LUMAT TOOL MANUAL - INVITO

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A. GETTING STARTED

The Interactive Visualisation Tool (InViTo) is an instrument conceived as a toolbox for visually supporting the analysis, the exploration, the visualisation and communication of both spatial and non-spatial data in order to facilitate policy and decision making. InViTo focuses on data sharing and visualisation of information as a vehicle for the social inclusion in the planning processes. InViTo produces maps, where the correlation between information and their localisation generates an essential instrument for the knowledge of urban dynamics and resilience in answering to specific policies. A higher knowledge enhances the decision-making process, providing opportunities for better choices. For this reason, it can be classified within the category of spatial Decision Support System (sDSS) as a Web-GIS tool.

In particular, InViTo does not provide spatial solutions, but it aims at facilitating the analysis, exploration, visualisation and communication of data in order to improve the communication between actors coming from various backgrounds and with different interests. Projects can be managed and set in an easy and accessible way by people also with a low expertise in GIS technologies. Meanwhile, users have a high level of possibilities for customising their project and relative visualisations. In addition, InViTo can be part of instrumental equipment for collaborative working sessions, such as meeting or workshops, thanks to its interactive and dynamic usability. Its quick responses and visual interface can improve the discussion among people, offering a shared basis for enhancing the debate.

As a toolbox, InViTo was developed as a set of instruments for dealing with different spatial issues, disciplines and case studies. InViTo allows the weighting of different maps, as in a simplified multi-criteria analysis, and the exporting of maps with filters and weights to different formats (*.csv; *.pdf; *.jpg), so that the outcomes can be re-used for many other purposes.

InViTo can be accessed on the base of individual involvement in projects. In particular, there are three different kind of users: the project contributors, who have a personal account for full access to the creation and editing of a project; the project advisors, who have a personal account for accessing to non-public project, download maps and leave comments; and, finally, the public users, who do not need an account but can only view and explore the data within public projects.

The structure of InViTo

This configuration implies that the structure of InViTo is based on two main sections: the project editor, and data explorer.

The project editor is designed for GIS technicians, planners and administrators of projects. Here the logged-in users can create new projects and manage existing ones deciding the information that need to be seen by exploring users. Moreover, in the back-end interface, the logged-in users can decide the filter modality choosing among checkbox, dropdown menu, range sliders or single choice range sliders. Finally, specific buttons provide possibilities for customising the visualisation or for enabling particular elements such as tables, analysis grids or background maps.

The data explorer is designed for final users. In fact it can be public and allows people visualizing, filtering and exploring data related to specific projects.
The structure of data explorer can be in turn divided into three subsections:

- the data filtering section;
- the map weighting section;
- the data visualization section.

The distinctive features of InViTo are therefore dynamicity and interactivity, which make it open to variously skilled users and suitable to be part of instrumental equipment for meetings and workshops. It can be used by a single person or collectively during discussion sessions. In this case, the displayed map can become the interface for sharing opinions and reasoning. Its quick responses and visual interface offers possibilities for improving the discussion among people, providing a shared basis for enhancing the debate.

A.1 Uses and purposes

The main task of InViTo is to create opportunities for reasoning on data. InViTo can be used to:

- detect critical areas and areas with more opportunities;
- design alternative options;
- evaluate “what if” scenarios;
- investigate data spatial distribution;
- data mining;
- customise data visualisation;
- stimulate discussions;
- elaborate shared solutions.

A.2 User’s account

According to the individual involvement in projects, InViTo has three different kinds of user’s access. In order to create, edit or delete projects:

Users need to login with a “project contributor” account. In order to have a personal account, please, request it to stefano.pensa@polito.it.

In order to explore an existing project, there are two possible cases:

If it is a non-public project, users need to login with a “project advisors” account. Such kind of users can also download maps and leave comments to the project. In this case of private project, the log-in permission is provided directly by the project administrator.

