**Development of a Metadata Crawler  
Desktop Application using Python**

Project Report for Summer Internship 2015

*Submitted By*

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**CERTIFICATE**

This is to certify that the project report entitled “Development of a Metadata Crawler Desktop Application using Python” is a record of bonafide work carried out by Aly Akhtar & Sachin Sharma of Faculty of Engineering & Technology, Jamia Millia Islamia under my supervision and guidance, as part of their Summer Internship 2015, at the National Informatics Centre, Shastri Park, New Delhi.

**Mr. Kapil Sharma**

Date: Scientist-D, National Informatics Centre

Place: New Delhi Shastri Park, New Delhi

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**Aly Akhtar**

**Sachin Sharma**

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**About PostgreSQL**

PostgreSQL is a powerful, open source object-relational database system. It has more than 15 years of active development and a proven architecture that has earned it a strong reputation for reliability, data integrity, and correctness. It runs on all major operating systems, including Linux, UNIX (AIX, BSD, HP-UX, SGI IRIX, Mac OS X, Solaris, Tru64), and Windows. It is fully ACID compliant, has full support for foreign keys, joins, views, triggers, and stored procedures (in multiple languages). It includes most SQL: 2008 data types, including INTEGER, NUMERIC, BOOLEAN, CHAR, VARCHAR, DATE, INTERVAL, and TIMESTAMP. It also supports storage of binary large objects, including pictures, sounds, or video. It has native programming interfaces for C/C++, Java, .Net, Perl, Python, Ruby, Tcl, ODBC, among others, and exceptional documentation.

PostgreSQL prides itself in standards compliance. Its SQL implementation strongly conforms to the ANSI-SQL: 2008 standard. It has full support for subqueries (including sub selects in the FROM clause), read-committed and serializable transaction isolation levels. And while PostgreSQL has a fully relational system catalog which itself supports multiple schemas per database, its catalog is also accessible through the Information Schema as defined in the SQL standard. Data integrity features include (compound) primary keys, foreign keys with restricting and cascading updates/deletes, check constraints, unique constraints, and not null constraints. It also has a host of extensions and advanced features. Among the conveniences are auto-increment columns through sequences, and LIMIT/OFFSET allowing the return of partial result sets. PostgreSQL supports compound, unique, partial, and functional indexes which can use any of its B-tree, R-tree, hash, or GiST storage methods.

Best of all, PostgreSQL's source code is available under a liberal open source license: the PostgreSQL License. This license gives you the freedom to use, modify and distribute PostgreSQL in any form you like, open or closed source. Any modifications, enhancements, or changes you make are yours to do with as you please. As such, PostgreSQL is not only a powerful database system capable of running the enterprise, it is a development platform upon which to develop in-house, web, or commercial software products that require a capable RDBMS.

1. **Project Introduction**

The aim of the project was to develop a desktop application to access the metadata information of a PostgreSQL database including tables, columns, functions, procedures, views, indexes etc.

This application, which we have named “MetGeomi”, will allow the user to connect to a remote PostgreSQL database by providing the authentication details like IP, User Name, Password, Database Name etc. The software will then crawl through the database and retrieve metadata information. The information will be displayed in an easy-to-use Graphic User Interface display.

