GUI configuration

The GUI is currently compatible only with Linux environments (the reference for this guide is Ubuntu). If you have a Windows OS in your PC, you will need to install and launch WSL2 (Windows Subsystem for Linux). You can find the installation guide [here](#).

Dependencies:

1. Essentials
2. CMake
3. Qt
4. VTK

Make sure that all the packages are up to date calling `sudo apt update` and `sudo apt upgrade`

Essentials

```
sudo apt install build-essential mesa-common-dev mesa-utils freeglut3-dev
python3-dev python3-venv git-core ninja-build libx11-dev rapidjson-dev
```

CMake

```
sudo apt install cmake
```

```
sudo apt install cmake-curses-gui
```

Qt

```
wget https://download.qt.io/new_archive/qt/5.12/5.12.0/qt-opensource-linux-
x64-5.12.0.run
```

```
chmod 777 qt-opensource-linux-x64-5.12.0.run
```

```
./qt-opensource-linux-x64-5.12.0.run
```

The Qt MaintenanceTool will guide you through the installation of the required packages (here Qt5.12.0 with Desktop gcc 64 bit). Remember the path in which Qt will be installed, it will be needed for the VTK installation.

VTK

```
git clone https://gitlab.kitware.com/vtk/vtk.git
```

```
cd vtk
```

```
mkdir build
```

```
cd build
```

```
ccmake ..
```

The last command will display a configuration GUI for the (semi-automatic) definition of the path of several dependencies for VTK. Here, you need to press the "c" button.

If there are no issues, you should visualise something similar to what you can find in the following image:

```
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BUILD_SHARED_LIBS                  *ON
CMAKE_BUILD_TYPE                   *Debug
CMAKE_INSTALL_PREFIX               */usr/local
OPENGL_GLES2_INCLUDE_DIR           */usr/include
OPENGL_GLES3_INCLUDE_DIR           */usr/include
VTK_BUILD_DOCUMENTATION            *OFF
VTK_BUILD_EXAMPLES                 *OFF
VTK_BUILD_SCALED_SOA_ARRAYS        *OFF
VTK_BUILD_SPHINX_DOCUMENTATION     *OFF
VTK_BUILD_TESTING                  *OFF
VTK_EXTRA_COMPILER_WARNINGS        *OFF
VTK_GROUP_ENABLE_Imaging           *DEFAULT
VTK_GROUP_ENABLE_MPI               *DONT_WANT
VTK_GROUP_ENABLE_Qt                *DEFAULT
VTK_GROUP_ENABLE_Rendering         *WANT
VTK_GROUP_ENABLE_StandAlone        *WANT
VTK_GROUP_ENABLE_Views             *DEFAULT
VTK_GROUP_ENABLE_Web               *DEFAULT
VTK_SMP_IMPLEMENTATION_TYPE        *Sequential
VTK_USE_CUDA                       *OFF
VTK_USE_LARGE_DATA                 *OFF
VTK_USE_MEMKIND                    *OFF
VTK_USE_MPI                        *OFF


BUILD_SHARED_LIBS: Build VTK with shared libraries.
Keys: [enter] Edit an entry [d] Delete an entry              CMake Version 3.22.1
      [l] Show log output    [c] Configure
      [h] Help               [q] Quit without generating
      [t] Toggle advanced mode (currently off)
```

Here, you need to set "CMAKE_BUILD_TYPE" to "Release" and "VTK_GROUP_ENABLE_Qt" to "YES", then press again the "c" button. The procedure will give you an error, since it is not able to locate Qt. Press the "e" button and then proceed to set "VTK_QT_VERSION" to "5" and "Qt5_DIR" to "QtHOME/5.12.0/gcc_64/lib/cmake/Qt5", where QtHOME is the path to the folder in which you installed Qt. Press again the "c" button and if everything is fine, you will see something like what you can see in the next image:

```
                              Page 1 of 2
Qt5Core_DIR            */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5Core
Qt5Gui_DIR             */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5Gui
Qt5Network_DIR         */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5Network
Qt5OpenGL_DIR          */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5OpenGL
Qt5Qml_DIR             */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5Qml
Qt5Quick_DIR           */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5Quick
Qt5Sql_DIR             */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5Sql
Qt5Widgets_DIR         */home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5Widgets
BUILD_SHARED_LIBS       ON
CMAKE_BUILD_TYPE        Release
CMAKE_INSTALL_PREFIX    /usr/local
OPENGL_GLES2_INCLUDE_DIR  /usr/include
OPENGL_GLES3_INCLUDE_DIR  /usr/include
Qt5_DIR                 /home/andreas/Qt5.12.0/5.12.0/gcc_64/lib/cmake/Qt5
Qt6_DIR                 Qt6_DIR-NOTFOUND
VTK_BUILD_DOCUMENTATION  OFF
VTK_BUILD_EXAMPLES       OFF
VTK_BUILD_SCALED_SOA_ARRAYS  OFF
VTK_BUILD_SPHINX_DOCUMENTATION  OFF
VTK_BUILD_TESTING        OFF
VTK_EXTRA_COMPILER_WARNINGS  OFF
VTK_GROUP_ENABLE_Imaging  DEFAULT
VTK_GROUP_ENABLE_MPI     DONT_WANT


Qt5Core_DIR: The directory containing a CMake configuration file for Qt5Core.
Keys: [enter] Edit an entry [d] Delete an entry              CMake Version 3.22.1
      [l] Show log output    [c] Configure
      [h] Help               [q] Quit without generating
      [t] Toggle advanced mode (currently off)
```

Press again the "c" button and then "g". The GUI will be closed. Next, you need to run

```
make -j16
```

if you have a PC with good processor, you can even try putting a greater value after j, as it defines the number of threads to be used for the building of VTK (it will require some time). If everything works fine, you will not see errors and, after the building is finished, you need to launch

```
sudo make install
```

Libraries

1. SemantisedTriangleMesh
2. DrawableGeometries
3. UrbanIntelligenceEnvironment

SemantisedTriangleMesh

```
git clone https://github.com/andreasscalas/SemantisedTriangleMesh.git

cd SemantisedTriangleMesh

mkdir build

cd build

cmake ..

make -j16

sudo make install
```

DrawableGeometries

```
git clone https://github.com/andreasscalas/DrawableGeometries.git

cd DrawableGeometries

mkdir build

cd build

ccmake ..
```

As for VTK, here you need to set "Qt5_DIR" to "QtHOME/5.12.0/gcc_64/lib/cmake/Qt5" and press the "c" and then "g" button

```
make -j16

sudo make install
```

UrbanIntelligenceEnvironment

```
git clone https://github.com/andreasscalas/UrbanIntelligenceEnvironment.git

cd UrbanIntelligenceEnvironment

mkdir build

cd build

cmake ..

make -j16
```

At this point the GUI is built, you can launch it with

```
./UrIntEnv
```