If it is a public project, log-in is not needed and you have open access to its visualisation. Public users can not download data, nor leave comments.
B. PROJECT EDITOR

WARNING! This section is only for logged-in users. Depending on user’s profile, InViTo allows different options on the visibility and editing of projects.

See paragraph 1.2 to know the possible options. If you are a Project Advisor or a Project Contributor (logged-in user) continue reading Section 2 to discover the possibilities for editing and customising projects. Otherwise, skip to Section 3 and discover how explore data.

If you are a logged-in user, you can access to your project list and back-end interface in two ways:

- from the InViTo website, click on “My Projects” menu.
- from the data explorer window, clicking on the project list icon.

Then, you will access to a page containing a toolbar, a menu and a list of projects:

The toolbar, on the upper left side, allows the access to the following activities:

- **Home icon**: link to the home page of Urban Toolbox;
- **List icon**: link to the list of projects accessible by each single user;
- **Question point**: access to the documentation useful for the use of InViTo;
- **Arrow icon**: link to the home page of Urban Toolbox.
The menu on the left allows the access to the different sections for setting the visualization and interaction of each project. The sections are:

- **Projects section**: it allows to configure a project;
- **Curves section**: it allows to decide the mathematical curves necessary to build the relationships between data;
- **Map Styles section**: it allows to configure the style of background map;
- **Color Sets section**: it is necessary for defining the colours used in the visualization of data;
- **Log section**: here you can see the last days of InViTo logs.

### B.1 “Projects” section

**WARNING!** This section is only for logged-in users.

If you have a project advisors account, you can view the list of projects you are involved in.

If you have a project contributor account, clicking on the arrow on the right of project’s name, you can View, Edit or Delete your projects.

![Manage Projects](image)

Through this section, you can configure/edit or delete a project in InViTo.

In order to start your project, go the Project Manager page (section 2.1.1).

#### B.1.1 Add new project

- If you have a project advisors account, clicking on the arrow on the right of project’s name, you can click on “View” button to display the project.
- If you have a project contributor account, clicking on the arrow on the right of project’s name, you can View, Edit or Delete the project.
For building a new project, click on the “+Add new project” blue button.

The “+Add new project” button opens a setting page where providing a title and a description of the project.

After that, click on “Register new project” button and you will be redirected to the Edit project page.

Here Project Contributor users have to compile 4 sections and view the model as it appears in the data explorer view:

- **Settings** (section 2.1.2)
- **People** (section 2.1.3)
- **Components** (section 2.1.4)
- **Tables** (section 2.1.5)
B.1.2 Settings

When you create a New Project or click on the edit button near to the project list, you access to the settings project page.

Compile the form considering suggestions as follow:

- “Project contributors” users can assign a title, a sub-title and a description related to each single project. They can also upload the project logo picture and link it to project website. Among the front interface appearance settings, also the main colour can be chosen, so that each project visualised in InViTo can maintain the same graphic line of its parent project.
- **Title**: title of the project visible on the front-end interface
- **Subtitle**: short sentence after the title.
- **Description**: description visible in the front-end interface (par. 3.4).
- **Public project**: check yes if you want to use this project as Public. You can keep this button unchecked while you need to work on the project. In this case, the project will be accessible only by the users included in the “people” list.
- **Public export**: check yes if you want data included in the project can publicly exported.
- **Project Logo**: add jpg or png file (maximum size: 300px x 150px).
- **Project Logo Link**: web address that will appear by clicking on the logo.
- **Project Color**: define the main colour theme for the front-end interface.
- **Background**:
  - **Google Maps**: You can choose among different Maps styles or customize it.
  - **Open Street Maps (OSM)**,
  - or a **flat colour** map within the RGB palette colours. In addition, you can customise the and use it for your project. Flat colour maps (non-geographical maps) are very useful to visualise non-spatial data which should be represented through an abstract mode, such as charts, diagrams or info-graphics. In that case, a geometry can be upload to be used as background for the exploration of non-spatial data.
- **Flat Background Color**: choose which colour should be visualised in the case the user will select a flat colour map style.
- **Default Map Style**: choose which map style do you want when accessing to the project.

