Multimedia Information Extraction and Retrieval SoSe 2010
Exercise Sheet 6

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09.06.2010

1. Think of two different approaches on how to answer queries with respect to (non-probabilistic) Datalog programs. Name one example scenarios for each appraoch, where your chosen approach for answering queries is better suited than the other one.

   Solution:

   bottom up (generation of all derivable facts), top down (proving one particular fact)

2. Is Datalog decidable? You don't need to proof it, but give a general intuition. How to make it decidable/undecidable?

   Solution:

   Yes, because there exists a limited number of possible facts, i.e. you can compute a fixpoint bottom-up.

3. Design a datalog program as follows: You want to build a digital library for movies similar to IMDB. Come up with a Datalog-model (predicates for a program) to encode the following information:

   (a) Every movie has a title, a director, genre (set of keywords), set of actors

   (b) You have to encode information about the ranking of a movie compared to the other movies. You might have to use a Datalog

extension Negation (i.e. every predicate can also occur negated in the body of a rule).

(c) You have to encode information about friendships between people (actors + directors).

Solution:

movie(m1)
movie(m2)
...
hastitle(m1, t1)
hastitle(m2, t2)
hasdirector(m1, p1)
hasgenre(m1, g1)
hasgenre(m1, g2)
hasactor(m1, g1)
isbetterthan(m1, m2)
friend(p1, p2)
friend(X,Y):-friend(Y,X)

Write down Datalog queries for the following problems:

(a) In which movies did Denzel Washington play? **Solution:**
Q(X):-movie(X), hasactor(X, dw)

(b) Which movie is the best movie of all? **Solution:**
Q(X):-movie(X), ¬ hasbettermovie(X) ... where
hasbettermovie(X):-movie(X), movie(Y),isbetterthan(Y,X)

(c) Which movie is the worst movie of Denzel Washington? **Solution:**
Q(X):-movie(X), ¬ hasworsemovie(X), hasactor(X, dw) ... where
hasworsemovie(X):-movie(X), movie(Y),isbetterthan(X,Y), hasactor(Y, dw)

(d) In which movies did their director take part as an actor? **Solution:**
Q(X):-movie(X), hasactor(X, Y),hasdirector(X,Y)

(e) Are there any movies, such that no actor is the friend of the director?

Solution:

Q(X):-movie(X), hasactor(X, Y), hasdirector(X,Z), ¬ friend(Y,Z)

4. Explain the notions of content-based and collaborative recommendations. What are item profiles?

   Solution:

   content-based: recommend items similar to previous items rated highly by the customer collaboration-based: consider similar users and average their recommendations

5. Explain the new-user and the new-item problem with collaborative recommendation.

   Solution:

   see lecture slides ...