
Question Answering

— Relation Identification and Linking —

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Objective


- Identify relations between entities
- Find corresponding information from a database

For example:

- Who are the family members of Peter Griffin?
- Who are the **family members** of **Peter Griffin**?
- **family members** \leftarrow **Peter Griffin**
- Look up for family members of Peter Griffin in DBpedia

Inspiration

<http://chat.dbpedia.org/>



Factoid Questions

You can also ask me simple factual questions/trivia:

WHO IS EINSTEIN?

WHAT IS A PLANET?

WHERE IS BERLIN?

When is JFK's wife birthday?

1953-09-12

Where was she born?

I'm not sure I understand you fully.

Was this helpful?


Yes No

Write a message

Please go on.

FOX

Here's some info I found:



Steve Marmel

American screenwriter and producer

Steve Marmel is an American television writer and producer who has worked on many animated TV series, including The Fairly OddParents, I Am

Residence: Los Angeles, California

Birth Year: 1964


Who is the writer of Family Guy?

Who is the creator of Family Guy?

Who is the producer of Family Guy?

Write a message

dbpedia.org/page/Family_Guy



Guy was renewed for a fifteenth season. (en)

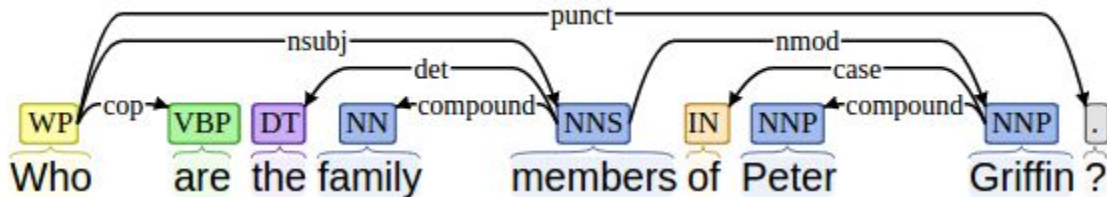
dbo:company	<ul style="list-style-type: none">dbp:20th_Century_Fox_Televisiondbp:Fuzzy_Door_Productions
dbo:composer	<ul style="list-style-type: none">dbp:Ron_Jones_(composer)dbp:Walter_Murphy
dbo:creator	<ul style="list-style-type: none">dbp:Seth_MacFarlane
dbo:developer	<ul style="list-style-type: none">dbp:David_Zuckerman
dbo:distributor	<ul style="list-style-type: none">dbp:20th_Television
dbo:executiveProducer	<ul style="list-style-type: none">dbp:Danny_Smith_(writer)dbp:Chris_Sheridan_(writer)dbp:Daniel_Palladinodbp:David_A_Goodmandbp:Mark_Hentemanndbp:Wellesley_Wilddbp:Alec_Sulkindbp:Steve_Callaghan
dbo:format	<ul style="list-style-type: none">dbp:NTSC

Basic Flow

- Question: (...) X of Y of Z (currently)
- Identify Z
- Find out relationship Y
- Find out relationship X
- Provide an answer

Dependency Parsing

Who are the family members of Peter Griffin?



members

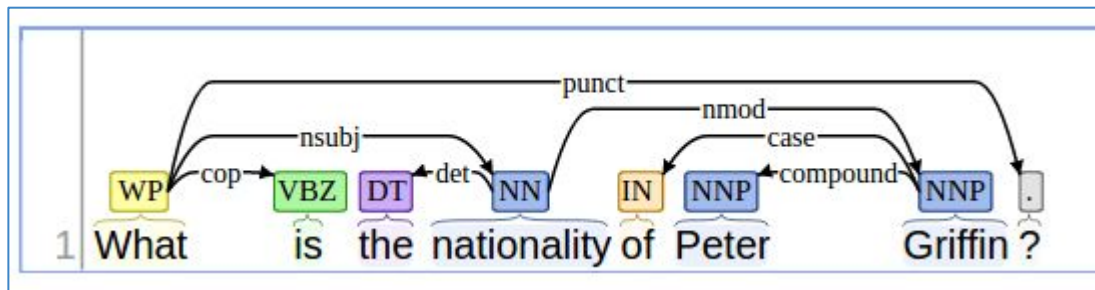
Griffin

((u'What', u'WP'), u'cop', (u'is', u'VBZ'))
((u'What', u'WP'), u'nsubj', (u'nationality', u'NN'))
((u'nationality', u'NN'), u'det', (u'the', u'DT'))
((u'nationality', u'NN'), u'nmod', (u'Griffin', u'NNP'))
((u'Griffin', u'NNP'), u'case', (u'of', u'IN'))
((u'Griffin', u'NNP'), u'compound', (u'Peter', u'NNP'))

Entity Recognition

What are the family members of Peter Griffin?