Then, save the setting.

### B.1.3 People

In the “People” section, “Project Contributors” users can include people in the project:

- people in the “Project contributors” are enabled to edit/delete the project;
- if the project is **public**, this field can be left empty; if the project is not public, people in the “Project advisors” are allowed to assess to the project.
B.1.4 Components

In the components section are listed external configuration of the project.

- **Color Set**: a list of color sets through which users can set the color of geometry in the data explorer view.
- **Curve Configuration**: a list of pre-defined curves which describes how an element generates attraction or repulsion on the basis of the distance. The application of curves is at the basis of the weighted sum of maps in the **Weighting section** (3.2).
- **Map Style**: a list of pre-defined map styles through which users can set the background map in the data explorer view.

B.1.5 Tables

The Tables menu is the data core. Here you have to upload your tables in .Json or GeoJSON file format. The tables show the attributes of data to be filtered, providing pre-set additional information field by field.

The setting of table visualization allows a high level of customization on **colours, dimensions, styles, map styles** and on a series of utilities by means of which the tool is expected to offer a wide range of possibilities for users to improve their analytical skills and enhancing the discussion.

To add a private table, click on the blue button “+Add private table“

**WARNING**! for a correct use of InViTo, Json files have to be projected as follows:

- Projected Coordinate System: WGS_1984/Web_Mercator_Auxiliary_Sphere
- Projection: Mercator_Auxiliary_Sphere
B.1.5.1 Add private table

**TIP #1!** Pay attention to the editing of the table. Each table you add, will be displayed in the filtering section of the data explorer as last layer. Thus, if you want to maintain a specific order of layers when you access to the viewer, keep in mind the order of uploading. However, this order can be modified just clicking on the layer’s name and moving it up and down the other layers.

**TIP #2!** The name of table’s columns (field name) will determine the order of filtering data. The way data are displayed respect the alphabetical order.

**TIP #3!** Check Forbidden characters (see section 2.1.5.2)

**TIP #4!** Check Forbidden words (see section 2.1.5.3).

After clicking on the blue button “Add private table”, a form will be displayed. First of all, click on “Scegli file” button and browse your folder to choose the .json or .geojson file.

![Add new Table form](image)

As the file is uploades on InViTo’s server, a green text will confirm the file is “Uploaded with success”.

Then, provide a name and a description to the table.

**WARNING!** Before save changes

- check the Primary Key relative to the FID field;
- check the type for each field corresponds to your setting.
When it is all ok, click on **save changes and wait** until green banner on the top confirms the table has been created. Then, click on the name of the project (in blue).
B.1.5.2 Forbidden characters

When editing a table, please consider that a number of characters can generate some errors due to the incompatibility between some platforms. In order to avoid errors, some letters are automatically substituted or, in case a proper substitution is not found, trimmed from strings during upload a table in InViTo. The following list shows the substiutions:

<table>
<thead>
<tr>
<th>from</th>
<th>to</th>
</tr>
</thead>
<tbody>
<tr>
<td>α</td>
<td>a</td>
</tr>
<tr>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>,</td>
<td>.</td>
</tr>
<tr>
<td>(</td>
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<tr>
<td>{</td>
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<tr>
<td>@</td>
<td>*</td>
</tr>
<tr>
<td>%</td>
<td>&amp;</td>
</tr>
<tr>
<td>©</td>
<td>C</td>
</tr>
<tr>
<td>®</td>
<td>R</td>
</tr>
<tr>
<td>Ñ</td>
<td>E</td>
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<tr>
<td>⫐</td>
<td>+</td>
</tr>
<tr>
<td>±</td>
<td>●</td>
</tr>
<tr>
<td>x</td>
<td>∙</td>
</tr>
<tr>
<td>&lt;</td>
<td>&lt;</td>
</tr>
</tbody>
</table>
### B.1.5.3 Forbidden words for table name or column name

When editing a table, please consider that the following words cannot be used for table name or for column name.