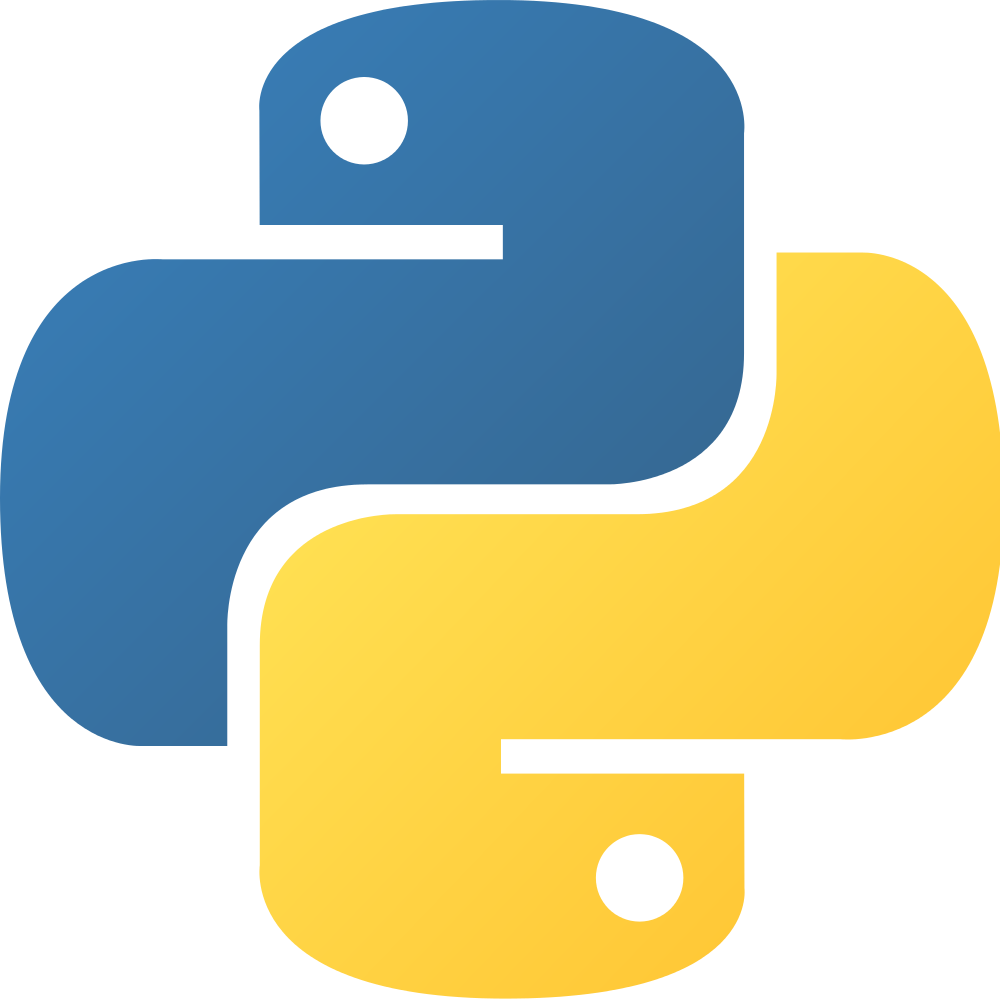
This Project Report is being written to provide a detailed and complete description of the implemented work to the intended readers. The subsequent chapters include all the information one would need to understand this piece of work.

1. **Tools and Language**

The whole project is written in python language i.e. both the front end and the back end. The back end is written in basic python language and it uses psycopg2 library for connecting to a PostgreSQL database and extracting the metadata from the database. The front end or the GUI is written in python with the help of pyqt4 library. The windows executable file was created with another python library pyinstaller and the whole installer was created with the inno setup compiler.

Overall the following things were used in realization of the project:

* Python programming language.
* Inno setup compiler.
* Pyinstaller library.
* Psycopg2 library.
* Pyqt4 library.



1. **IMPLEMENTATION**

The basic idea behind this application is to fetch all the metadata from a given remote database and then display it with GUI. The back-end of the application does all the working and then passes it on to the front–end of the application to print it for the user.

The back-end is defined with multiple methods, to perform the needed operations. The GUI takes the user input as the database name, password, host, port and user name which then passes it on to the backend for further operation. The first step is to create a connection with the database, if the connection exists then it proceeds to crawl the database and fetch all the items like table names, views, functions, triggers etc. and create a summary for it, otherwise it gives a message for wrong credentials.

The data that is fetched is shown in tabular form with tabs for every other category and the last tab gives the summary i.e. the total number of each items in the database. The scope of crawling is only limited to the PostgreSQL databases.

1. **CONCLUSION**

The project “Database Metadata Crawling” has been created in python and works to all its requirements. This has will help in easily fetching the metadata from a database from a remote server and displaying it for the user in a user-friendly manner.

This Project helped us in understanding the working of the PostgreSQL database and the crawling of the databases using python and gave us a chance to work on a different thing and learn something new.

Python has rich set of libraries which help us in easily connecting with the databases and even create a windows executable file and graphical user interface for a full-fledged application.

Overall, it has been a good learning experience and very informative in realization of the project.

1. **CODE**

#!/usr/bin/python

#Importing the required Modules

import psycopg2

import sys

from PyQt4 import QtCore, QtGui

from GUI import Ui\_Dialog

from GUI2 import Ui\_Dialog3

from GUI3 import Ui\_Dialog4

con = None

#Connecting with the Database

def create\_connection(database , user , password , host , port):

cur\_db = database

cur\_usr = user

cur\_pass = password

cur\_host = host

cur\_port = port

try:

con = psycopg2.connect(database = cur\_db , user = cur\_usr , password = cur\_pass , host = cur\_host , port = cur\_port)

except:

con = -1

return con

#Extracting the Tables Info from database

def meta\_crawl\_tables(con):

cur = con.cursor()

tables=[]

cur.execute("SELECT table\_name FROM information\_schema.tables "

"WHERE table\_schema='public' "

"AND table\_type='BASE TABLE'");

resp = cur.fetchall()

for row in resp:

global tables

tables.append(row[0])

