

CS421- Language Processing
Report of project
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Here is the implementation technique of our code:

Step 1:

The first step is to generate parse trees. We chose the nltk Stanford CoreNlp to generate the parse trees for the input questions.

Step 2:

Semantic grammar was created for the parse trees. For each node of the parse tree (NP, NNP, VP etc.), we attached semantic rules to the corresponding nodes.

Step 3:

The resultant semantic grammar is used to reduce lambda expression. We generated function of the head verbs and passed the proper nouns as arguments of the function. (e.g. won(2012, MerylStreep) lambda reduction for question 'Did MerylStreep won the oscar in 2012?')

Step 4:

At the next step, the sql queries are generated based on the type of question ('Wh' question or 'Do/Does/is/was' question etc.).

Step 5:

The generated query is then applied to the domain of database it belongs to. To implement this task, we used wordnet and some heuristics. We also hard-coded some headwords (for example, if a question has 'win' or 'won', the query will go to the movie database) and some proper nouns for 'music' database.

The output:

The output for some of the questions are mentioned below:

```
<QUESTION>: Is Kubrick a director?
```

```
<Query>:
```

```
["select count(*) from person p inner join director d on p.id =  
d.director_id where p.name like '%Kubrick%']
```

```
<ANSWER>: yes
```

```
<QUESTION>: Is Neeson an actor?
```

```
<Query>:
```

```
["select count(*) from person p inner join actor a on p.id = a.actor_id  
where p.name like '%Neeson%']
```

```
<ANSWER>: yes
```

```
<QUESTION>: Is Mighty Aphrodite by Allen?
```

```
<Query>:
```

["select count(*) from person p inner join director d on p.id = d.director_id inner join movie m on m.id = d.movie_id where p.name like '%Aphrodite%' and m.name like '%Allen%', "select count(*) from person p inner join director d on p.id = d.director_id inner join movie m on m.id = d.movie_id where p.name like '%Allen%' and m.name like '%Aphrodite%']
<ANSWER>: yes

<QUESTION>: Was Loren born in Italy?

<Query>:

["select count(*) from person p where p.name like '%Loren%' and pob like '%Italy%']

<ANSWER>: yes

<QUESTION>: Was Birdman the best movie in 2015?

<Query>:

["select count(*) from movie m inner join oscar o on m.id = o.movie_id where m.name like '%Birdman%' and o.year = '2015' and o.type = 'BEST-PICTURE']

<ANSWER>: yes

<QUESTION>: Did Neeson star in Schindler's List?

<Query>:

[]

<ANSWER>: I don't know

<QUESTION>: Did Swank win the oscar in 2000?

<Query>:

["select count(*) from movie m inner join oscar o on m.id = o.movie_id where m.name like '%Swank%' and o.year = '2000'", "select count(*) from person p inner join oscar o on p.id = o.person_id where p.name like '%Swank%' and o.year = '2000'"]

<ANSWER>: yes

<QUESTION>: Did a French actor win the oscar in 2012?

<Query>:

[]

<ANSWER>: I don't know

<QUESTION>: Did a movie with Neeson win the oscar for best film?

<Query>:

["select count(*) from person p inner join actor a on p.id = a.actor_id inner join movie m on a.movie_id = m.id where p.name like '%Neeson%' and m.name like '%%', "select count(*) from person p inner join director d on p.id = d.director_id inner join movie m on d.movie_id = m.id where p.name like '%Neeson%' and m.name like '%%']

<ANSWER>: yes

<QUESTION>: Who directed SchindlersList?

<Query>:

["select p.name from person p inner join director d on p.id = d.director_id inner join movie m on d.movie_id = m.id and m.name like '%SchindlersList%']

<ANSWER>: None

<QUESTION>: Who won the oscar for best actor in 2005?

<Query>:

["select p.name from person p inner join oscar o on p.id = o.person_id where o.year = '2005' and o.type like '%best-actor%']

<ANSWER>: Jamie Foxx

<QUESTION>: Who directed the best movie in 2010?