Most of those words are commands and are misinterpreted in the database.

More info in [official Postgresql documentation](https://www.postgresql.org/docs/current/).
B.1.5.4 Type of data

List of available data type in InViTo tables. This is a small subset of the available data in Postgresql.

For more information have a look to the official documentation on the specific types: http://www.postgresql.org/docs/9.3/static/datatype.html

- SMALLSERIAL
- SERIAL
- BIGSERIAL
- SMALLINT
- INTEGER
- BIGINT
- BOOLEAN
- TEXT
- CHARACTER
- CHARACTER VARYING
- REAL
- DOUBLE PRECISION
- INTERVAL
- NUMERIC
- JSON

B.1.5.5 Configure a table

In order to configure the visualisation of a table, in the table section click on the arrow near the table name and click in the “+Add Config” button.
You will access the Configuration Setting page

Here you have to compile the form as follows:

- **Name**: provide a name to the table configuration which could be easily understood by final users. This name will be the title of layers in the visualisation.
- **Description**: this field can be used to add a description to the layer.
- **Configuration**: for advanced users, this field can be used to copy and paste the same configuration from other projects.
- **Active in project**: if not enabled, the table will not be visible in the project visualisation
- **Filter Hierarchy**: for advanced users, this field allows to create a hierarchy between filters.

Then, further 3 sections have to be compiled:

- **Appearance** (see section B.1.5.6)
- **Filters** (see section B.1.5.7)
- **Weighting** (see section B.1.5.8)
B.1.5.6 Appearance setting

The appearance setting of geometries has to be done layer by layer, field by field. In the appearance menu, "project contributors" users can choose the basic aspect of all geometries when no map style is enabled.

A difference is considered among points, lines and areal geometries as well as in GIS data. For all of these elements, a colour, a dimension and a level of opacity have to be assigned.

A checkbox allows users to decide if the layer should be visible when opening the project, and if the layer can be filtered by the final user or it should be used only as a background image.

An info box content window can be compiled in order to have a pop-up window for each geometry when double-clicking on it in the front interface.

The pop-up window containing the info box. It appears when double-clicking on a geometry in the map window.
The info box window should be compiled in html. Here below an example shows the content of an info-box window where:

- the title of the image, included in the database field named "title_", is in bold.
- a picture of the geometry is loaded from an url contained in the database field named "image_".
- a description (in italic style) of the feature is loaded from the database field named "descr_

```html
<b>{{title_}}</b><br/>
<img src="{{image_}}"><br/>
Description: <i>{{descr_}}</i></code>
```

B.1.5.7 Filters setting

Through the filtering section, project contributor users are guided to design the visualisation of data, which will be displayed in the front-end interface. Project contributors can decide which layers and sub-layers of data can be visualised in the front interface, and how data should be displayed. Therefore, they can decide the degree of freedom of final users in knowing the information included within data.

When opening the filtering section, you will find the list of fields included in the table.
For each field, click on the arrow, then open and compile the form.

- **Alias**: is the name visible in the filtering section of data explorer.
- **Description**: is the name visible when passing with the mouse over the field’s name in the filtering section of data explorer.
- **Appears in table**: checking it enables the field to be visible in the table in data explorer.
- **Draw graph**: checking it enables the field to be visible in the graph in data explorer.

**FILTERING**

- Filtering: checking it enables the field to be visible in the filtering section of data explorer.
- Each kind of data can be visualised through different types of filters:
  - **checkbox**: for text fields.
  - **dropdown menu**: for text fields.
  - **range sliders**: for numeric fields.
  - **single choice range slider**: numeric fields.
  - **tag**: text fields in [“txt1”, “t2”, ..”] format.
- **Filtering panel**: writing a name, you automatically create a panel containing the field. You can use the same panel’s name for different field in order to create sub-folders for visualization.