#Extracting the Columns Info from database

def meta\_crawl\_columns(con , tables):

cur = con.cursor()

to\_d\_col=[]

for table in tables:

cur.execute("SELECT column\_name,data\_type,character\_maximum\_length "

"FROM information\_schema.columns "

"WHERE table\_name = '" + table + "'");

resp = cur.fetchall()

for row in resp:

columns=[]

global columns

global to\_d\_col

columns.append(table)

columns.append(row[0])

columns.append(row[1])

columns.append(row[2])

to\_d\_col.append(columns)

#DataTypeID to DataTypeName Mapping

def typeid\_to\_typename(con , id):

cur = con.cursor()

cur.execute("SELECT typname from pg\_type WHERE oid = " + str(id))

resp = cur.fetchone()

return resp[0]

#Extracting the Functions Info from database

def meta\_crawl\_functions(con):

cur = con.cursor()

to\_d\_func=[]

user\_func=[]

cur.execute("SELECT routine\_name FROM information\_schema.routines WHERE specific\_schema = 'public'")

resp=cur.fetchall()

for row in resp:

user\_func.append(row[0])

cur.execute("SELECT proname, prorettype, pronargs, proargnames , proargtypes from pg\_proc WHERE proname IN " + str(tuple(user\_func)))

resp = cur.fetchall()

for row in resp:

functions=[]

global to\_d\_func

ret\_type\_list=[]

functions.append(row[0])

functions.append(typeid\_to\_typename(con , row[1]))

functions.append(row[2])

functions.append(row[3])

ret\_arg = row[4].split()

for item in ret\_arg:

ret\_type\_list.append(typeid\_to\_typename(con , item))

functions.append(ret\_type\_list)

to\_d\_func.append(functions)

#Extracting the Triggers Info from database

def meta\_crawl\_triggers(con):

cur = con.cursor()

to\_d\_trig=[]

cur.execute("SELECT trigger\_name, action\_timing, event\_manipulation, event\_object\_table FROM information\_schema.triggers")

resp=cur.fetchall()

for row in resp:

triggers=[]

global to\_d\_trig

triggers.append(row[0])

triggers.append(row[1])

triggers.append(row[2])

triggers.append(row[3])

to\_d\_trig.append(triggers)

#Extracting the Views Info from database

def meta\_crawl\_views(con):

cur = con.cursor()

to\_d\_view=[]

cur.execute("SELECT table\_name FROM information\_schema.views WHERE table\_schema = 'public'")

resp=cur.fetchall()

for row in resp:

view=[]

global to\_d\_view

view.append(row[0])

tb=[]

cur.execute("SELECT table\_name FROM information\_schema.view\_table\_usage WHERE view\_name = '"+ str(row[0]) +"'")

sub\_resp = cur.fetchall()

for item in sub\_resp:

tb.append(item[0])

col=[]

cur.execute("SELECT column\_name FROM information\_schema.view\_column\_usage WHERE view\_name = '"+ str(row[0]) +"'")

sub\_resp = cur.fetchall()

for item in sub\_resp:

col.append(item[0])

view.append(tb)

view.append(col)

to\_d\_view.append(view)

#Extracting the Constraints Info from database

def meta\_crawl\_constraints(con):

cur = con.cursor()

cons=[]

to\_d\_cons=[]

cur.execute("SELECT constraint\_name, column\_name, table\_name "

"FROM information\_schema.constraint\_column\_usage")

resp = cur.fetchall()

for row in resp:

cons=[]

global to\_d\_cons

cons.append(row[0])

cons.append(row[1])

cons.append(row[2])

to\_d\_cons.append(cons)

#Extracting the Indexes Info from database

def meta\_crawl\_indexes(con):

cur = con.cursor();

ind=[]

to\_d\_ind=[]

cur.execute("SELECT i.relname,t.relname,array\_to\_string(array\_agg(a.attname), ', ') "

"FROM pg\_class t, pg\_class i, pg\_index ix, pg\_attribute a "

"WHERE t.oid = ix.indrelid and i.oid = ix.indexrelid and a.attrelid = t.oid and a.attnum = ANY(ix.indkey) and t.relkind = 'r' and t.relname like 'test%' "

"GROUP BY t.relname, i.relname "

"ORDER BY t.relname, i.relname")

resp = cur.fetchall()

for row in resp:

ind=[]

global to\_d\_ind

ind.append(row[0])

ind.append(row[1])

ind.append(row[2])

to\_d\_ind.append(ind)

#Creating GUI

class MyDialog4(QtGui.QWidget):

def \_\_init\_\_(self, parent=None):

QtGui.QWidget.\_\_init\_\_(self, parent)

self.ui = Ui\_Dialog4()

self.ui.setupUi(self)

self.ui.pushButton\_6.clicked.connect(self.NEXT)

def NEXT(self):

myapp4.hide()

myapp.show()