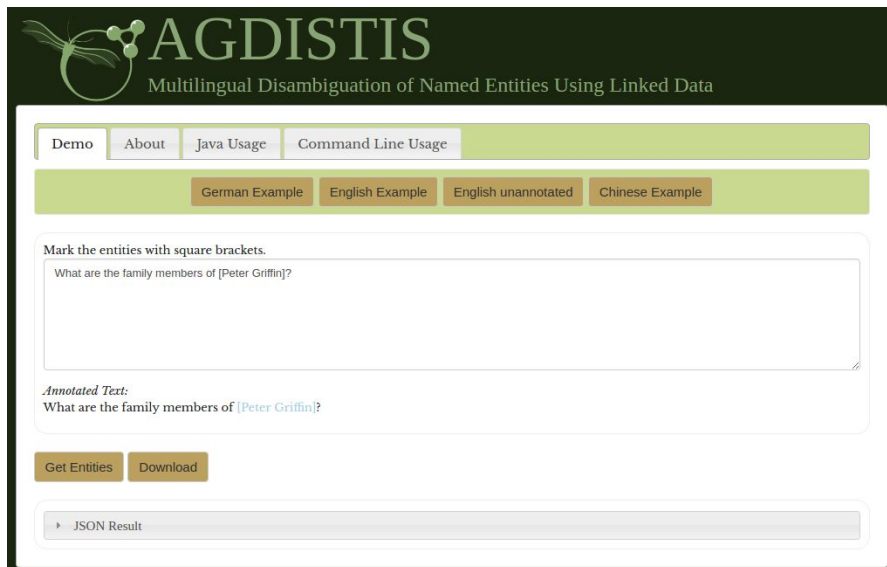
Griffin



What are the family members of [**Peter Griffin**]?

Entity Recognition

What are the family members of **[Peter Griffin]**?



The screenshot shows the AGDISTIS web interface. At the top, there is a logo with a green dragonfly and the text "AGDISTIS" in a large, green, serif font. Below the logo, the subtitle "Multilingual Disambiguation of Named Entities Using Linked Data" is displayed in a smaller, green, sans-serif font. The interface has a dark green header bar with a navigation menu containing "Demo", "About", "Java Usage", and "Command Line Usage". Below this, there is a light green bar with four buttons: "German Example", "English Example", "English unannotated", and "Chinese Example". The main content area is white and contains a text input field with the prompt "Mark the entities with square brackets." and the text "What are the family members of [Peter Griffin]?". Below the input field, there is a section labeled "Annotated Text:" showing the same text with "[Peter Griffin]" highlighted in blue. At the bottom of the main content area, there are two buttons: "Get Entities" and "Download". Below these buttons, there is a section labeled "JSON Result" with a placeholder for the output.

http://dbpedia.org/resource/Peter_Griffin

Relationship linking

http://dbpedia.org/resources/Family_Guy

select distinct ?prop

where {<http://dbpedia.org/resource/Peter_Griffin>

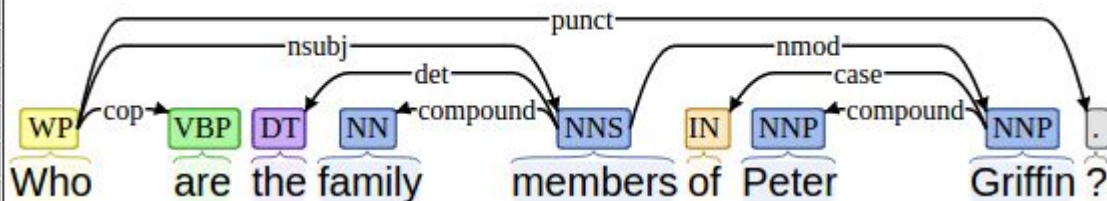
?prop ?ent }

	prop
	http://www.w3.org/1999/02/22-rdf-syntax-ns#type
	http://www.w3.org/2000/01/rdf-schema#label
	http://www.w3.org/2000/01/rdf-schema#comment
	http://www.w3.org/2002/07/owl#sameAs
	http://purl.org/dc/terms/subject
	http://dbpedia.org/ontology/wikiPageID
	http://dbpedia.org/ontology/wikiPageRevisionID
	http://xmlns.com/foaf/0.1/name
	http://purl.org/dc/terms/description
	http://xmlns.com/foaf/0.1/givenName
	http://xmlns.com/foaf/0.1/gender
	http://xmlns.com/foaf/0.1/isPrimaryTopicOf
	http://xmlns.com/foaf/0.1/surname
	http://www.w3.org/ns/prov#wasDerivedFrom
dbo:child	http://dbpedia.org/ontology/abstract
	http://dbpedia.org/ontology/child
	http://dbpedia.org/ontology/creator
dbo:creator	http://dbpedia.org/ontology/firstAppearance
	http://dbpedia.org/ontology/occupation
dbo:firstAppearance	http://dbpedia.org/ontology/relative
	http://dbpedia.org/ontology/series
dbo:occupation	http://dbpedia.org/ontology/spouse
	http://dbpedia.org/ontology/voice
dbo:relative	http://dbpedia.org/property/align
	http://dbpedia.org/property/nationality
	http://dbpedia.org/property/quote
dbo:series	http://dbpedia.org/property/source
	http://dbpedia.org/property/width
dbo:spouse	http://purl.org/linguistics/gold/hyponym
dbo:voice	