**APPEARANCE** (how to visualise data)

- **Filtered opacity**: set the geometry opacity;
- **Fill Style**: choose the set of colours for filling the geometry in relation to the values included in the table field.
- **Line Style**: choose the set of colours and width for lines and polygons’ perimeters in relation to the values included in the table field.
- **Point Style**: choose the set of colours and radius (n. of pixels) of point geometries in relation to the values included in the table field.
B.1.6 Weighting setting

The weighting section allows data to have an influence on other data on the basis of mathematical curves.

Through this section, users can assign a curve to each value included in a specific field of the table. In order to weight maps, firstly check the “Weighting on” box. Then, Roles should be assigned to the layer:

- **“Listeners data”**: this role can be assigned to one map for each project. This map has the function of defining the land subdivision. For this purposes, it can be used a grid, a census map, a zoning map or whatever land classification map.
- **“Players data”**: all the other layer can be weightd assigning them a “players data” role. Then, two fields of the table must be chosen for defining the role:
  - Type field is the field of the table which contains the family name of the values to be weighted (i.e. Transport network).
  - Sub-Type field is the field which contains the sub-type of the values to be weighted. To each subtype, users can assign a different curve (i.e. Public Transport, Bykelanes, Highways,..).

By default, mathematical curves have been previously set to linear functions. Clicking on the dropdown menu, users can choose between the curve types associated to the project.
B.2 “Curves” section: configuration

In order to calculate the influence of each layer on the other layers, InViTo makes use of mathematical curves which describe the behaviour.

The curve configuration sub-menu allows administrator users to create or edit one of the already available curve. For each curve archetype, users can set the radius of action, the intensity, and all the parameters that define the behaviour of the curve. Once curves are edited, users assign them to the relative layer. Their working is then visible in the front interface.

In the curves setting page, administrator users can set the typology and the parameters of each curve to be used to weight maps in the front interface.

The weights are calculated on the data filtered in the previous section of data filtering. Therefore, both administrator and public users have the opportunity to evaluate the response of different scenarios through an interactive and dynamic visualisation, which immediately provides the response of land to specific planning choices or policies.

Curves assign a behaviour on the basis of a distance:

\[ f(x) = d \]
B.3 “Map Styles” section: configuration

Here, "Project contributors" users can choose or customise the map style(s), through assigning different setting to a Google Maps style.

For example, map styles can be customised by the use of html script provided by specific open source data repository, where communities share their own map styles and allow users to create their own. One of this portal is for example Snazzy Maps (https://snazzymaps.com/), which allows highly detailed generation of map styles under the Creative Commons licence.

Back interface of InViTo: definition of map styles. Here, "Project contributors" users can set the Map styles parameters, to be visualised in the front interface.

B.4 “Color Sets” section: configuration

A specific menu for colour-set management is available in order to choose the map style to be assigned to each layer when selected. Here, project contributors users can choose, edit or create a specific set of colour to be assigned to a specific field of data. This set of colours will be visible when the final user will click on the fill icon (section 3.3.1) near each layer name on the front-end interface.

For creating a new color set, click on the blue button on the top. Provide it with a name and a related project. If you want that your color set could be used in other projects, enable the Public check box. Then choose the Color set nature between:

- **Blending**: choose the number of colours (Color steps) and the key colours to be used for creating a graduated scale.
- **Random**: choose the number of random colours you need and click to update the view. Clicking on the colour you can change it.
- **Code**: write your code as this example: [FFFFFF, 000000]
If you need to change an existing color set, click on the arrow near the color set name and click on the edit icon.

The menu for the color-sets management.

**WARNING!** In changing a color set, verify that the color set is not used by other projects. If so, please, build a NEW color set in order to not damage other project.

### B.5 “Log” section

In this page you can see the last days of InViTo logs.