#creating credentials page

class MyDialog(QtGui.QWidget):

def \_\_init\_\_(self, parent=None):

QtGui.QWidget.\_\_init\_\_(self, parent)

self.ui = Ui\_Dialog()

self.ui.setupUi(self)

self.ui.pushButton.clicked.connect(self.NEXT)

self.ui.pushButton\_2.clicked.connect(self.CANCEL)

def retranslateUi(self, Dialog):

Dialog.setWindowTitle(QtGui.QApplication.translate("Dialog", "Dialog", None, QtGui.QApplication))

self.pushButton.setText(QtGui.QApplication.translate("Dialog", "OKAY", None, QtGui.QApplication))

self.label.setText(QtGui.QApplication.translate("Dialog", "WRONG DETAILS GIVEN", None, QtGui.QApplication))

def NEXT(self):

# text = self.ui.textEdit.toPlainText()

database\_name = self.ui.lineEdit.text()

user\_name = self.ui.lineEdit\_2.text()

password = self.ui.lineEdit\_3.text()

ip\_address = self.ui.lineEdit\_4.text()

port\_number = self.ui.lineEdit\_5.text()

var = create\_connection(ip\_address , user\_name , password , database\_name , port\_number)

global var

if (var != -1):

myapp2 = Ui\_Dialog2()

myapp2.setupUi(self)

myapp2.pushButton\_5.clicked.connect(self.BACK)

elif(var == -1):

myapp3.show()

myapp.hide()

def BACK(self):

self.close()

def CANCEL(self):

self.close()

#Creating pop up for wrong credentials

class MyDialog2(QtGui.QWidget):

def \_\_init\_\_(self, parent=None):

QtGui.QWidget.\_\_init\_\_(self, parent)

self.ui = Ui\_Dialog3()

self.ui.setupUi(self)

self.ui.pushButton\_6.clicked.connect(self.BACK)

def BACK(self):

myapp3.hide()

myapp.show()

#creating display for the Database Details

class Ui\_Dialog2(object):

def setupUi(self, Dialog):

meta\_crawl\_tables(var)

meta\_crawl\_columns(var , tables)

meta\_crawl\_functions(var)

meta\_crawl\_triggers(var)

meta\_crawl\_views(var)

meta\_crawl\_constraints(var)

meta\_crawl\_indexes(var)

Dialog.setObjectName("Dialog")

Dialog.setGeometry(350, 200, 700, 400)

Dialog.setWindowTitle('MetGeomi')

Dialog.setWindowIcon(QtGui.QIcon('crawl.ico'))

self.verticalLayout = QtGui.QVBoxLayout(Dialog)

self.verticalLayout.setObjectName("verticalLayout")

self.tabWidget = QtGui.QTabWidget(Dialog)

self.tabWidget.setObjectName("tabWidget")

self.tab = QtGui.QWidget()

self.tab.setObjectName("tab")

self.horizontalLayout = QtGui.QHBoxLayout(self.tab)

self.horizontalLayout.setObjectName("horizontalLayout")

self.tableWidget\_7 = QtGui.QTableWidget(self.tab)

self.tableWidget\_7.setGridStyle(QtCore.Qt.NoPen)

self.tableWidget\_7.setObjectName("tableWidget\_7s")

self.tableWidget\_7.setColumnCount(1)

item = QtGui.QTableWidgetItem()

self.tableWidget\_7.setRowCount(len(tables))

self.tableWidget\_7.setHorizontalHeaderItem(0, item)

item = QtGui.QTableWidgetItem()

item = self.tableWidget\_7.horizontalHeaderItem(0)

item.setText("TABLES")

for i, row in enumerate(tables):

item = QtGui.QTableWidgetItem("%s"% row)

self.tableWidget\_7.setItem(i, 0, item)

self.horizontalLayout.addWidget(self.tableWidget\_7)

self.tableWidget\_7.setColumnWidth(0, 160);

self.tableWidget\_7.setColumnWidth(1, 160);

self.tableWidget\_7.setColumnWidth(2, 180);

self.tableWidget\_7.setColumnWidth(3, 120);

self.tabWidget.addTab(self.tab, "")

self.tab\_2 = QtGui.QWidget()

self.tab\_2.setObjectName("tab\_2")

self.horizontalLayout\_2 = QtGui.QHBoxLayout(self.tab\_2)

self.horizontalLayout\_2.setObjectName("horizontalLayout\_2")

self.tableWidget = QtGui.QTableWidget(self.tab\_2)

