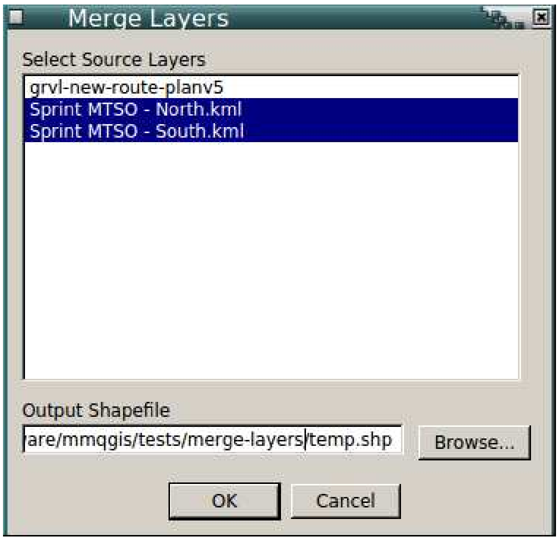
The join attributes tool permits import of attributes from a CSV file based on a join using a "key" field that is present both in the CSV file and in the attribute table of the map layer to which the data is being joined. The key is specified by selection boxes for CSV File Field and Join Layer Attribute and do not have to have the same name. The join is similar to an SQL join and if there are multiple occurances of a key in the CSV or map layer, there will be multiple combinations of the data in the output shapefile.

A box is also provided to specify the file where unmatched records from the CSV file are saved for further analysis.

Note that because CSV files contain no reliable type data in the header, data is always imported from CSV files as text. Text columns can be converted to numeric (floating point) using the "Text to Float" tool.

CSV files must be encoded in the UTF-8 character set. Although other 8-bit encodings (like Windoze ISO-8859-x) will work if only ASCII characters are present, non-ASCII characters may cause unpredictable behavior.

Merge Layers



Merge Layers

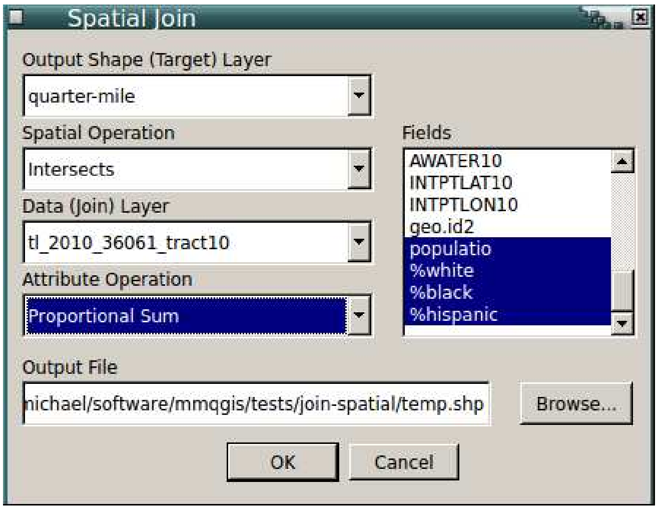
Select Source Layers:
grvl-new-route-planv5
Sprint MTSO - North.kml
Sprint MTSO - South.kml

Output Shapefile: are/mmqgis/tests/merge-layers/temp.shp

The merge layers tool merges features from multiple layers into a single shapefile and adds the merged shapefile to the project. One or more layers are selected from the "Select Source Layers" dialog list box and an output shapefile name is specified in the "Output Shapefile" dialog field.

Merged layers must all be the same geometry type (point, polygon, etc.). If the source layers have different attribute fields (distinguished by name and type), the merged file will contain a set of all different fields from the source layers with NULL values inserted when a source layer does not have a specific output field.

Spatial Join



Spatial Join

Output Shape (Target) Layer: quarter-mile

Spatial Operation: Intersects

Data (Join) Layer: tl_2010_36061_tract10

Attribute Operation: Proportional Sum

Fields: AWATER10, INTPTLAT10, INTPTLON10, geo.id2, populatio, %white, %black, %hispanic (selected: populatio, %white, %black, %hispanic)

Output File: nichael/software/mmqgis/tests/join-spatial/temp.shp

A spatial join permits combination of information from different layers based on spatial relationship. The spatial joins are very common operations in standard GIS analysis.

The Output Shape (target) Layer indicates the layer that defines the shapes that will be the output from the operation.

The Data (join) Layer indicates the layer that will provide the data output from the operation.

Spatial Operation box allows specification of the relationship that should be used in the operation: Within, Intersects or Contains. Some relationships are not available for some combinations of shapes (ex: there is no within relationship when joining a polygon target layer with a point join layer).

Attribute Operation indicates what should be done when multiple features from the join layer have a relationship with the target layer: First, Sum, Average, and Proportional Sum. Proportional Sum indicates that the data from each related feature should be summed in proportion to the amount of join feature area (in map units) covered by the target feature. Some operations are not available with some combinations of shapes (ex: proportional sum is not available for point target layers).

The Fields box permits selection of the combined attributes from both source layers that will be included in the output. Multiple attributes can be selected. Selection capability is provided so that the output does not have to be cluttered with multiple unnecessary attributes.

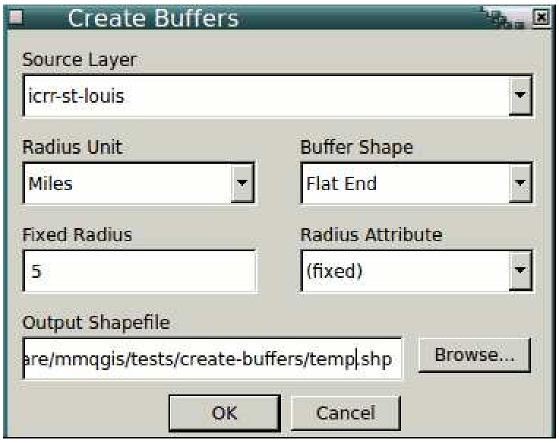
A COUNT attribute is automatically appended to the output that indicates the number of related join layer features contributing data to each feature from the target layer.

Features from the target layer that have no spatial relationship to the join layer are not included in the output.

The ranges given in the legend are rounded to four significant digits to avoid the extraneous precision associated with mathematical range calculation.

Create Tools

Create Buffers


Create Buffers

Source Layer: icrr-st-louis

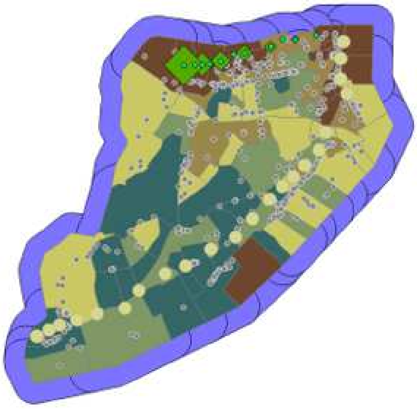
Radius Unit: Miles

Buffer Shape: Flat End

Fixed Radius: 5

Radius Attribute: (fixed)

Output Shapefile: are/mmqgis/tests/create-buffers/temp.shp



This tool creates polygon buffers around points, lines and polygons.

Point buffers can be created as circles, triangles, diamonds, pentagons or hexagons.

This tool offers a feature for expressing buffer sizes as absolute linear distance units (miles, feet, meters, kilometers defined by WGS 84 great circle distance) rather than map units. To approximate meaningful distances independent of the original projection with normal rounded buffers, the geometry is transformed to an azimuthal equidistant projection (meters) with the feature centroid as the origin. While this may introduce some deviation from the original CRS, buffering is assumed in practice to be an inexact operation that can usually tolerate such discrepancy. Map units should be used with projected data sets to maintain consistency with projected units.