Timestamp with: time zone, host, application, [pid]: [client ip], user (wordpress user id if wpUser:id else postgresql user), message.
C. DATA EXPLORER

The data explorer interface is graphically structured by two main elements:

- a viewer window containing an interactive map;
- a vertical menu on the left side containing all the parameters setting.

The interactive map can be both geographical or not, so that also non spatial-data can be visualised and explored. This means that the geographical maps can be replaced by info-graphics, according to the choice of the project contributor.

The menu on the left side contains all the elements for exploring data and interact with the information.

The map scale and the zoom commands are on the upper right side of the dynamic map frame.
C.1 Data Filtering

InViTo proposes a web interface where people can easily decide the information to see. The data filtering section allows data to be interactively selected and filtered by the end users in order to customise the visualisation.

Despite basically InViTo works as other GIS viewers, it does not visualise only the different layers of a set of data, but it allows users to explore the single records of a dataset by the use of different kind of filters.

All data can be selected and filtered through checkbox windows, dropdown menu or sliding cursors.

Filters can be grouped in specific panels, so that the visualisation of data is supported by specific steps to follow.

Specific buttons provide possibilities for enabling particular elements such as tables, analysis grids or background maps.

InViTo allows data to be investigated at different levels with also intersection of attributes, in order to analyse data clusters in relation to specific parameters.

In order to filter data, explore the content of each layer clicking on the arrow on the right of the layer’s name. A number of sub-layers appear. Data in sub-layers can be filtered in five ways:

- moving the sliders and selecting the range of interest;
- (un)checking the checkbox:
- selecting the tag you want to include in your visualisation;
- selecting the sub-menu from a list of possibilities:
- clicking on the Invert icon, so that you can invert the selection of data.

Last but not least, during the visualisation on the front-end interface, some changes in the order of layers can be necessary. Therefore, users can change this order simply dragging up and down the layer name in menu on the left side of the front interface.
C.2 Map Weighting

The map weighting section allows the filtered maps to be overlapped and weighted on the basis of their priority. The aim of the map weighting section is to provide users with a tool for analysing the localisation of expected effects of specific elements and evaluating the sum of effects on the basis of a specific mathematical curve associated to the layers.

On the basis of a green-yellow-red gradient colour scale, InViTo shows where specific requested aspects are present (green colour) or absent (red colour).

The maps show the spatial effect of selected criteria depending on assigned weights.

The variation of weights on the left side menu makes the map changing in colours through a traffic-light colour gradient scale.

The weighting section can be used to determine the presence of specific elements in an area and to understand the influence of these elements on their surroundings. Combining the effects of each aspect, InViTo generates one single map which highlights the suitability of the area to respond to a specific question according to the chosen parameters. Through the resulting maps, actors could understand which areas already had the requirements to fit their preferences. InViTo can be useful in suggesting new planning decisions, providing responses in real time to “what if” questions and displaying the effects of planning choices.

This section is an on-going part of the research. In fact, the map weighting is currently based on the sum of maps as in the basic methodology of Multicriteria Decision Analysis (MCDA) [1]. Further developments of InViTo will improve this section in order to integrate the opportunity to develop MCDA directly in the tool as the spatial Multicriteria Analyses combining GIS and MCDA [2, 3].

The weighting section is set as follows:

- It is composed by a set of slider cursors, which allow users to set the importance of each element on a scale from -10 to 10.
- The computing can be performed not only on regular grids but in any kind of irregular grid.
- The calculation of values can be given not only by a function of distance as in the previous version of the tool, but also by considering a proper value of each single cell.
- The mathematical curves, that calculate the effect of an element on land, can be easily set up by users through a specific submenu of InViTo named “curve configuration”.

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The weighting section includes a further range filter, which allows weighted maps to be filtered on the basis of their resulting values. By this filter, users can select the areas which respond to a specific range of selected criteria and visualise which areas are over or under a specific threshold or comprised between a defined range.

