

Outline

- Background
 - Freebase
 - Probabilistic retrieval model for semistructured data
- Exercise:
 - Entity Retrieval with a probabilistic retrieval model for semistructured data

EL&R: not as hard as you imagine



Example

Query: meg ryan war

40,016,179

Topics
(and counting)

A community-curated database of well-known people, places, and things

Data

Schema

Queries

Apps

Loads

Review Tasks

Users

Explore Freebase Data

Domain	ID	Topics	Facts
Music	/music	25M	173M
Media	/media_common	7M	21M
Books	/book	6M	32M
People	/people	3M	15M
TV	/tv	2M	16M
Film	/film	1M	15M
Location	/location	1M	16M
Organization	/organization	788K	4M
Fictional Universes	/fictional_universe	740K	1M

How can you get started?

Learn how it works

Discover what kind of information Freebase contains, how it's organized, and how Freebase allows you to uniquely identify identities anywhere on the web

[Keep reading »](#)

Use Freebase data

Freebase data is free to use under [an open license](#). You can:

- Query Freebase using our [Search](#), [Topic](#), or [MQL](#) APIs
- [Download](#) our weekly data dumps

Join the Community

Search

meg ryan war

any ▾

Constrain results by type...

+

Options: Scoring

entity ▾



Prefixed

Search Results

Your search - **meg ryan war** - did not match any topics.

Suggestions:

- Make sure all words are spelled correctly.
- Try different keywords.
- Try different constraints or options.



meg ryan war



Daan Odijk



Web

Images

Maps

Shopping

More ▾

Search tools



SafeSearch ▾



About 1,890,000 results (0.10 seconds)

[Courage Under Fire \(1996\) - IMDb](#)

www.imdb.com/title/tt0115956/ ▾

★ ★ ★ ★ ☆ Rating: 6.5/10 - 27,930 votes

Directed by Edward Zwick. With Denzel Washington, **Meg Ryan**, Lou Diamond Phillips, Michael Moriarty. ... "Sam's List" of 1000 **War** Movies. a list of 1623 titles ...

[Full cast and crew](#) - [Synopsis](#) - [Plot Summary](#) - [Trivia](#)

[Courage Under Fire - Wikipedia, the free encyclopedia](#)

en.wikipedia.org/wiki/Courage_Under_Fire ▾

... was involved in a friendly fire incident in Al Bathra during the Gulf **War**. ... Emma Walden (**Meg Ryan**) should be the first woman to receive (posthumously) the ...

[Top 10 Meg Ryan Movies - Hollywood Movies - About.com](#)



movies.about.com ▸ ... ▸ [Alpha Actress List](#) ▸ [Ryan Meg](#) ▾

by Rebecca Murray - in 305 Google+ circles

Tom Hanks and **Meg Ryan** reunite for this romantic tale of total opposites who wage **war** with each other in person while falling in love over the internet. As their ...

[All That She Could Be ... Meg Ryan Goes Extra Mile For `Courage ...](#)

articles.mcall.com/.../3110101_1_meg-ryan-french-kiss-georgetown-s-fo... ▾

Jul 12, 1996 - The day began, like many others on the set of "Courage Under Fire," with **Meg Ryan** listening to **war** stories. All morning long, she heard her ...



courage under fire



Daan Odijk



Web

Images

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Videos

More ▾

Search tools



SafeSearch ▾



About 19,500,000 results (0.40 seconds)

[Courage Under Fire \(1996\) - IMDb](#)

www.imdb.com/title/tt0115956/ ▾

★★★★★ Rating: 6.5/10 - 27,930 votes

Directed by Edward Zwick. With Denzel Washington, Meg Ryan, Lou Diamond Phillips, Michael Moriarty. A US Army officer, despondent about a deadly mistake ...

[Full cast and crew](#) - [Synopsis](#) - [Plot Summary](#) - [Trivia](#)

[Courage Under Fire - Wikipedia, the free encyclopedia](#)

en.wikipedia.org/wiki/Courage_Under_Fire ▾

Courage Under Fire is a 1996 film directed by Edward Zwick, and starring Denzel Washington, Meg Ryan, Lou Diamond Phillips and Matt Damon.

[Plot](#) - [Cast](#) - [Reception](#) - [Historical accuracy](#)

[Courage Under Fire - Official Trailer - YouTube](#)



www.youtube.com/watch?v=9ZQE49MjyYQ ▾

May 22, 2009 - Uploaded by TheMoviePark

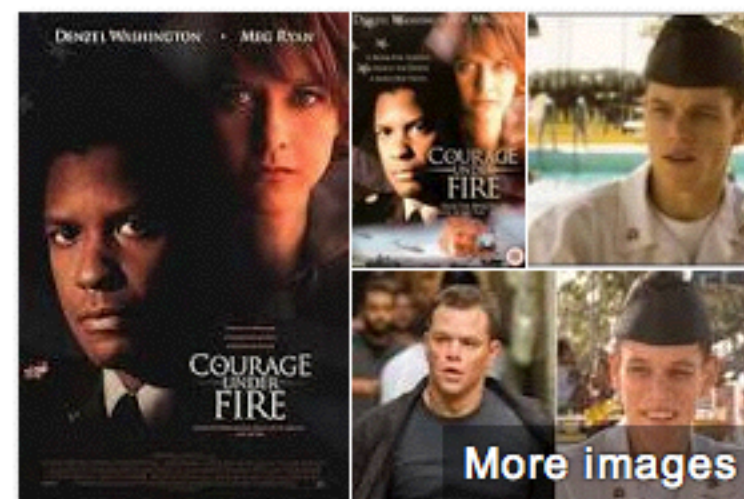
When Lt. Colonel Nathaniel Serling (Denzel Washington) is asked to review the posthumous candidacy of the ...