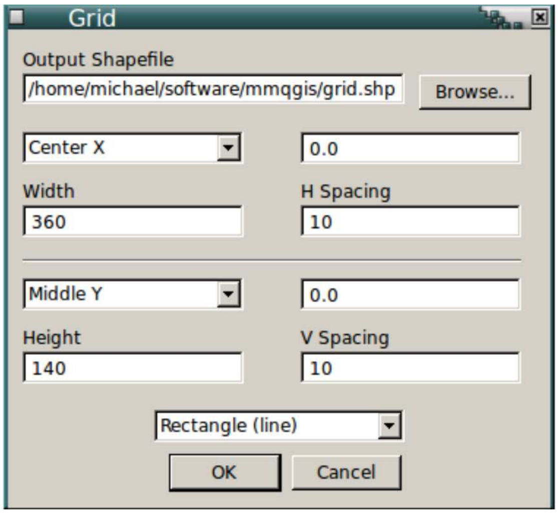
Because of the multiple projection transformations needed to work with real distances, on large data sets this tool can be quite slow compared to the native QGIS buffer tools that use only the source layer CRS.

Buffer radius can be fixed for all buffers as specified in the dialog, or buffer sizes can be taken from an attribute in the source shape layer.

Line buffers can be created as normal rounded-end, single-sided, or flat-ended. Flat ended buffers are created by dissolving a north-sided and south-sided buffer for each line. This may cause odd shapes when line ends point in directions that deviate significantly from the general direction of the line. With multiple-line features, each line segment is treated as a separate shape, so angular deviations between line segments may result in slivers.

Line buffers can also be north-, south-, east- or west-side only. The determination of which side of the line is buffered is determined by the angular direction of line as defined by the start and end points of the line. This may result in undesirable results if buffering layers that mix vertically- and horizontally-oriented features. This tool does not currently have the capability to buffer based on directional characteristics like traffic or water flow through the features that lines are used to represent. For lines that are exactly perpendicular, the west side is considered the north side for north side buffering. For lines that are exactly horizontal, the south side is considered the west side.

Create Grid Layer


Grid

Output Shapefile: /home/michael/software/mmqgis/grid.shp

Center X: 0.0

Width: 360

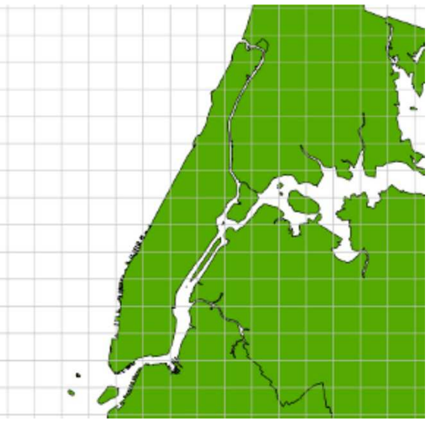
H Spacing: 10

Middle Y: 0.0

Height: 140

V Spacing: 10

Rectangle (line)



The MMQGIS grid tool creates a line shapefile containing grid lines. The grid location is specified based on an X value of left, center or right, and a Y value of top, middle, or bottom, as specified in the dialog combo boxes.

The width/height of the area to cover with gridlines, and the horizontal/vertical spacing of the gridlines are also specified in the dialog.

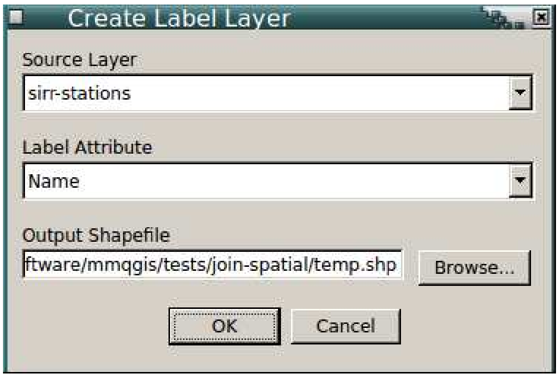
The defaults when the dialog is brought up are set to cover the full extent in the project coordinate reference system of the current display that is active when the plugin is invoked.

The grid is saved to a shapefile specified in the "Output Shapefile" form field.

The Grid Type combo box at the bottom of the dialog allows selection of four types of grids:

- Rectangular (line): Creates longitude and latitude lines.
- Rectangular (polygon): Creates longitude and latitude lines as adjacent rectangular polygons. The attributes for each polygon are for the center point.
- Diamond (polygon): Creates a grid of adjacent diamonds. The attributes for each polygon are for the center point.
- Hexagon (polygon): Creates a grid of hexagons. To maintain equilaterality, the ratio between the horizontal and vertical spacing is fixed (and different). Changing horizontal spacing will automatically change vertical spacing, and vice versa. The attributes for each polygon are for the center point.

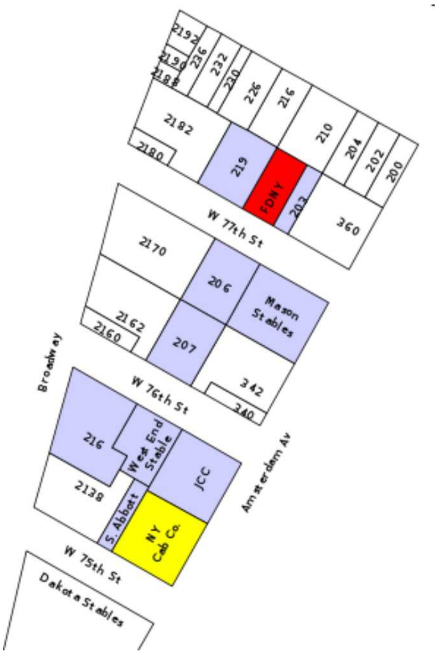
Create Label Layer


Create Label Layer

Source Layer
sirr-stations

Label Attribute
Name

Output Shapefile
ftware/mmqgis/tests/join-spatial/temp.shp



Although label placement in QGIS becomes more robust as the software has matured, individual formatting or placement of dynamically generated feature labels is still a bit cumbersome. It is possible to add attribute columns to the feature for setting various "data defined" formatting and positioning parameters, although this represents a significant amount of work if you simply want to drag a few labels to new positions or delete some existing labels.

The create label layer tool provides a way to work around this deficiency by creating a point layer with unique attribute values from an existing vector layer. Those points can then be labeled and moved at will.

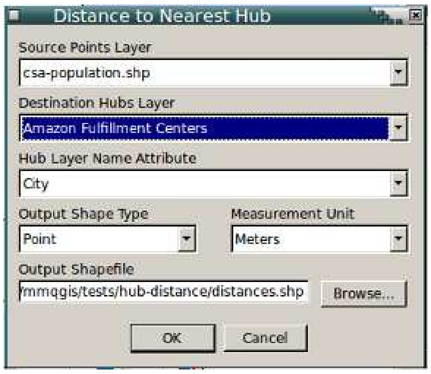
Duplicate labels for multiple features representing a single geographic entity can be avoided by creating points only for unique label names. The attributes of each point are the attributes for the first feature encountered in the source table, although the placement of the point is determined by a coordinate average of the centers of all features which have that label.

The create label layer tool has a single dialog box that permits specification of the source vector layer, the attribute that should be used for determining unique label text, and a box for the output shapefile. The label layer will be automatically added to the map, but the user will need to adjust the properties of the layer to set the attribute that is used for labeling. Additional points can be added to support multiline labels.

If some labels need to be individually tweaked for characteristics other than placement (such as formatting, rotation, font size, bolding, etc.), attribute columns will need to be added to the point layer that can be used to specify data defined label characteristics.

Note that if the source data does not have a problem with numerous redundant labels, a better approach than using this tool may be to simply add additional attribute columns to the source data for data defined positioning, formatting, etc. Use of this tool breaks the dynamic linkage between data and labels, so that labels will have to be manually adjusted to reflect changes to the underlying source data.

Hub Distance



Source Points Layer: csa-population.shp

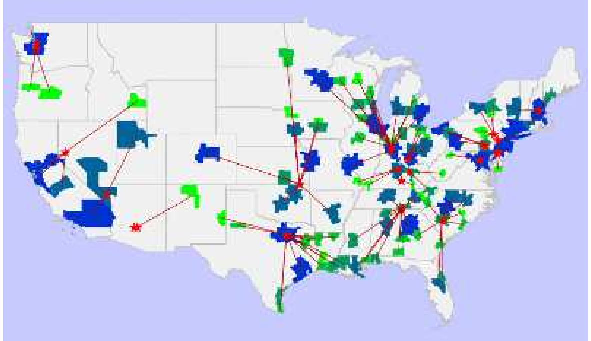
Destination Hubs Layer: Amazon Fulfillment Centers

Hub Layer Name Attribute: City

Output Shape Type: Point

Measurement Unit: Meters

Output Shapefile: /mmqgis/tests/hub-distance/distances.shp



The hub distance tool iterates through each feature on the source points layer and finds the closest "hub" from the destination hubs layer based on Ellipsoidal distance. The output is a shapefile containing all the attributes from the source layer along with a distance field and the name of the hub based on an attribute selected in the Hub Layer Name Attribute box.