<Query>:
["select p.name from person p inner join director d on p.id = d.director_id
inner join oscar o on o.movie_id = d.movie_id where o.type like 'best-
picture' and o.year = '2010'"]

<ANSWER>: Kathryn Bigelow

<QUESTION>: Which actress won the oscar in 2012?

<Query>:
["select p.name from person p inner join oscar o on p.id = o.person_id where
o.year = '2012' and o.type like '%best-actress%'"]

<ANSWER>: Meryl Streep

<QUESTION>: Which movie won the oscar in 2000?

<Query>:
["select m.name from movie m inner join oscar o on m.id = o.movie_id where
o.type like '%best-picture%' and o.year = '2000'"]

<ANSWER>: American Beauty

<QUESTION>: When did Blanchett win an oscar for best actress?

<Query>:
["select o.year from oscar o inner join person p on o.person_id = p.id where
p.name like '%Blanchett%' and o.type like '%best-actress%'"]

<ANSWER>: 2014

<QUESTION>: Did Jamie Foxx win the oscar for best actor in 2005?

<Query>:
["select count(*) from person p inner join oscar o on p.id = o.person_id
where o.year = '2005' and o.type like '%best-actor%'"]

<ANSWER>: yes

<QUESTION>: Which French actor win the oscar in 2012?

<Query>:
[]

<ANSWER>: I don't know

<QUESTION>: Did MerylStreep won the oscar in 2012?

['(']

<Query>:
["select count(*) from movie m inner join oscar o on m.id = o.movie_id where
m.name like '%MerylStreep%' and o.year = '2012'", "select count(*) from
person p inner join oscar o on p.id = o.person_id where p.name like
'%MerylStreep%' and o.year = '2012'"]

<ANSWER>: no

<QUESTION>: When did Meryl Streep won the oscar for best actress?

<Query>:
["select o.year from oscar o inner join person p on o.person_id = p.id where
p.name like '%Meryl%' and o.type like '%best-actress%'"]

<ANSWER>: 1983

<QUESTION>: Where did Loren born?

<Query>:
["select pob from person p where p.name like '%Loren%'"]

<ANSWER>: Pozzuoli, Italy

<QUESTION>: Did Spielberg direct Schindler's List?

<Query>:

[]

<ANSWER>: I don't know

<QUESTION>: Did Madonna sing Papa Do Not Preach?

[]

<Query>:

[]

<ANSWER>: I don't know

<QUESTION>: Does the album Thriller include the track Beat It?

[]

<Query>:

["select count(*) from Track t inner join Album a on a.albumId == t.albumId where a.name like '%Thriller%' and t.name like '%Beat%' and t.name like '%It%', "select count(*) from Track t inner join Album a on a.albumId == t.albumId where a.name like '%It%' and t.name like '%Thriller%' and t.name like '%Beat%']"]

<ANSWER>: yes

<QUESTION>: Which album by Beyonce was released in 2014?

<Query>:

["select a.name from Album a inner join Artist ar on ar.id == a.artsitID where ar.name like '%Beyonce%' and a.releaseDate >= '2014-1-1' and a.releaseDate < '2015-1-1'"]

<ANSWER>: 1989

<QUESTION>: Which is the highest mountain in the world?

<Query>:

['select m.Name from Mountains m order by m.Height Desc Limit 1']

<ANSWER>: Mount Everest

<QUESTION>: Where is the highest mountain?

<Query>:

['select m.Name from Mountains m order by m.Height Desc Limit 1']

<ANSWER>: Mount Everest

<QUESTION>: Which is the deepest ocean?

<Query>:

['select s.Ocean from Seas s order by s.Deeppest Desc Limit 1']

<ANSWER>: Pacific Ocean

<QUESTION>: Is K2 taller than Makalu?

<Query>:

[]

<ANSWER>: I don't know