# self.tableWidget.setGridStyle(QtCore.Qt.NoPen)

self.tableWidget.setObjectName("tableWidget")

self.tableWidget.setColumnCount(4)

item = QtGui.QTableWidgetItem()

self.tableWidget.setRowCount(len(to\_d\_col))

self.tableWidget.setHorizontalHeaderItem(0, item)

item = QtGui.QTableWidgetItem()

self.tableWidget.setHorizontalHeaderItem(1, item)

item = QtGui.QTableWidgetItem()

self.tableWidget.setHorizontalHeaderItem(2, item)

item = QtGui.QTableWidgetItem()

self.tableWidget.setHorizontalHeaderItem(3, item)

item = QtGui.QTableWidgetItem()

item = self.tableWidget.horizontalHeaderItem(0)

item.setText("TABLE")

item = self.tableWidget.horizontalHeaderItem(1)

item.setText("COLUMN")

item = self.tableWidget.horizontalHeaderItem(2)

item.setText("TYPE")

item = self.tableWidget.horizontalHeaderItem(3)

item.setText("LENGTH")

for i, row in enumerate(to\_d\_col):

for j, value in enumerate(row):

item = QtGui.QTableWidgetItem("%s"% value)

self.tableWidget.setItem(i, j, item)

self.horizontalLayout\_2.addWidget(self.tableWidget)

self.tableWidget.setColumnWidth(0, 160);

self.tableWidget.setColumnWidth(1, 160);

self.tableWidget.setColumnWidth(2, 180);

self.tableWidget.setColumnWidth(3, 120);

self.tabWidget.addTab(self.tab\_2, "")

self.tab\_3 = QtGui.QWidget()

self.tab\_3.setObjectName("tab\_3")

self.horizontalLayout\_3 = QtGui.QHBoxLayout(self.tab\_3)

self.horizontalLayout\_3.setObjectName("horizontalLayout\_3")

self.tableWidget\_2 = QtGui.QTableWidget(self.tab\_3)

self.tableWidget\_2.setObjectName("tableWidget\_2")

self.tableWidget\_2.setColumnCount(5)

item = QtGui.QTableWidgetItem()

self.tableWidget\_2.setRowCount(len(to\_d\_func))

self.tableWidget\_2.setHorizontalHeaderItem(0, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_2.setHorizontalHeaderItem(1, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_2.setHorizontalHeaderItem(2, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_2.setHorizontalHeaderItem(3, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_2.setHorizontalHeaderItem(4, item)

item = QtGui.QTableWidgetItem()

item = self.tableWidget\_2.horizontalHeaderItem(0)

item.setText("FUNCTION")

item = self.tableWidget\_2.horizontalHeaderItem(1)

item.setText("TYPE")

item = self.tableWidget\_2.horizontalHeaderItem(2)

item.setText("ARGUMENTS")

item = self.tableWidget\_2.horizontalHeaderItem(3)

item.setText("ARGUMENT NAME")

item = self.tableWidget\_2.horizontalHeaderItem(4)

item.setText("ARGUMENT TYPE")

for i, row in enumerate(to\_d\_func):

for j, value in enumerate(row):

item = QtGui.QTableWidgetItem("%s"% value)

self.tableWidget\_2.setItem(i, j, item)

self.horizontalLayout\_3.addWidget(self.tableWidget\_2)

self.tableWidget\_2.setColumnWidth(0, 150);

self.tableWidget\_2.setColumnWidth(1, 100);

self.tableWidget\_2.setColumnWidth(2, 100);

self.tableWidget\_2.setColumnWidth(3, 140);

self.tableWidget\_2.setColumnWidth(4, 140);

self.tabWidget.addTab(self.tab\_3, "")

self.tab\_4 = QtGui.QWidget()

self.tab\_4.setObjectName("tab\_4")

self.horizontalLayout\_4 = QtGui.QHBoxLayout(self.tab\_4)

self.horizontalLayout\_4.setObjectName("horizontalLayout\_4")

self.tableWidget\_3 = QtGui.QTableWidget(self.tab\_4)

self.tableWidget\_3.setObjectName("tableWidget\_3")

self.tableWidget\_3.setColumnCount(4)

item = QtGui.QTableWidgetItem()

self.tableWidget\_3.setRowCount(len(to\_d\_trig))

self.tableWidget\_3.setHorizontalHeaderItem(0, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_3.setHorizontalHeaderItem(1, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_3.setHorizontalHeaderItem(2, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_3.setHorizontalHeaderItem(3, item)

item = QtGui.QTableWidgetItem()

item = self.tableWidget\_3.horizontalHeaderItem(0)

item.setText("TRIGGER")

item = self.tableWidget\_3.horizontalHeaderItem(1)

item.setText("ACTION")

item = self.tableWidget\_3.horizontalHeaderItem(2)

item.setText("EVENT")