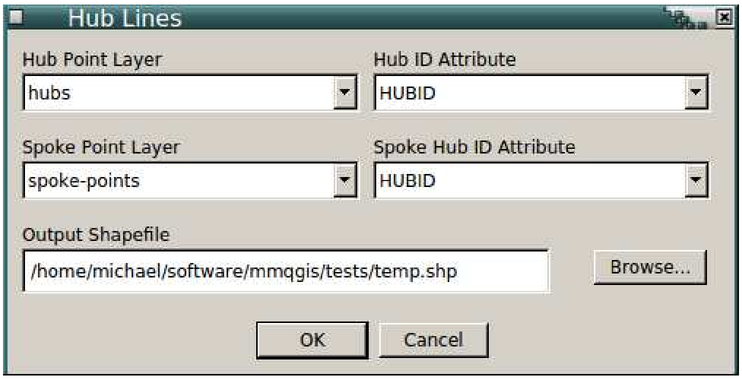
The output shapefile can be either points (one for each source point) or lines from the source points to the closest hubs.

Distances can be specified in the units selected in the Measurement Unit combo box. No attempt is made to transform between coordinate systems, so using source and hub layers with different coordinate systems may yield odd and undesirable results.

If absolute units are specified (meters, feet, kilometers, miles), great-circle distances are calculated using the Haversine formula with Lambert's (1942) formula to correct for ellipisoidal flattening. With layer units, distances are Euclidian. If your data is projected not WGS84 lat/long), it may be preferable to use "Layer Units" so the calculated distances are compatible with the distortions in your layer projection.

This tool does not incorporate any kind of network analysis, so if paths to hubs are non-linear (e.g. when dealing with city blocks), the closest Euclidian distance may not be the closed in terms of traveling distance.

Hub Lines



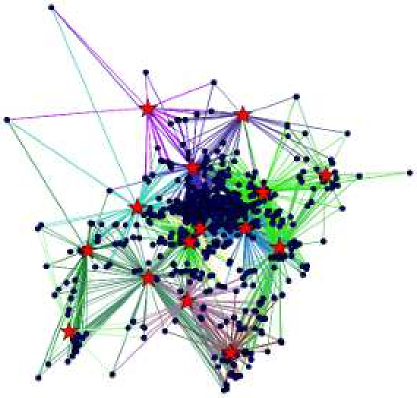
Hub Point Layer: hubs

Hub ID Attribute: HUBID

Spoke Point Layer: spoke-points

Spoke Hub ID Attribute: HUBID

Output Shapefile: /home/michael/software/mmqgis/tests/temp.shp

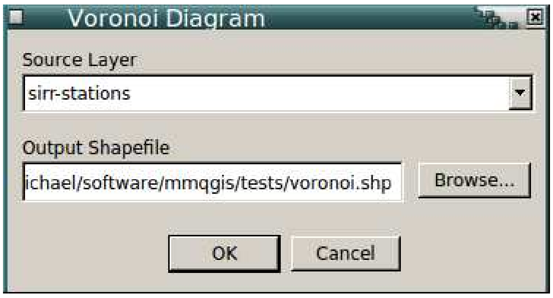


The hub lines tool creates hub and spoke diagrams with lines drawn from points on the "Spoke Point" layer to matching points in the "Hub Point" layer. Determination of which hub goes with each point is based on a match between the "Hub ID Attribute" on the hub points and the "Spoke Hub ID Attribute" on the spoke points.

The lines are output to a shapefile of lines and each line inherits all attributes from the matching spoke points.

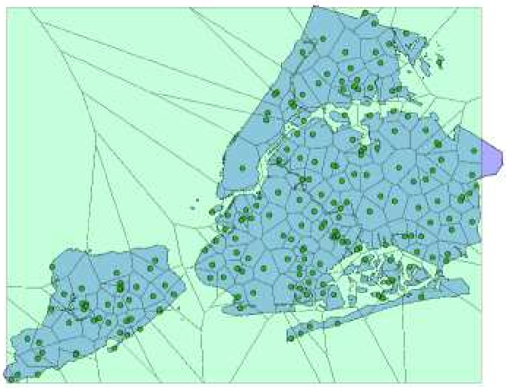
No attempt is made to transform between coordinate systems, so using source and hub layers with different coordinate systems may yield odd and undesirable results. This tool also does not incorporate any kind of network awareness (e.g. as when dealing with streets between city blocks), and all lines are straight lines from spoke to hub.

Voronoi Diagram



Source Layer: sirr-stations

Output Shapefile: ichael/software/mmqgis/tests/voronoi.shp



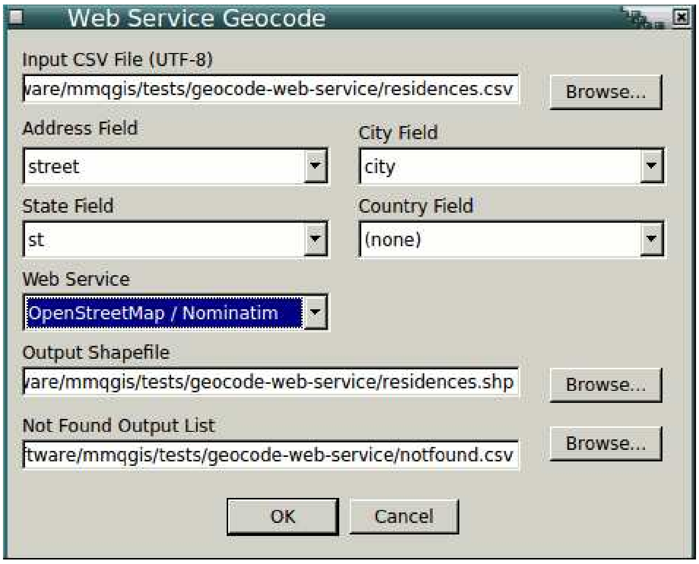
A Voronoi diagram is a collection of polygons, each surrounding individual points and representing the area around each point that is closer to that point than any other. The shapes are named after Russian mathematician Georgy Fedoseevich Voronoi, who published a formal definition in 1908, but the concept of this type of polygon extends back to Descartes in the 17th century. Similar polygons were famously used by physician John Snow to trace the source of a London cholera epidemic in 1854 and Voronoi diagrams remain useful in GIS for analyzing areas of influence associated with individual points within a collection.

The Voronoi diagram tool requires a point layer and outputs a polygon shapefile with the option to add it to the map. The boundary of the Voronoi diagram is the min/max extent of the points in the source layer.

The algorithm used to calculate the edges and nodes starts with tangents at the midpoints of lines between each point. The closest tangent is assumed to be a border and intersections to the border are calculated to circle each border until back to the beginning. The algorithm is computationally intensive, but still seems to run fairly quickly on a reasonably small set of points.

Geocode Tools

Geocode CSV With Web Service



Web Service Geocode

Input CSV File (UTF-8): vare/mmqgis/tests/geocode-web-service/residences.csv

Address Field: street

City Field: city

State Field: st

Country Field: (none)

Web Service: OpenStreetMap / Nominatim

Output Shapefile: vare/mmqgis/tests/geocode-web-service/residences.shp

Not Found Output List: tware/mmqgis/tests/geocode-web-service/notfound.csv

This tool imports addresses from a CSV file and uses either the Google Maps ™ API or the OpenStreetMap Nominatim web service to geocode those addresses. The result is a point shapefile that is added to the current map, along with a Not Found CSV file containing all rows that could not be geocoded (for whatever reason).

All columns from the input CSV file are added as attributes in the output shapefile. Addresses may be spread across as many as four different columns (street, city, state, country - which are concatenated for the query), although only one meaningful column is absolutely required (such as for a city/state combination).

