The Search Interface of Neo4j Database

Hang Jin Mentor:Emily
jinhang@gwmail.gwu.edu
George Washingtin University, University of Michigan

Science Gateways Community Institute

ABSTRACT

Neo4j is a new data system. In previous database, every elements in the database only have the static data. In Neo4j the elements not only have the static data but also have the dynamic data, which is called "relationship" in Neo4j database or "method object" in python and Django's class. Prof Bruce Palfey and Miss Emily have a Neo4j database of protein. I established a website of search interface connected to the Neo4j database.

The program is divided into two parts, the first one is to use Html, Css and Java strip to build the search interface. The second one is to use Django to connect the search interface with Neo4j database.

How To Use

Open cmd
Cd into newsite by
cd newsite
Run server by
py manage.py runserver

Then open http://127.0.0.1:8000/

Then search, capitalize is not sensitive. But for number you need to enter an decimal. (i.e pH is 7.0 instead of 7)

To close the website use cmd Ctrl+C

To modify the database, go to http://127.0.0.1:8000/admin

You can add, delete or modifier the database

http://127.0.0.1:8000/index
is the index page contains all the elements in the database.

Method

In the file "newsite", you have a program or app called "protein". Four py documents and the file "templates" are important.

Models.py: In models.py you have a class called "Protein" which is the model of the database. That means all the elements in the database has the same data structure defined in the class(python class) "Protein". For example, all the elements in the database has a object called "Protein_name" which is the name of this specific protein.

Each models is a class. You can have a father model, and one object of the father model is also model. In neo4j system, the model class not only has object but also has method object which is defined as "relationship".

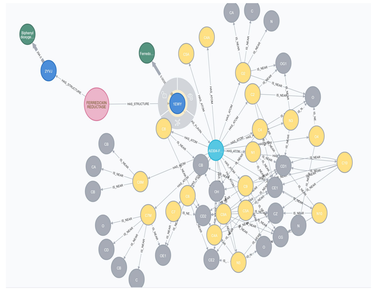
Please remember that models is strongly related to the database. If one object in the model class but not in the database, then set "default=None". You can have objects in database but not in model.

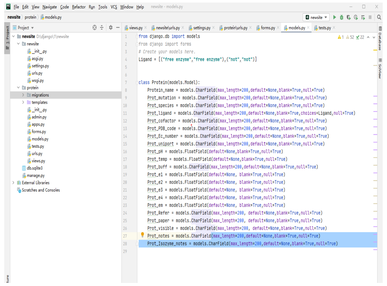
Once you change the database or model, use "migrate".

Forms.py: Form.py is a form, which has the same structure with "model.Protein", the class defined in models. Form is used to get and post the information from website. It's the bridge between website and database.

Each form is a dictionary. The key is the object name (a string) of the model, and the value is the variable to the) object name. We need form, because website cannot read or load class function. The best html.file (or websitecan do is read or load dictionary.

Urls.py: urls has a path set. Which direct the Uniform Resource Locator to your functions in View.py. For example, .../index/ means python is going to execute the index function defined in View.py.





Once you create an new function, set the urls for the function.

Views.py: In views.py, you have a branch of functions related to Urls and website. The urls is the input of the function and returns a web page. For example, .../index/ executes the index function and index function returns the web page called "index".
Views can be a function, and also a class.

Templates file: You have a branch of template in it. Each template is the return of a view function. Template is html.file and is what your web pages are. You can get or post the information from the "form" related to this web page.

Search Logic

You have a search page, input all the information. Information will be saved as a form(recall form is a dictionary), then use the form to find the right data you want in the the database (recall all elements in database is a class). As you get the correct class, you output the class by templates.

Remark: in search function you CANNOT or at least not easy to use for loop. Since in the model.class, there are many hide objects, the id object to name one.

FUTURE WORK

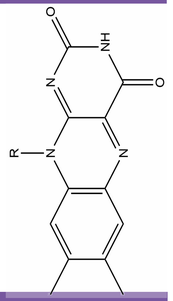
A) Once connected with Neo4j database. The first thing is to modify the model.class in model.py. Since my model only has the objects, in Neo4j database it should also has method objects. To see the method objects you need the relationship graph of the database. Also ,you may need to change the object name in class to suit for the new data.

B) Then modify the form in form.py to fix the data model. Then run "py manage.py makemigrations" and "py manage.py migrate" by CMD. (Each time you change your model, you need the migrate the database by those two commands in order.)

ACKNOWLEDGEMENTS

We would like to thank Dr. Linda B. Hayden for her support during this project and the Science Gateway Community Institute for funding of this project.

A special thanks goes to Dr. Palfey and Miss Emily at University of Michigan, Anbor for their assistance.



References

Django is the most common Python web-development library: https://www.djangoproject.com/start/overview/
Neo4j general database resources: https://neo4j.com/developer/resources/
Neo4j Python driver resources: https://neo4j.com/developer/python/
Our Neo4j graph database is hosted on a virtual machine through our University's Advanced Research Computing office. We plan to do web hosting with our University's container service which is very similar to Docker. Here's the documentation for that resource: https://its.umich.edu/computing/virtualization-cloud/container-service/support
Getting Started With Python and Red Hat Open Shift creating a public Neo4j instance: https://think-lab.github.io/d/216/