item = self.tableWidget\_3.horizontalHeaderItem(3)

item.setText("TABLE")

for i, row in enumerate(to\_d\_trig):

for j, value in enumerate(row):

item = QtGui.QTableWidgetItem("%s"% value)

self.tableWidget\_3.setItem(i, j, item)

self.horizontalLayout\_4.addWidget(self.tableWidget\_3)

self.tableWidget\_3.setColumnWidth(0, 170);

self.tableWidget\_3.setColumnWidth(1, 160);

self.tableWidget\_3.setColumnWidth(2, 180);

self.tableWidget\_3.setColumnWidth(3, 120);

self.tabWidget.addTab(self.tab\_4, "")

self.tab\_5 = QtGui.QWidget()

self.tab\_5.setObjectName("tab\_5")

self.horizontalLayout\_5 = QtGui.QHBoxLayout(self.tab\_5)

self.horizontalLayout\_5.setObjectName("horizontalLayout\_5")

self.tableWidget\_4 = QtGui.QTableWidget(self.tab\_5)

self.tableWidget\_4.setObjectName("tableWidget\_4")

self.tableWidget\_4.setColumnCount(3)

item = QtGui.QTableWidgetItem()

self.tableWidget\_4.setRowCount(len(to\_d\_view))

self.tableWidget\_4.setHorizontalHeaderItem(0, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_4.setHorizontalHeaderItem(1, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_4.setHorizontalHeaderItem(2, item)

item = QtGui.QTableWidgetItem()

item = self.tableWidget\_4.horizontalHeaderItem(0)

item.setText("VIEW")

item = self.tableWidget\_4.horizontalHeaderItem(1)

item.setText("TABLES")

item = self.tableWidget\_4.horizontalHeaderItem(2)

item.setText("COLUMNS")

for i, row in enumerate(to\_d\_view):

for j, value in enumerate(row):

item = QtGui.QTableWidgetItem("%s"% value)

self.tableWidget\_4.setItem(i, j, item)

self.horizontalLayout\_5.addWidget(self.tableWidget\_4)

self.tableWidget\_4.setColumnWidth(0, 200);

self.tableWidget\_4.setColumnWidth(1, 220);

self.tableWidget\_4.setColumnWidth(2, 210);

self.tabWidget.addTab(self.tab\_5, "")

self.tab\_7 = QtGui.QWidget()

self.tab\_7.setObjectName("tab\_7")

self.horizontalLayout\_7 = QtGui.QHBoxLayout(self.tab\_7)

self.horizontalLayout\_7.setObjectName("horizontalLayout\_7")

self.tableWidget\_5 = QtGui.QTableWidget(self.tab\_7)

self.tableWidget\_5.setObjectName("tableWidget\_5")

self.tableWidget\_5.setColumnCount(3)

item = QtGui.QTableWidgetItem()

self.tableWidget\_5.setRowCount(len(to\_d\_ind))

self.tableWidget\_5.setHorizontalHeaderItem(0, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_5.setHorizontalHeaderItem(1, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_5.setHorizontalHeaderItem(2, item)

item = QtGui.QTableWidgetItem()

item = self.tableWidget\_5.horizontalHeaderItem(0)

item.setText("INDEX")

item = self.tableWidget\_5.horizontalHeaderItem(1)

item.setText("TABLES")

item = self.tableWidget\_5.horizontalHeaderItem(2)

item.setText("COLUMNS")

for i, row in enumerate(to\_d\_ind):

for j, value in enumerate(row):

item = QtGui.QTableWidgetItem("%s"% value)

self.tableWidget\_5.setItem(i, j, item)

self.horizontalLayout\_7.addWidget(self.tableWidget\_5)

self.tableWidget\_5.setColumnWidth(0, 200);

self.tableWidget\_5.setColumnWidth(1, 220);

self.tableWidget\_5.setColumnWidth(2, 210);

self.tabWidget.addTab(self.tab\_7, "")

self.tab\_8 = QtGui.QWidget()

self.tab\_8.setObjectName("tab\_8")

self.horizontalLayout\_8 = QtGui.QHBoxLayout(self.tab\_8)

self.horizontalLayout\_8.setObjectName("horizontalLayout\_8")

self.tableWidget\_6 = QtGui.QTableWidget(self.tab\_8)

self.tableWidget\_6.setObjectName("tableWidget\_6")

self.tableWidget\_6.setColumnCount(3)

item = QtGui.QTableWidgetItem()

self.tableWidget\_6.setRowCount(len(to\_d\_cons))

self.tableWidget\_6.setHorizontalHeaderItem(0, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_6.setHorizontalHeaderItem(1, item)

item = QtGui.QTableWidgetItem()

self.tableWidget\_6.setHorizontalHeaderItem(2, item)