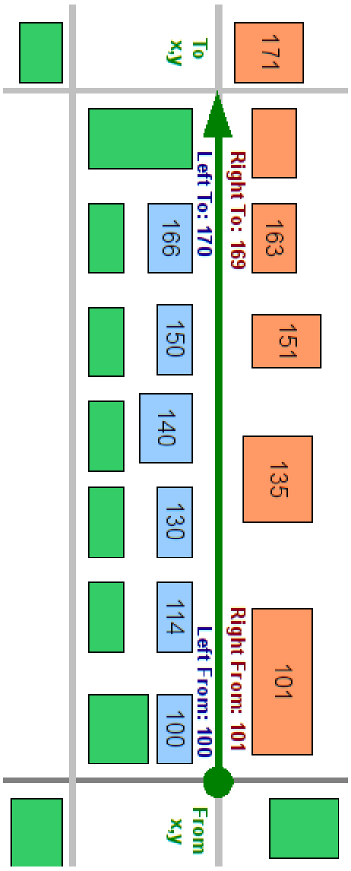
Two additional attributes are added to each shape to preserve exactly what the web service geocoded so that accuracy can be assessed. *addrtype*is the Google <type> element or OSM class attribute and indicates what kind of address type this is (street, route, etc). *addrlocat* is the Google <location_type> element or OSM type attribute and indicates the relationship of the coordinates to the addressed feature (rooftop, geometric center, interpolation, etc).

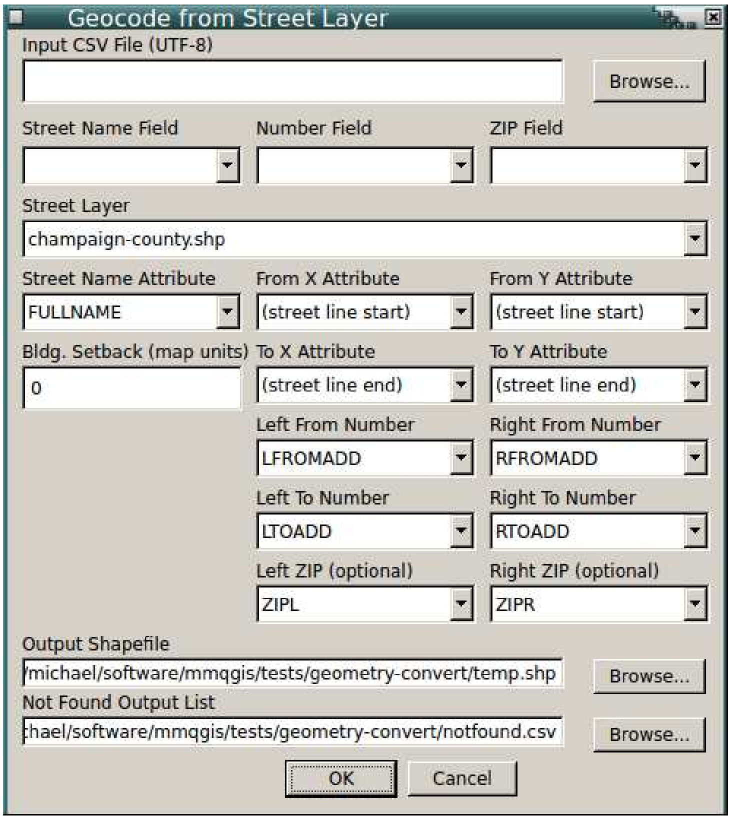
The input CSV file should be encoded in the UTF-8 character set. Although other 8-bit encodings (like Windoze ISO-8859-x) will work if only ASCII characters are present, non-ASCII characters may cause unpredictable behavior.

If the service returns more than one location for the address, only the first of the locations will be used for an output feature.

Use of this plugin requires an active Internet connection. Google places both rate and volume restrictions on the number of addresses that can be geocoded within various time limits. You should visit Google's Google Geocoding API page for more details, current information and Google's terms of service.

Geocode from Street Layer




Geocode from Street Layer

Input CSV File (UTF-8)

Browse...

Street Name Field	Number Field	ZIP Field

Street Layer: champaign-county.shp

Street Name Attribute: FULLNAME	From X Attribute: (street line start)	From Y Attribute: (street line start)
Bldg. Setback (map units): 0	To X Attribute: (street line end)	To Y Attribute: (street line end)
	Left From Number: LFROMADD	Right From Number: RFROMADD
	Left To Number: LTOADD	Right To Number: RTOADD
	Left ZIP (optional): ZIPL	Right ZIP (optional): ZIPR

Output Shapefile: /michael/software/mmqgis/tests/geometry-convert/temp.shp

Browse...

Not Found Output List: thael/software/mmqgis/tests/geometry-convert/notfound.csv

Browse...

OK Cancel

The street address geocoding tool requires a layer with street centerline features and attributes indicating the range of addresses associated with each feature.

Examples of street centerline shapefiles include the US Census Bureau's TIGER/Line Shapefiles and the New York City Department of City Planning's DCPLION files. Shapefiles created as ESRI "address locators" can be used with this geocoder, but newer version file geodatabases and older Access geodatabases cannot be used because these proprietary formats are not supported by QGIS. MapInfo tables are supported and can be used if these are provided as an alternative.

The street centerline layer should have attributes for FROM x/y and TO x/y (in map coordinates), a range of addresses on the left side, and a range of addresses on the right side.

Optionally, an attribute selector is given to permit the FROM/TO x/y from the shape lines themselves can be used ("street line start" and "street line end"). However, this assumes that the order of line vertices in the shapefile consistently starts with FROM or TO points, which may not be true and which may result in inconsistently geocoded locations.

Addresses (along with other attributes) are read in from a CSV file. Addresses should have separate attribute fields for number and street name. Optional ZIP Code fields are provided for additional accuracy when using TIGER/Line files. The attributes columns from the street centerline layer can also be selected, although when a layer is selected, the dialog will attempt to find columns with appropriate names.

The input address CSV file and the street centerline shapefile should be encoded in the UTF-8 character set. Although other 8-bit encodings (like Windoze ISO-8859-x) will work if only ASCII characters are present, non-ASCII characters may cause unpredictable behavior.

The "Building Setback" indicates how far the geocoded points should be set away from the street centerline (i.e. how far buildings are from the middle of the street, in map units).

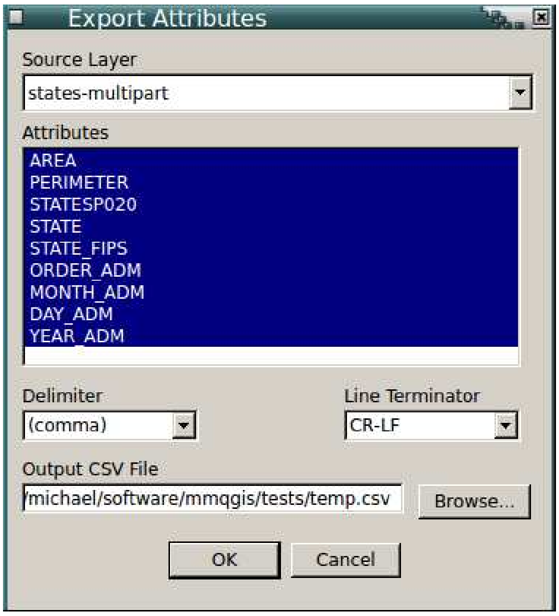
To improve searching, street names are internally modified with common abbreviations such as "st" for "street" and "w" for "west". This add fuzziness to the search process that may result in unexpected results. This address handling may be augmented or refined in future releases.

As with many tools of this type, the matching and interpolation is quite fragile. Street names in the street layer must match the names in the CSV file exactly - "First Street" will not match "1st street". The tool will also only handle address street numbers that are entirely numeric - "172-10 Seventh Ave." or "1872a Main" will throw fatal errors.

Output is a new point shapefile and a CSV file listing which addresses were not matched.

