Create GUI in Python using Qt

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Introduction

Qt is a C++ cross-platform application and user-interface framework. It is developed by Nokia and contains a comprehensive library of GUI classes.

Using the visual editor “Qt Designer” GUIs are easily created and maintained.

This tutorial describes a simple way to integrate Qt GUIs in Python programs using PyQt and the Python module `QtGuiLoader`.

In example 1 a flexible widget is created, which can be used as Widget, Dialog or MainWindow. Follow this example in case you do not need menubar, toolbar and statusbar. Otherwise follow example 2 in which a MainWindow with a menubar is created.

Requirements

Install Pythonxy from pythonxy.com (Only for windows)
Or
Install Python 2.7, Qt (including QtDesigner), and PyQt

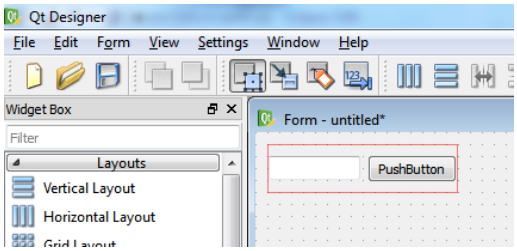
Copy QtGuiLoader.py to your working folder

Example 1

In this example a flexible widget is created, which can be used as Widget, Dialog or main window. Follow this example in case you do not need menubar, toolbar and statusbar

Create ui

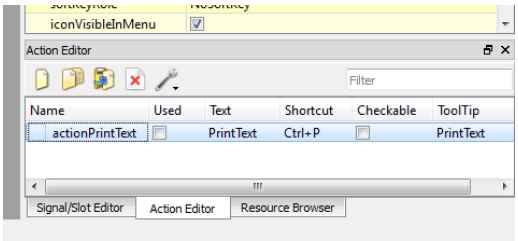
- Open Qt Designer
- Select “Widget” and <Create>*
- Add a Horizontal Layout
- Add LineEdit to layout
- Add PushButton to layout



*It is possible to create “Main Window” and “Dialog” as well, but select “Widget” as it can be used for all three purposes when integrating in Python. If however a menu is required then Main Window must be selected, see example 2.

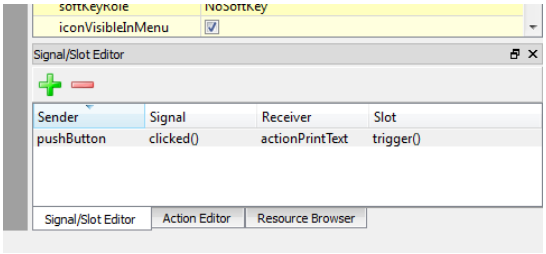
Add action

- Create new action in Action Editor
  - Text: PrintText
  - Name: actionPrintText



Connect button to action

- Add Signal/Slot in Signal/Slot Editor
  - Sender: pushButton
  - Signal: clicked()
  - Receiver: actionPrintText
  - Slot: trigger()



Prepare for integrate in python

- Save as “MyWidgetUI.ui”
- Create an empty “MyWidgetUI.py” file at same location as “MyWidgetUI.ui”**.
  Its content will be autogenerated if the file is completely empty or older than “MyWidgetUI.ui”

**This is required in order to ”`import MyWidget`”.

Integrating in Python

The widget can be integrated as `QMainWindow`, `QDialog` or `QWidget`. When using QtGuiLoader, actions are automatically connected to methods with the same name.

All `PyQt` elements are found in the `ui`-object, e.g. `x.ui.lineEdit` and documentation of the `PyQt` elements is found at http://pyqt.sourceforge.net/Docs/PyQt4/classes.html

Before a gui can be shown, a `QApplication` must be started. This is automatically done when calling `QtMainWindowLoader` and `QtDialogLoader` from `QtGuiLoader` if the `application` argument is `True`.

The following examples are found in UseQtGuiLoader.py

Main window

A main window is a separate window, i.e. two main windows can be closed independently.

In order to use the `MyWidgetUI` as `QMainWindow`, subclass `QtMainWindowLoader` from `QtGuiLoader` and instantiate with `MyWidgetUI` as `ui_module` argument.

```
import MyWidgetUI
from QtGuiLoader import QtMainWindowLoader
class MyMainWindow(QtMainWindowLoader):
    def __init__(self):
        QtMainWindowLoader.__init__(self, ui_module=MyWidgetUI, application=True)

    def actionPrintText(self):
        print "Mainwindow text: %s"%self.ui.lineEdit.text()

MyMainWindow().start()
```

Dialog

A Dialog is a sub window, i.e. if its parent window is closed the dialog is closed too. A dialog may be modal, such that other windows cannot be operated before the dialog is closed.