item = QtGui.QTableWidgetItem()

item = self.tableWidget\_6.horizontalHeaderItem(0)

item.setText("VIEW")

item = self.tableWidget\_6.horizontalHeaderItem(1)

item.setText("TABLES")

item = self.tableWidget\_6.horizontalHeaderItem(2)

item.setText("COLUMNS")

for i, row in enumerate(to\_d\_cons):

for j, value in enumerate(row):

item = QtGui.QTableWidgetItem("%s"% value)

self.tableWidget\_6.setItem(i, j, item)

self.horizontalLayout\_8.addWidget(self.tableWidget\_6)

self.tableWidget\_6.setColumnWidth(0, 200);

self.tableWidget\_6.setColumnWidth(1, 220);

self.tableWidget\_6.setColumnWidth(2, 210);

self.tabWidget.addTab(self.tab\_8, "")

self.tab\_6 = QtGui.QWidget()

self.tab\_6.setObjectName("tab\_6")

self.horizontalLayout\_6 = QtGui.QHBoxLayout(self.tab\_6)

self.horizontalLayout\_6.setObjectName("horizontalLayout\_6")

self.listWidget\_6 = QtGui.QListWidget(self.tab\_6)

self.listWidget\_6.setObjectName("listWidget\_6")

item = QtGui.QListWidgetItem("\nTotal Number of Tables : %i"% len(tables))

self.listWidget\_6.addItem(item)

item = QtGui.QListWidgetItem("\nTotal Number of Columns : %i"% len(to\_d\_col))

self.listWidget\_6.addItem(item)

item = QtGui.QListWidgetItem("\nTotal Number of Functions : %i"% len(to\_d\_func))

self.listWidget\_6.addItem(item)

item = QtGui.QListWidgetItem("\nTotal Number of Triggers : %i"% len(to\_d\_trig))

self.listWidget\_6.addItem(item)

item = QtGui.QListWidgetItem("\nTotal Number of Views : %i"% len(to\_d\_view))

self.listWidget\_6.addItem(item)

item = QtGui.QListWidgetItem("\nTotal Number of Indexes : %i"% len(to\_d\_ind))

self.listWidget\_6.addItem(item)

item = QtGui.QListWidgetItem("\nTotal Number of Constraints : %i"% len(to\_d\_cons))

self.listWidget\_6.addItem(item)

self.horizontalLayout\_6.addWidget(self.listWidget\_6)

self.tabWidget.addTab(self.tab\_6, "")

self.verticalLayout.addWidget(self.tabWidget)

self.pushButton\_5 = QtGui.QPushButton(Dialog)

self.pushButton\_5.setObjectName("pushButton\_5")

self.verticalLayout.addWidget(self.pushButton\_5)

self.retranslateUi(Dialog)

self.tabWidget.setCurrentIndex(7)

QtCore.QMetaObject.connectSlotsByName(Dialog)

def retranslateUi(self, Dialog):

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab), QtGui.QApplication.translate("Dialog", "Tables", None, QtGui.QApplication.UnicodeUTF8))

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab\_2), QtGui.QApplication.translate("Dialog", "Columns", None, QtGui.QApplication.UnicodeUTF8))

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab\_3), QtGui.QApplication.translate("Dialog", "Functions", None, QtGui.QApplication.UnicodeUTF8))

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab\_4), QtGui.QApplication.translate("Dialog", "Triggers", None, QtGui.QApplication.UnicodeUTF8))

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab\_5), QtGui.QApplication.translate("Dialog", "Views", None, QtGui.QApplication.UnicodeUTF8))

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab\_6), QtGui.QApplication.translate("Dialog", "Summary", None, QtGui.QApplication.UnicodeUTF8))

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab\_7), QtGui.QApplication.translate("Dialog", "Indexes", None, QtGui.QApplication.UnicodeUTF8))

self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab\_8), QtGui.QApplication.translate("Dialog", "Constraints", None, QtGui.QApplication.UnicodeUTF8))

self.pushButton\_5.setText(QtGui.QApplication.translate("Dialog", "CLOSE", None, QtGui.QApplication.UnicodeUTF8))

#Main

if \_\_name\_\_ == "\_\_main\_\_":

app = QtGui.QApplication(sys.argv)

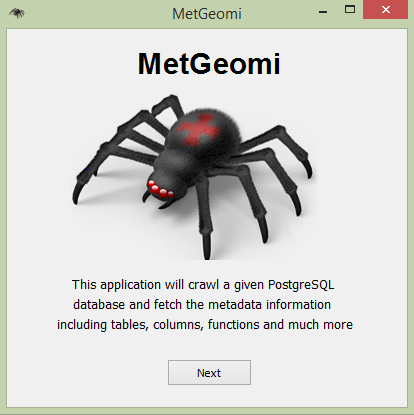
myapp = MyDialog()

myapp3 = MyDialog2()