Import / Export Tools

Attributes Export to CSV File



Source Layer: states-multipart

Attributes:
AREA
PERIMETER
STATESP020
STATE
STATE_FIPS
ORDER_ADM
MONTH_ADM
DAY_ADM
YEAR_ADM

Delimiter: (comma)

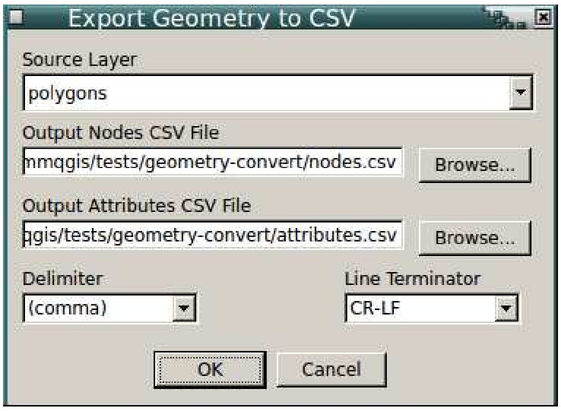
Line Terminator: CR-LF

Output CSV File: /michael/software/mmqgis/tests/temp.csv

The export attributes tool saves attributes from a map layer to a CSV file, which can then be viewed or edited. This can be helpful when you have some use for the attribute data without the associated geographic data. When dealing with data sets that have large numbers of rows or columns, viewing or searching exported data can be simpler or faster than the QGIS open attribute table, which can be unacceptably slow with large data sets.

A multiple-selection list box on the dialog permits selection of the attribute columns to export to a CSV file specified at the bottom of the form.

Geometry Export To CSV



Source Layer: polygons

Output Nodes CSV File: mmqgis/tests/geometry-convert/nodes.csv

Output Attributes CSV File: qgis/tests/geometry-convert/attributes.csv

Delimiter: (comma)

Line Terminator: CR-LF

Geometry Export to CSV exports points, polylines or polygons to comma-separated variable (CSV) files.

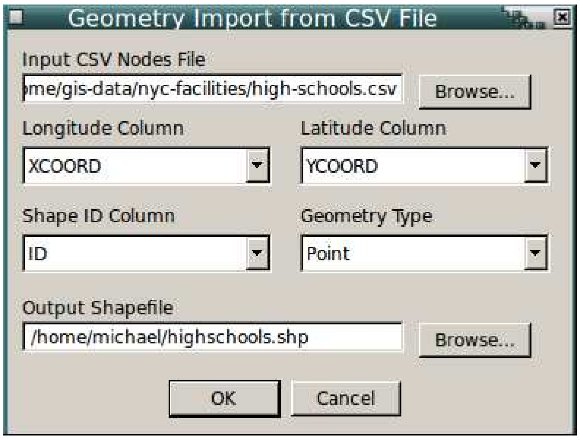
For point layers, the output CSV file includes an "x" column, a "y" column, and a "shapeid" column in addition to all attributes associated with each point.

For polyline and polygon layers, individual nodes of each shape are given a separate row in the output file. Nodes for each shape have the same "shapeid" value. Node lines are written in the same sequential order that nodes occur in the shape. Attributes for each shape are exported to a separate CSV file, with a "shapeid" column referencing the associated nodes in the node CSV file.

Elevation (z) export is not currently supported because QGIS geometriesdo not currently support z-axis / 2.5D

Polygons with holes (inner rings) have hole polygons saved under separate shapeids that contains "ring" in the name.

Geometry Import From CSV



Geometry Import from CSV File

Input CSV Nodes File: me/gis-data/nyc-facilities/high-schools.csv

Longitude Column: XCOORD

Latitude Column: YCOORD

Shape ID Column: ID

Geometry Type: Point

Output Shapefile: /home/michael/highschools.shp

Geometry Import From CSV imports points, polylines exports points, polylines or polygons to comma-separated variable (CSV) files. A combo box is provided to indicate whether the nodes from the CSV file should be imported as discrete points, as lines or as polygons.

For point layers, only a single input CSV file is needed that includes latitude and longitude columns. All other columns are imported as attributes. This is essentially the same as the "Add Delimited Text Layer" native QGIS command. Attributes are always imported as text strings and if columns need to be converted to integer or floating-point types, the MMQGIS "Text to Float" command should be used.

For polyline and polygon layers, individual nodes of each shape should be provided on separate rows in an input CSV node file. The file should have three columns: Latitude, Longitude, and Shape ID. Any additional columns will be ignored. Nodes for each shape should have the same unique Shape ID value and should occur in the file in the same sequence that they will be added to the shape.

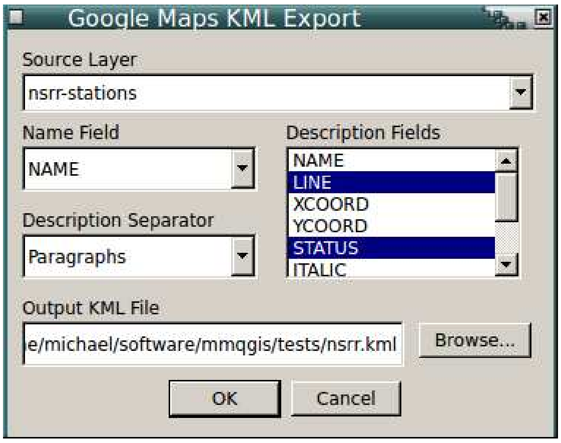
If the imported polylines or polygons have additional attributes to be imported, they should be placed in a separate CSV file with a Shape ID column to join to the imported nodes using the MMQGIS "Attributes Join From CSV File" command.

Other than providing a compliment to the "Geometry Export To CSV" command, this command can be used to import transit "shapes.txt" data from General Transit Feed Specification (GTFS) releases by transit agencies.

The input CSV file(s) should be encoded in the UTF-8 character set. Although other 8-bit encodings (like Windoze ISO-8859-x) will work if only ASCII characters are present, non-ASCII characters may cause unpredictable behavior.

Type errors such as non-numeric latitude/longitude may throw a cryptic Python error.

Google Maps (tm) KML Export Form



Google Maps KML Export

Source Layer: nsrr-stations

Name Field: NAME

Description Fields: NAME, LINE (selected), XCOORD, YCOORD, STATUS (selected), ITALIC

Description Separator: Paragraphs

Output KML File: e/michael/software/mmqgis/tests/nsrr.kml

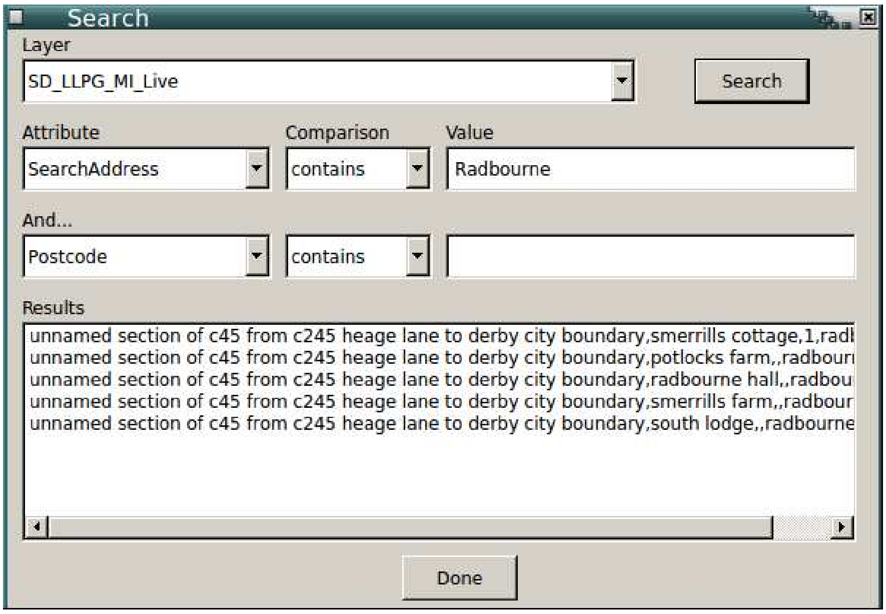
Although QGIS permits seamless import and export of formally correct KML files, the KML is often not optimal for import into Google Maps (tm).

This tool exports features to KML with the capability to explicitly specify fields for the Name and Description that are always displayed in the current (as of this writing) default Google Maps (tm) interface.