[Courage Under Fire - Rotten Tomatoes](#)

www.rottentomatoes.com/m/courage_under_fire/ ▾

★★★★★ Rating: 85% - 53 reviews

Review: An emotional and intriguing tale of a military officer who must review the merits of a fallen officer while confronting his own war demons....



Courage Under Fire

1996 Film

★★★★★ 6.5/10 - [IMDb](#)

★★★★★ 85% - [Rotten Tomatoes](#)

★★★★★ 77% - [Metacritic](#)

Courage Under Fire is a 1996 film directed by Edward Zwick, and starring Denzel Washington, Meg Ryan, Lou Diamond Phillips and Matt Damon. [Wikipedia](#)

Topic

Courage Under Fire^{en}Created by [metaweb](#) on 10/22/2006mid: [/m/01j5ql](#) notable type: [/film/film](#) on the web: [W](#) [wikipedia.org](#) ▾

Courage Under Fire is a 1996 film directed by Edward Zwick, and starring Denzel Washington, Meg Ryan, Lou Diamond Phillips and Matt Damon. [Wikipedia](#) [-]

Properties

118n

Keys

Links



View and edit specific domains, types, or properties.

Filter options: ☐ Show all domains and propertiesCommon [/common](#)

Freebase Commons

Topic [/common/topic](#) XAlso known as [/common/topic/alias](#)

-

• Description [/common/topic/description](#)

Courage Under Fire is a 1996 film directed by Edward Zwick, and starring Denzel Washington, Meg Ryan, Lou Diamond Phillips and Matt Damon. [Wikipedia](#)

16 values total »

Image [/common/topic/image](#)

▼ Types:

Common
TopicFilm
FilmMedia
Netflix TitleAwards
Ranked item

Performances /film/film/starring

Actor	Character	Special Performance Type	Character note
Denzel Washington	Nat Serling	-	-
Meg Ryan	Karen Walden	-	-
Lou Diamond Phillips	Monfriez	-	-
Michael Moriarty	General Hershberg	-	-
Matt Damon	Specialist Ilario	-	-
Bronson Pinchot	Bruno	-	-
Seth Gilliam	Altameyer	-	-
Regina Taylor	Meredith Serling	-	-
Željko Ivanek	Banacek	-	-
Scott Glenn	Gartner	-	-

18 values total »

Personal appearances /film/film/personal_appearances

Person	Type of Appearance
--------	--------------------

-

Dubbing performances /film/film/dubbing_performances

Actor	Character	Language
-------	-----------	----------

-

Genres /film/film/genre

[Gulf War](#)
[Crime Fiction](#)
[War film](#)
[Mystery](#)
[Political drama](#)
[Political thriller](#)

[Common](#)
[Topic](#)

[Film](#)
[Film](#)

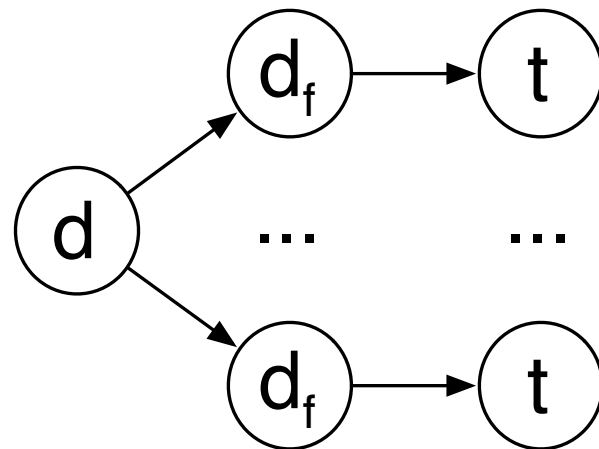
[Media](#)
[Netflix Title](#)

[Awards](#)
[Ranked item](#)

Example

Query: meg ryan war

Fielded document model



Probabilistic Retrieval Model for Semistructured data

[Kim et al. 2009]

- Extension to the Mixture of Language Models
- Find which document field each query term may be associated with

$$P(t|\theta_d) = \sum_{j=1}^m \mu_j P(t|\theta_{d_j})$$

Mapping probability

Estimated for each query term

$$P(t|\theta_d) = \sum_{j=1}^m \overbrace{P(d_j|t)} P(t|\theta_{d_j})$$

Estimating the mapping probability

$$P(t|C_j) = \frac{\sum_d n(t, d_j)}{\sum_d |d_j|}$$

Term likelihood

Probability of a query term occurring in a given field type

Prior field probability

Probability of mapping the query term to this field before observing collection statistics

$$P(d_j|t) = \frac{\overbrace{P(t|d_j)}^{\text{Term likelihood}} \overbrace{P(d_j)}^{\text{Prior field probability}}}{\underbrace{P(t)}} \rightarrow \sum_{d_k} P(t|d_k) P(d_k)$$