In order to use the `MyWidgetUI` as `QDialog`, subclass `QtDialogLoader` from `QtGuiLoader` and instantiate with "`MyWidgetUI`" as `ui_module` argument.

```
import MyWidgetUI
from QtGuiLoader import QtDialogLoader
class MyDialog(QtDialogLoader):
    def __init__(self,parent,application,modal):
        QtDialogLoader.__init__(self, MyWidgetUI, parent, application,modal)

    def actionPrintText(self):
        print "Mainwindow text: %s"%self.ui.lineEdit.text()

MyDialog(parent=None,application=True,modal=True).start()
```

Widget

A widget can be inserted into an existing widget or layout.

In order to use the `MyWidgetUI` as Widget, subclass `QtWidgetLoader` from `QtGuiLoader` and instantiate with "`MyWidgetUI`" as `ui_module` argument and the parent of the widget as parent.

```
"""Use as widget with actionhandlers in widget subclass"""
class MyWidget(QtWidgetLoader):
    def __init__(self, parent):
        QtWidgetLoader.__init__(self, ui_module=MyWidgetUI, parent)

    def actionPrintText(self):
        print "Mainwindow text: %s"%self.ui.lineEdit.text()

app = QtGui.QApplication(sys.argv)
window = QtGui.QMainWindow()
w = MyWidget(parent=window)
window.show()
sys.exit(app.exec_())
```

Example 2

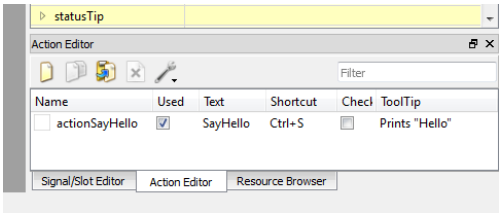
In this example a main window with menubar is created. Follow this example if menubar, toolbar and/or statusbar are required

Create ui

- Open Qt Designer
- Select “MainWindow” and <Create>
-
- Add PushButton to window

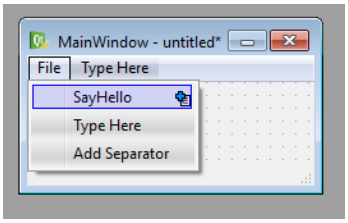
Add action

- Create new action in Action Editor
  Text: SayHello
  Name: actionSayHello
  Shortcut: Ctrl+S

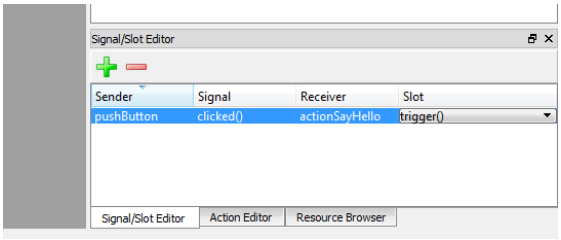


Connect action to menu and button

- Doubleclick on “Type Here” in the menubar of the window and type “File”
- Drag actionSayHellow from Action Editor to the file menu



- Add Signal/Slot in Signal/Slot Editor
  Sender: pushButton
  Signal: clicked()
  Receiver: actionSayHello
  Slot: trigger()



Prepare for integrate in python

- Save as “MyMainWindowUI.ui”
- Create an empty “MyMainWindowUI.py” file at same location as “MyMainWindowUI.ui”**.
  Its content will be autogenerated if the file is completely empty or older than “MyMainWindowUI.ui”

**This is required in order to “`import MyMainWindow`”.

Integrating in Python

When loading via `QtMainWindowLoader`, actions are automatically connected to methods of the same name.

All PyQt elements are found in the “`ui`”-object, e.g. “`x.ui.pushButton`” and documentation of the PyQt elements is found at http://pyqt.sourceforge.net/Docs/PyQt4/classes.html

The following example are found in UseQtGuiLoader.py

In order to integrate `MyMainWindowUI` in Python, subclass `QtMainWindowLoader` from `QtGuiLoader` and instantiate with "`MyMainWindowUI`" as `ui_module` argument.

```
import MyMainWindowUI
from QtGuiLoader import QtMainWindowLoader
class MyMainWindowWithMenu(QtMainWindowLoader):
    def __init__(self):
        QtMainWindowLoader.__init__(self, MyMainWindowUI)

    def actionSayHello(self):
        print "hello"

MyMainWindowWithMenu().start()
```

In this example the action "actionSayHello" can be invoked from the menu, by its shortcut or by the pushButton