Multiple fields can be combined in the description. The Description Separator indicates how multiple fields should be separated: as separate paragraphs, preceded by a field name in separate paragraphs, or simply separated by commas in a single paragraph.

This tool also exports points using the default Google Maps (tm) PNG icons. Since a full palette of icon colors is not available, icon colors are loosely based on the RGB values of point layer symbol colors.

Search



Layer
SD_LLPG_MI_Live

Attribute: SearchAddress
Comparison: contains
Value: Radbourne

And...
Postcode
contains

Results

```
unnamed section of c45 from c245 heage lane to derby city boundary,smerrills cottage,1,radl
unnamed section of c45 from c245 heage lane to derby city boundary,potlocks farm,,radbour
unnamed section of c45 from c245 heage lane to derby city boundary,radbourne hall,,radbou
unnamed section of c45 from c245 heage lane to derby city boundary,smerrills farm,,radbour
unnamed section of c45 from c245 heage lane to derby city boundary,south lodge,,radbourne
```

The search tool permits interactive browsing of features that match the specified search criteria. Results are displayed in a list box at the bottom of the search dialog.

Clicking one of the features on the results box moves the map canvas to center that feature in the window.

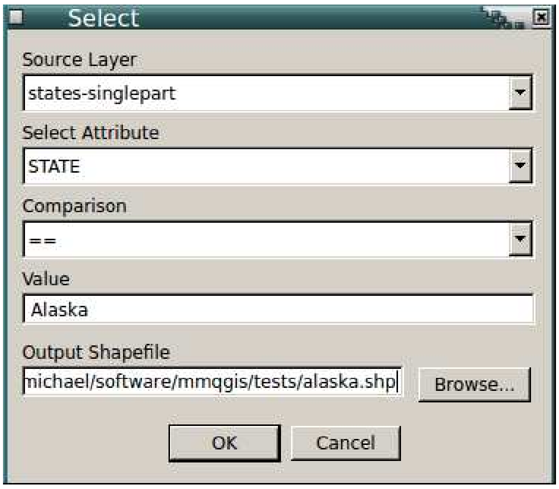
This tool also provides options in the layer selection combo box for searching addresses using Google Maps or Nominatim / Open Street Map. This option only searches for addresses since generalized serches (such as for restaurants or landmarks) require use of the Google Places API, which requires a website-specific API key that cannot be included in a generalized plugin. Selection of an address only pans the map display to place the location in the center of the display, and no markings are added to the map.

Multiple selections in the results list are possible using the CTRL and SHIFT keys. If multiple features are selected, the map canvas centers on a central area between the centroids of all selected features.

Layer feature searches can be performed on one or two attribute fields. If a value is specified for an second attribute, a feature must match BOTH conditions to be included in the results list.

Possible comparisons on numeric or string attributes are the common permutations of equal, greater than, or less than. String attributes can be searched with "contains" or "begins with." Searches are case insensitive.

Select



Source Layer
states-singlepart

Select Attribute
STATE

Comparison
==

Value
Alaska

Output Shapefile
michael/software/mmqgis/tests/alaska.shp

The select tool permits export of features from a layer based on comparison to attribute values. The selection is written to a new shapefile.

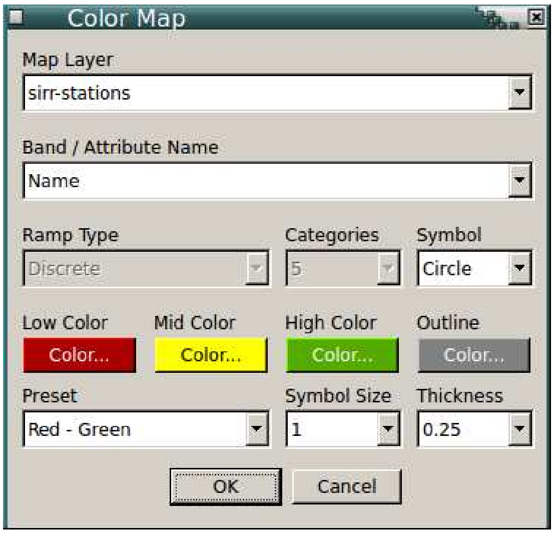
While the native QGIS export selection capability is suitable for most select operations, this tool may save time when selecting from extremely large data sets. The frequent and explicit status updates also provide awareness and assurance that the software is not frozen.

The select tool can select based on a single attribute (Select Attribute) a comparison (equal, not equal, greater, greater equal, less, less equal, begins with and contains), and a user-specified comparison value. Values can be numeric or text and type conversion will be made based on the native type of the specified selection attribute. The "begins with" and "contains" comparisons are meant for strings and may give unpredictable results when applied to integer or floating-point attributes.

No capability is provided for complex selections or selection based on multiple attributes. However, is is generally possible, albeit cumbersome, to execute multiple selection operations and/or merge operations from separate output files to perform complex selections.

Modify Tools

Color Ramp



Map Layer: sirr-stations

Band / Attribute Name: Name

Ramp Type: Discrete

Categories: 5

Symbol: Circle

Preset: Red - Green

Symbol Size: 1

Thickness: 0.25

The color map tool permits assignment of a continuous gradation of customized symbology colors to both vector and raster layers.

While the new symbology (v1.9) capabilities of QGIS make this tool less useful than with the older, more-limited symbology, this tool provides a quick way to deal with custom color schemes, non-linear scales, and mixed symbol shapes.

The Map Layer and Band/Attribute Name boxes permit selection of the feature layer that will be colored and the attribute used to determine coloration. This tool only works with numeric (integer or floating-point) attributes.

The Ramp Type indicates the way that the fill color ramp values are assigned:

- Quantiles: Values are ordered from low to high and features are grouped within each color category so an equal number of features are in each category
- Linear: Categories are created by taking the minimum and maximum attribute values and dividing the range equally by number
- Logarithmic: Categories are created by taking the minimum and maximum attribute values and dividing groups using a pseudo-logarithmic curve. This is useful when the distribution of values includes a small number of extremely high values that would distort a linear color ramp.
- Exponential: Categories are created by taking the minimum and maximum attribute values and dividing groups using a pseudo-exponential curve. This is useful when the distribution of values includes a small number of extremely small values that would distort a linear color ramp.
- Square Root: Categories are created by taking the minimum and maximum attribute values and dividing groups using a square-root curve. This is useful when the distribution of values includes a small number of extremely high values that would distort a linear color ramp, but not enough to justify a more-radical logarithmic curve.
- Square: Categories are created by taking the minimum and maximum attribute values and dividing groups using a squared-value curve. This is useful when the distribution of values includes a small number of extremely small values that would distort a linear color ramp, but not enough to justify a more-radical logarithmic curve.
- Discrete (Unique Value): The color ramp contains a separate color value for each different attribute value, ordered from low to high in the ramp. There is an arbitrary limit of 128 separate values to avoid unwieldy symbology configurations.

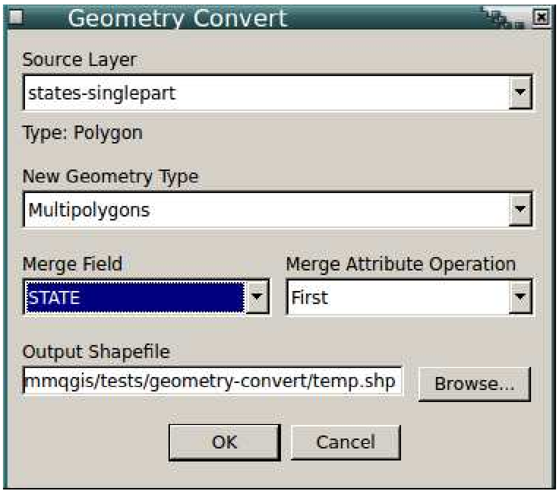
Color Presets are provided, although custom colors may be selected by clicking on the "Color..." buttons. Intermediate colors are computed using linear interpolation of the individual red/green/blue values.

For point features, one of the standard symbol types may be chosen: Circle, Triangle, Square, Rectangle, Diamond, Pentagon, Hexagon, Star and Arrow. "Mixed" sequentially assigns all those shapes (except Arrow) to the different values.

The Outline color button and Thickness selection box permit definition of the outline pen color and thickness.