Probabilistic Retrieval Model for Semistructured data

[Kim et al. 2009]

$$P(t|\theta_d) = \sum_{j=1}^m \underbrace{P(d_j|t)}_{\text{Mapping probability}} P(t|\theta_{d_j})$$

Mapping probability
Estimated for each query term

Term likelihood
Probability of a query term occurring in a given field type

$$P(t|C_j) = \frac{\sum_d n(t, d_j)}{\sum_d |d_j|}$$

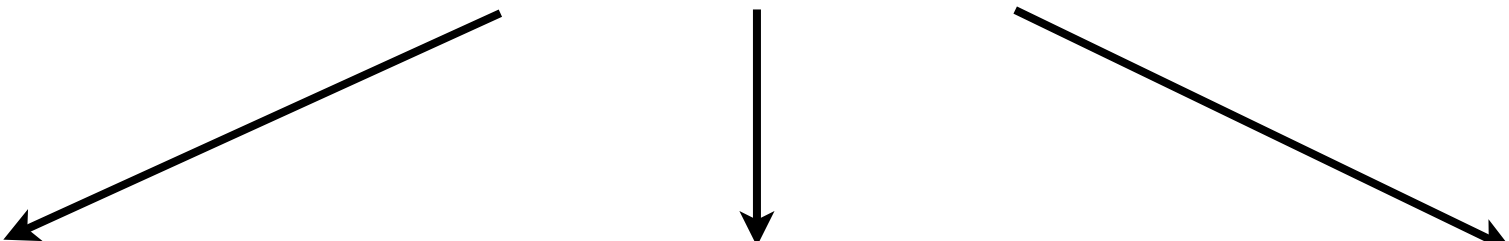
Prior field probability
Probability of mapping the query term to this field before observing collection statistics

$$P(d_j|t) = \frac{\underbrace{P(t|d_j)}_{\text{Term likelihood}} \underbrace{P(d_j)}_{\text{Prior field probability}}}{P(t)} \} \rightarrow \sum_{d_k} P(t|d_k) P(d_k)$$

Mapping Probabilities

Example

Query: meg ryan war



d_j	$P(t d_j)$
cast	0.407
team	0.382
title	0.187

d_j	$P(t d_j)$
cast	0.601
team	0.381
title	0.017

d_j	$P(t d_j)$
genre	0.927
title	0.07
location	0.002

Query Editor

Save Query

```
[{
  "name": null,
  "mid": null,
  "genre": [{
    "name": null
  }],
  "tagline": null,
  "starring": [{
    "actor": null
  }],
  "initial_release_date": null,
  "initial_release_date>": "1995",
  "initial_release_date<": "1999",
  "type": "/film/film",
  "limit": 10000
}]
```

Query assist ☒ ON

Options ^

Tidy

Run

Results

Help

Link ^

```
{
  "result": [
    {
      "initial_release_date": "1996-11-18",
      "name": "Star Trek: First Contact",
      "genre": [
        {
          "name": "Thriller"
        },
        {
          "name": "Adventure film"
        },
        {
          "name": "Action film"
        },
        {
          "name": "Science Fiction"
        }
      ],
      "starring": [
        {
          "actor": "Jonathan Frakes"
        },
        {
          "actor": "LeVar Burton"
        }
      ]
    }
  ]
}
```

<http://bit.ly/ELR-course>

Codecademy

Learn

Teach

Entity Linking and Retrieval

Course written by [Daan Odijk](#)

This course is created as a tutorial for Entity Linking and Retrieval. It covers web services, evaluation and fundamental methods. This Codecademy course is part of a tutorial created for WWW2013 and SIGIR2013, see: <http://bit.ly/ELR-slides>.

1. Entity Linking using Web Services

In this first section, we'll create a page where we can enter a text and then perform entity linking on this text. For this, we will use the DBpedia Spotlight web service.

2. Evaluating Entity Linking

In this section we will evaluate an entity linking webservice using a standard dataset. We will evaluate the DBpedia Spotlight Webservice on the AQUAINT dataset.

3. Entity Linking: Lexical matching of anchor text

In this exercise we will build the basic matching for lexical matching of anchor text from the ground up. This exercise is based on the University of Amsterdam Semanticizer and the University of Waikato Wikipedia Miner.

4. Entity Retrieval

In this section we will evaluate Entity Retrieval using Freebase.

Important Links

- Slides: <http://bit.ly/ELR-slides> (Github)
- Papers: <http://bit.ly/ELR-bib> (Mendeley)
- Exercises: <http://bit.ly/ELR-course> (CodeAcademy)
- Solutions: <http://bit.ly/ELR-exercises> (Offline version)