C.3 Data Visualization

The setting of data visualization allows a high level of customization on:

- **Colours** (section C.3.1)
- **Dimensions** (section B.1.5.7)
- **Styles** (section B.1.5.8)
- **Map styles** (section B.3)

and on a series of utilities by means of which the tool is expected to offer a wide range of possibilities for users to improve their analytical skills and enhancing the discussion.

Furthermore, users can visualize:

- **Tables** (section C.3.5)
- **Graphs** (section C.3.6)

showing data according to the filters activated in the filtering section. The tables show the attributes related to the filtered data, providing pre-settled additional information field by field. The charts show the values of the filtered data in relation to the whole set of data, highlighting the selected geometries.

Colours and thickness of lines change according to the setting made by the users, providing further information on the selected elements.

C.3.1 Colour and size

Data visualisation can be customised by the user clicking on the following icons:

- Weight feature's stroke with thickness dependent on this property. Clicking on this button you can modify the thickness of lines or the radius of points.

- Fill feature's area with color dependent on this property. Clicking on this button you can enable and disable the colour map style associated to each layer.


Clicking on the thickness button, lines assume different thickness according to their value, as shown in the legend window. The selected button has a different colour dependent on the colour configuration of the project interface.

Clicking on the fill button, lines assume different colours according to their value, as shown in the legend window. The selected button has a different colour dependent on the colour configuration of the project interface.
The intersection of the colour style from one layer with the thickness relative to another layer, provide interesting opportunities for reading maps and increasing the knowledge which can be achieved from data visualisation. In this case, you can visualise the colour scale according to a field (value 2) and the size according to another field (value 3). Such a visualisation can provide a number of outcomes. For example black and thicker lines correspond to the maximum values of two fields (value 2 and 3), while thinner white lines refer to minimum values.

C.3.2 Inverse selection

Clicking on this icon, you can invert the data selection of each single field.
C.3.3 Map styles

Users can customise the visualisation of the background map.

In the options menu, select “background”.

Here you can choose between different map styles, as set by the “Project contributors” user. Generally, map styles can vary on a number of:

- Google Maps styles (with pre-set colours listed in a menu);
- Open Street Map (OSM);
- and flat colours (well indicated for non-geographical representations such as info-graphics or interactive diagrams).

Example of background map: a gray scaled Google Maps style (left), an Open Street Map (center) and a flat colour (right).

C.3.4 Tables

Filtered data can be displayed also within a table, providing pre-settled additional information field by field.

On the front interface, clicking on the table icon near the layer name, a table appears on the bottom side of the screen. It contains the attributes relative to the filtered data, providing some more information on the sum, average, minimum and maximum values, field by field. In order to determine which attributes should be visible to the final users, administrators have to choose the setting of the table.
C.3.5 Graphs

Clicking on the graphs icon (as shown in the image on the left), you can open the graphs relative to the project database.
If you do not have selected any colour styles, the graphs appear gray. In this case, the graphs show only the trend of data and they average value (the horizontal line within the graph).

If you click on a colour style, the bar of the charts will assume the same colours of the geometries within the map, showing data according to the filters activated in the filtering section.

The tables show the attributes related to the filtered data, providing pre settled additional information field by field.

The graphs show the values of the filtered data in relation to the whole set of data, highlighting the selected geometries.
C.4 Description of the project

In this section you will find a brief description of the project.

C.5 Export data

Maps created through InViTo can be exported and used to produce further elaborations such as analysis or visualisations. This function is available only for authorised projects.

Currently, only the export function is active, while the import one is under construction.

You can export data in three different formats:
- .GeoJSON
- .csv, | as separator
- .png

To export data, click on the Floppy icon and select the file format you prefer.

C.6 Comments and feedbacks

Here, users can leave their own comments to the use of InViTo or on the project usability. Any feedback is always welcome!
D. REFERENCES