Sizes are specified in map-scale-independent points.

Convert Geometry


Geometry Convert

Source Layer: states-singlepart

Type: Polygon

New Geometry Type: Multipolygons

Merge Field: STATE

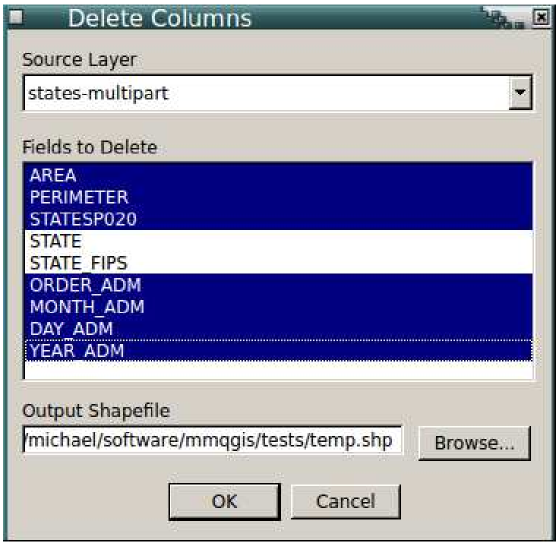
Merge Attribute Operation: First

Output Shapefile: mmqgis/tests/geometry-convert/temp.shp

The Geometry Convert tool changes the geometry types of shapes.

- All shapes other than points can be converted to centroids or individual node points
- Multi-part shapes (multi-point, multi-line, multi-polygon) can be decomposed to individual parts (point, line, polygon, respectively)
- Single-part shapes can be merged into multi-part shapes based on a common attribute (Merge Field). Numeric attributes from from the multiple source features will be handled using the Merge Attribute Operation (First or Sum). String attributes from multiple source features are always merged using the value from the first encountered feature.
- Polygons and multi-polygons can be converted to lines
- Shapes with elevation (2.5-D) are converted to X/Y (2-D). This can be helpful for converting GPS or KML layers to 2-D for merging with other 2-D layers (elevation is discarded)

Delete Columns


Delete Columns

Source Layer: states-multipart

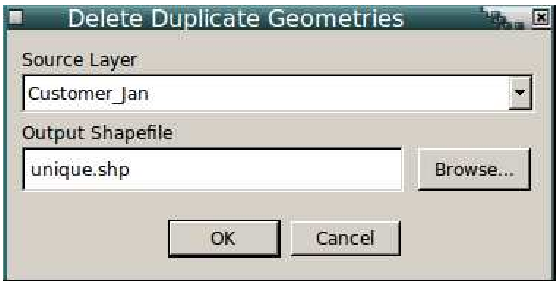
Fields to Delete:

AREA
PERIMETER
STATESP020
STATE
STATE_FIPS
ORDER_ADM
MONTH_ADM
DAY_ADM
YEAR_ADM

Output Shapefile: /michael/software/mmqgis/tests/temp.shp

The Delete Columns tool permits one or more fields to be deleted from a shapefile as it is saved to a new shapefile.

Delete Duplicate Geometries


Delete Duplicate Geometries

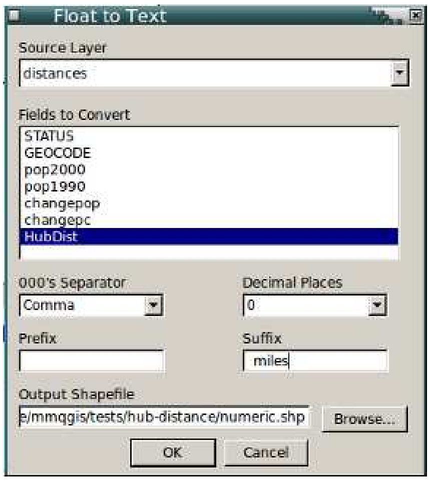
Source Layer: Customer_Jan

Output Shapefile: unique.shp

The Delete Duplicate Geometries tool removes duplicates shapes from a layer as it saves that layer to a shapefile. Two shapes are considered duplicates if their geometries are exactly identical, as determined by the QgsGeometry equals() function. Attributes are not considered, only geometry.

To improve speed, this tool loads all geometries into memory - which may cause memory issues with large datasets or large numbers of complex polygons.

Float to Text


Float to Text

Source Layer: distances

Fields to Convert:
STATUS
GEOCODE
pop2000
pop1990
changepop
changepc
HubDist

000's Separator: Comma

Decimal Places: 0

Prefix:

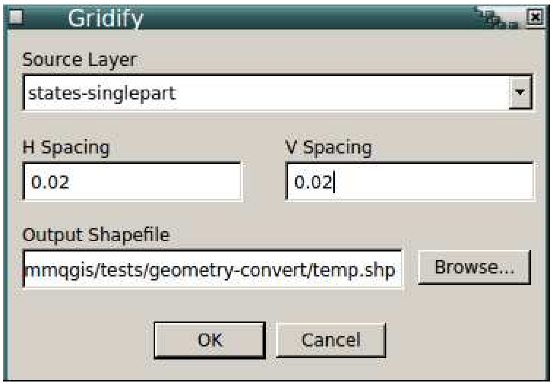
Suffix: miles

Output Shapefile: e/mmqgis/tests/hub-distance/numeric.shp

As of this writing, QGIS does not have a feature for number formatting when numeric values are used to label features. The Text to Float tool converts integer and floating point values to strings, with the ability to specify thousands separators, the number of decimal digits, prefixes and suffixes (eg. dollar sign prefix or "miles" suffix). This is the opposite of the "Text to Float" tool.

The Source Layer box is used to select the layer containing the attributes for conversion. The Fields to Convert selection box is used to select the attributes to be converted. Multiple fields may be selected. The Output Shapefile box selects the name of the file where the converted records will be written.

Gridify

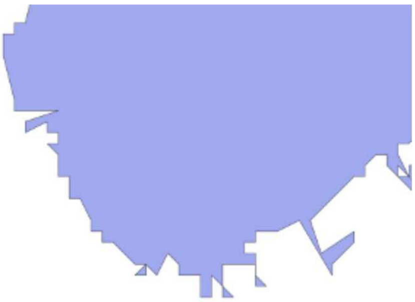

Gridify

Source Layer: states-singlepart

H Spacing: 0.02

V Spacing: 0.02

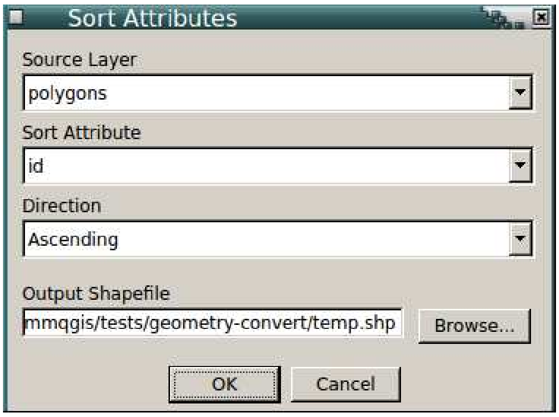
Output Shapefile: mmqgis/tests/geometry-convert/temp.shp



The gridify tool permits simplification of points, lines and polygons in a shapefile by aligning all vertices to a specified grid and then removing redundant points. This makes it possible to significantly improve display refresh time when working with shapefiles that are more detailed than is necessary for the final map. However, the gridification process can result in some odd artifacts when viewed at higher resolutions, particularly in dealing with coves and other appendages along the edges of larger polygons.

The alignment grid is specified with horizontal and vertical spacing. Defaults are based on 0.5% of the extent of the target layer. The gridified shapes are saved to a shapefile specified in the "Output Shapefile" form field.