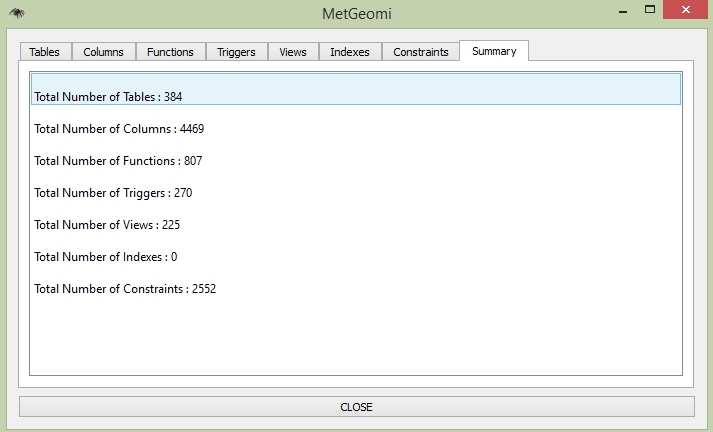
myapp4 = MyDialog4()

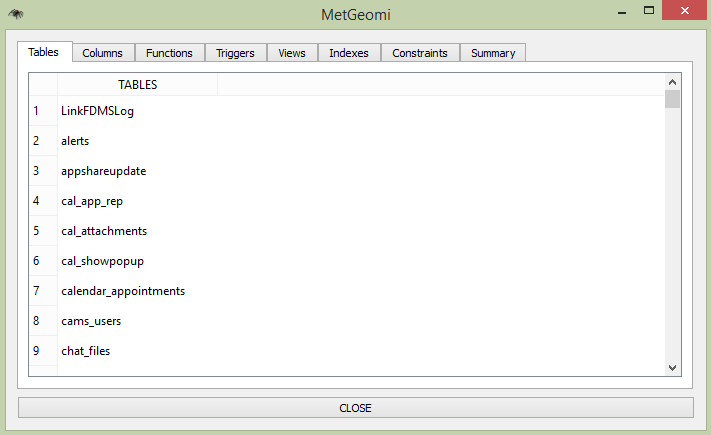
myapp4.show()

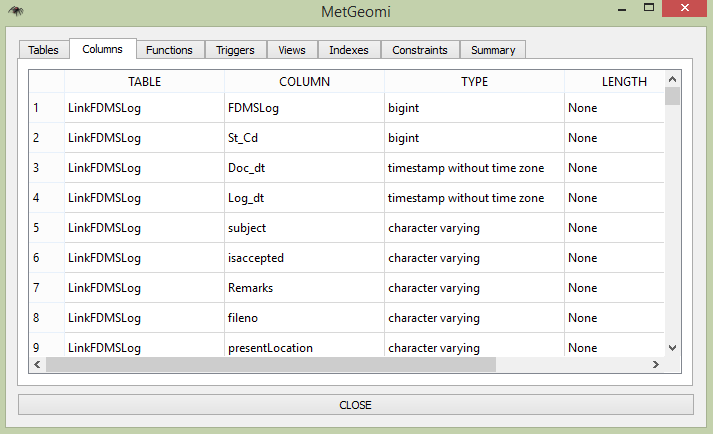
sys.exit(app.exec\_())











1. **FUTURE SCOPE**

Though this application is completed according to the requirements, it can be further developed and very interesting features can be added ti it, like:

After the crawled data is displayed, an option can be given to the user to save this data into a new database, so that when changes are made to the database then it can be compared with the saved version of it and the differences can be found out- basically it will be the comparison between the different version of a database.

In the graphical input the saved database can be given in a dropdown list for faster access, then it can ask for the option of comparison or just the data viewing from the user.

1. **REFERENCES**
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3. [**https://mborgerson.com/creating-an-executable-from-a-python-script**](https://mborgerson.com/creating-an-executable-from-a-python-script)
4. [**https://pythonspot.com/building-an-application-gui-with-pyqt-beginners-tutorial/**](https://pythonspot.com/building-an-application-gui-with-pyqt-beginners-tutorial/)
5. [**https://wiki.postgresql.org/wiki/Psycopg2\_Tutorial**](https://wiki.postgresql.org/wiki/Psycopg2_Tutorial)
6. [**http://www.py2exe.org/index.cgi/Py2exeAndPyQt**](http://www.py2exe.org/index.cgi/Py2exeAndPyQt)
7. [**http://www.py2exe.org/index.cgi/ListOfOptions**](http://www.py2exe.org/index.cgi/ListOfOptions)