Relationship linking

http://dbpedia.org/ontology/child
http://dbpedia.org/ontology/creator
http://dbpedia.org/ontology/firstAppearance
http://dbpedia.org/ontology/occupation
http://dbpedia.org/ontology/relative
http://dbpedia.org/ontology/series
http://dbpedia.org/ontology/spouse
http://dbpedia.org/ontology/voice
http://dbpedia.org/property/align
http://dbpedia.org/property/nationality
http://dbpedia.org/property/quote
http://dbpedia.org/property/source
http://dbpedia.org/property/width

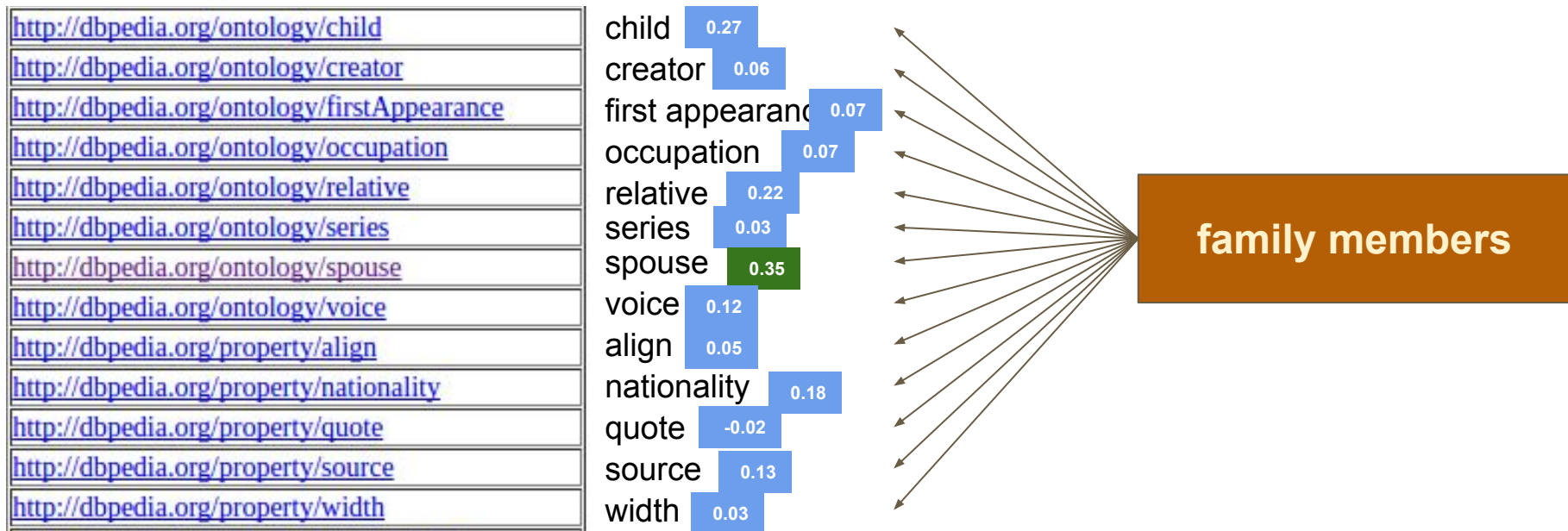
members



family members

Relationship linking

Phrase Matching: Using word2vec and cosine similarity



Relationship linking

spouse → property

`dbo:spouse`

■ `dbr:Lois_Griffin`

http://dbpedia.org/resources/Lois_Griffin

Answer!!

Achievement

Simply structured questions of the given format yields correct result if

- DBpedia has an answer for it
- If the phrase matching yields a reliable result

Setback

- Agisdistis does not always returns a correct entity URLs
 - What is [Family Guy]? (
 - Fails
 - correct: http://dbpedia.org/resources/Family_Guy
 - What are the satellites of [Earth]?
 - returns http://dbpedia.org/resource/Earth_2
 - correct: <http://dbpedia.org/resource/Earth>
- Phrase matching fails sometimes
 - Who is the owner of Facebook?
 - Owner → Subsidiary instead of Owner → Founder

Setback

Entity Extraction and relationship extraction is crude.

All complicated questions fail.

“Who is the creator of Batman?” or **“Who is Batman’s creator?”**

http://dbpedia.org/resource/Bob_Kane,

http://dbpedia.org/resource/Bill_Finger

"Who is the artist who created Batman?"

“Failed to fetch answer”.

Things to do now...

Supervised Relation Extraction

- Choose a set of relations to be extracted, a set of relevant entities and find and label data.
- Find all pairs of named Entities, decide if 2 entities are related, classify the relation.
- Using words or Bigrams and parse features to identify relations.
- Using classifiers extract the features.

Thank you

Questions?