Sort



Sort Attributes

Source Layer
polygons

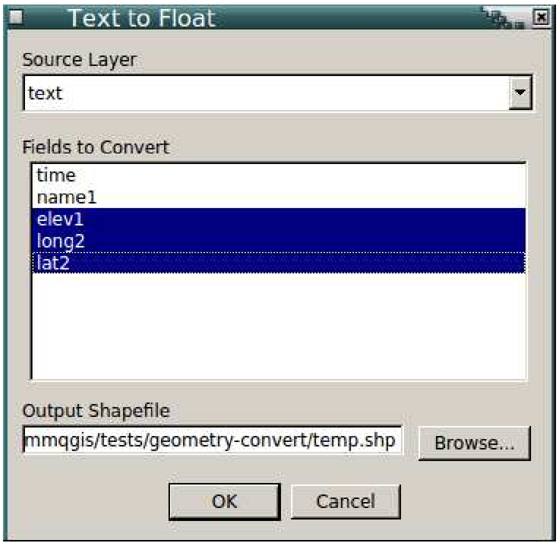
Sort Attribute
id

Direction
Ascending

Output Shapefile
mmqgis/tests/geometry-convert/temp.shp

The sort tool permits sorting of attribute data and associated shapefile data to maintain alignment. Sorting is based on a single attribute column and the result of the sort is saved to a shapefile specified in the Output Shapefile box. Sorting by attribute can be helpful for ordered CSV export or when viewing the Attribute Table

Text to Float



Text to Float

Source Layer
text

Fields to Convert
time
name1
elev1
long2
lat2

Output Shapefile
mmqgis/tests/geometry-convert/temp.shp

Numeric values may be stored as text strings in shapefiles, making it impossible to use them for symbology values. The Text to Float tool converts string attributes to floating point.

Source Layer selects the layer containing the attributes for conversion. The Fields to Convert selection box is used to select the attributes to be converted. Multiple fields may be selected. The Output Shapefile box selects the name of the file where the converted records will be written.

Care should be exercised in selecting fields since fields containing strings that cannot be converted to floating point (e.g. strings with non-numeric characters) will be assumed to have a value of zero.

Integer fields are converted to floating point, which should result in no loss of precision but may increase shapefile size. However, integer strings exceeding MAXINT will get unpredictable values and there may be some loss of precision when converting real values with large numbers of digits of significance.

Version History

v2014.09.19
Allow maximum 10-character field names from Join CSV rather than erroneous 9-character limit
Bug fix Join CSV handling of multiply-duplicated truncated field names so fields are not lost

v2014.08.25
Work around KML export style and symbolForFeature() API crash bug using start/stopRender()

v2014.08.24
CSV header conversion from UTF-8 so field names can be non-ASCII
KML export using io.open(encoding=utf-8) to support non-ASCII characters
Bug fix to save hub distance shapefile as WGS84 rather than source CRS

v2014.08.03
CSV format sniff read 4096 rather than 2048 bytes so error is not thrown on files with long lines

v2014.07.25
Add pixmap parameter to saveAsImage() so animation works with v2.4 asynchronous map refresh

v2014.07.10
mmqgis_merge() add case insensitivity to layer names
mmqgis_merge() add test for type mismatch for attributes with the same name
layer.dataProvider().crs() is now just layer.crs()
Add graceful failure when join by attribute or convert geometry type with no layers
Add "Only selected features" option for buffers

v2014.06.08
Add "Mixed" symbol types to color ramp
Add Red-Yellow and Yellow-Red to presets
Add escapechar to dialect for attribute join notfound CSV write
Fix mmqgis_round() so created grid centers correctly in WGS 84
Add addrtype and addrlocat fields for web geocoded addresses
Upgrade of animate columns to use rolled-back editing sessions rather than temporary layers
Upgrade of animate rows to use setSubsetString instead of temporary layers
Upgrade search dialog with Google and OSM search options

v2014.02.28
Add duplicate node check to Voronoi to avoid creating invalid geometries

v2014.02.24
Remove leading zeros in metadata.txt version numbers to avoid version number update loop since http://plugins.qgis.org strips leading zeros.

v2014.01.06
Remove debug lines from from mmqgis_geocode_street_layer() that were causing IOError on Windoze.

v2014.01.01
Add OpenStreetMap/Nomatim as web service geocoding option along with the Google
Add absolute measurement units to Distance to Nearest Hub
Add flat-end and single-sided buffers for lines

v2013.07.16
Upgrade mmqgis_search() to use QgsExpression for improved speed

v2013.07.15
Add Search tool for interactively browsing features
Add setDragDropMode() to merge layers list so layer merging can be ordered.

v2013.06.14
Inner rings (holes) are saved as separate polygons in Geometry Export
metadata.txt minimum version now has to be 2.0.0 to be fetched from repository, even though Master is 1.9
Fix code broken by more API changes
QgsFeature::attributes() no longer QVariant (API change in QVariant typecasting?)
QVariant toString(), toDouble() and toInt() replaced by unicode(), float() and int()
Coded substitute for removed QgsVectorLayer::featureAtId()
Conditional call to isUsingRendererV2() - old renderer V1 has been removed

v2013.03.23
Fix overlap/holes topology problem in create grid layer

v2013.03.14
Extensive upgrade to work with new QGIS vector API v1.9
Menu moved to top-level menu bar and reorganized
Continued fixes for UTF-8 support in all tools
Addition of create buffers, spatial join, and Google (tm) maps KML export
Enhance convert geometry tool to handle conversion from singlepart to multipart
Enhancement of color ramp tool (although the QGIS new symbology interface makes this tool less useful)
Addition of ZIP field to street geocode for TIGER line files

v2012.12.07
Replace QgsRenderer with QgsRendererV2 in animation tools (legacy renderer unsupported in Windoze, V2 unsupported in Linux)

v2012.10.25
__init__.py syntax error

v2012.10.19
Add urllib.quote() to Google geocode to handle non-ASCII address characters

v2012.08.28
mmqgis_select() uses unicode() instead of str() for string conversions
Upgrade street geocode to be able to use start/end x/y from layer geometries

v2012.05.10
Minimum qgis version now 1.4
Add exception handling in grid dialog for crs functions new to qgis 1.7 and 2.0
New tool: Geometry Convert

v2012.05.06
New tools: Animate Rows, Animate Columns, Delete Columns, Float to Text
text_to_float handles numbers with comma separators
Hub distance now calculated in meters, Km, feet or miles using QgsDistanceArea

mmqgis_library functions now return error message rather than creating error message box
mmqgis_library functions now all have addlayer parameter

v2012.04.06
Catch CSV sniffer errors in attribute join, Google geocode, and geocode streets
Change qt.4 legacy menu activated() to triggered()
Add submenus to facilitate future additions

v2012.01.11
Add Hub Lines tool
Add Delete Duplicate Geometries

v2011.11.12
Sort by attribute sorts int and float columns numerically

v2011.10.08
Commented out debug lines - causing "Bad file descriptor" error on Windoze

v2011.10.07
Fixed bug in raster color map - slightly better interpolation algorithm

v2011.10.06
Added is_float() tester for import geometry
Add explicit qgis parameter for mmqgis_read_csv_header()
Add notes for lack of UTF-8 and Unicode
Add direction for sort
Remove google geocode print debug line 494
Replace color_ramp /tmp directory with mkstemp()

v2011.09.14
Replace all str() with unicode() in mmqgis_dialogs.py to handle non-ASCII characters.

v2011.08.27
Add delimiter and line terminator options to export attributes and export geometry
Change attribute join text encoding from utf-8 to iso-8859-1 (M$-Windoze charset)
CSV attribute and geometry export character coding iso-8859-1
Fix case sensitivity in attribute join duplicate field name correction

v2011.08.22
Bug fix - unicode text handling in join attributes and export geometry

v2011.08.16
Bug fix - disable plugin removes menu entries - mmqgis_menu.unload()

v2011.07.30
Bug fix - bad shape ID on import geometries of points
Add error handling for CSV import delimiter sniffer exceptions
New grid types: rectangular polygon, diamond and hexagon

v2011.03.14
Add export / import geometries to / from CSV

v2011.01.21
Modify mmqgis_label_point() to use unicode() rather than str() for point labeling

v2011.01.08
Add to Official QGIS repository

v2010.09.29
- Added color map
- Added Google (tm) geocode
- Extensive internal reorganization of code
- Created mmqgis_library.py

v2010.01.02 - Added hub distance and select tools

v2009.09.04 - Added text to float tool

v2009.09.01 - Added merge layers tool

v2009.08.28 - Initial public release

When it comes to meeting men in New York, the odds are good but the goods are odd. (Garrison Keillor)