

# Writeup

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I put together a minimal example of the the system I'll use to compile natural language questions into SPARQL queries. This writeup will describe the current iteration and how I hope to proceed.

## Minimal Example

Below, Figure 1 show the usage of the script 'author\_prob\_example.py'. That's the script where I implemented the minimal example.

```
What books has Paolini written?
S
  bibliography_request
  'WHAT':['WHAT']
  'BOOKS':['BOOKS']
  'HAS':['HAS']
  'author':['PAOLINI']: 1.690229
  'WRITEN':['WRITEN']
By 'PAOLINI' did you mean:
1) Christopher James Paolini
2) Paolo Bacigalupi
3) Pierre-Augustin Caron
4) Valentin Paz-Andrade
5) None of the above.
1

PREFIX dbp:<http://dbpedia.org/resource/>
PREFIX dbpowl:<http://dbpedia.org/ontology/>
PREFIX rdfs:<http://www.w3.org/2000/01/rdf-schema#>
SELECT ?book ?title
WHERE{
  ?book a dbpowl:Book;
        dbpowl:author <http://dbpedia.org/resource/Christopher_Paolini>;
        rdfs:label ?title.
  FILTER langMatches( lang(?title), "EN" ).
}

{u'book': {u'type': u'uri', u'value': u'http://dbpedia.org/resource/Brisinr'}, u'title': {u'xml:lang':
: u'en', u'type': u'literal', u'value': u'Brisinr'}}
{u'book': {u'type': u'uri', u'value': u'http://dbpedia.org/resource/Eldest'}, u'title': {u'xml:lang':
u'en', u'type': u'literal', u'value': u'Eldest'}}
{u'book': {u'type': u'uri', u'value': u'http://dbpedia.org/resource/Eragon'}, u'title': {u'xml:lang':
u'en', u'type': u'literal', u'value': u'Eragon'}}
{u'book': {u'type': u'uri', u'value': u'http://dbpedia.org/resource/Inheritance_(novel)'}, u'title': {
u'xml:lang': u'en', u'type': u'literal', u'value': u'Inheritance (novel)'}}
```

Figure 1: Using 'author\_prob\_example.py'

The script uses my own parser to recognize questions of the form, "What books has {author} written?" The name of an author is recognized based on two pre-compiled statistical models; a distribution of the lengths of author names and a pseudo Markov-chain like model based on character N-grams. From there, the parser approximates the probability of each possible interpretation of the question (in this case, there can be only one) and the user can be asked to choose from a list of the most probable interpretations. Such statistical models will need to be compiled for each type of named entity that needs to be parsed.

Next, the chosen interpretation goes into a SPARQL generator. The first step of SPARQL generation is to choose the particular query type that is indicated by the top level of the parse-tree (output of the parser).

The second query-generation step is to resolve the name of the author into the RDF URI which best corresponds with that natural name. If there are multiple close-ish names (based on the same N-gram model the parser uses), the script asks the user which author one they meant.

Finally, the query is produced using the python mini-formatting language to fill in a template query. This isn't very robust and will be improved on in further iterations. With the compiled query, the script uses the SPARQLWrapper library to execute it.

## Moving On

The way I see it, there's three things I really need to do in the code:

- Make the script recognize some more complex questions.  
The parser can handle some really complicated stuff, and I should make that clear in the demo.
- Clean up the architecture.  
I wiped the demo script together really quickly and it's a mess. I'm going to have trouble moving forward unless I take some time to clean up the high level structure of the code a bit.
- Create a better interface.  
I'd like to create a decent interface. This isn't such a high priority so it'll probably have to wait. But it's something to keep in mind.

I also need to start working on the paper. I think the place to start with that is reading more source material. Much of the work I've done already has been my own, but I've kind of neglected the research part of this thesis.

I'd like to thoroughly understand at least a few key papers and at least scan the books you have on natural language parsing.