Entity Linking - Part I

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Entity Linking: Introduction

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  - Reference disambiguation or entity resolution

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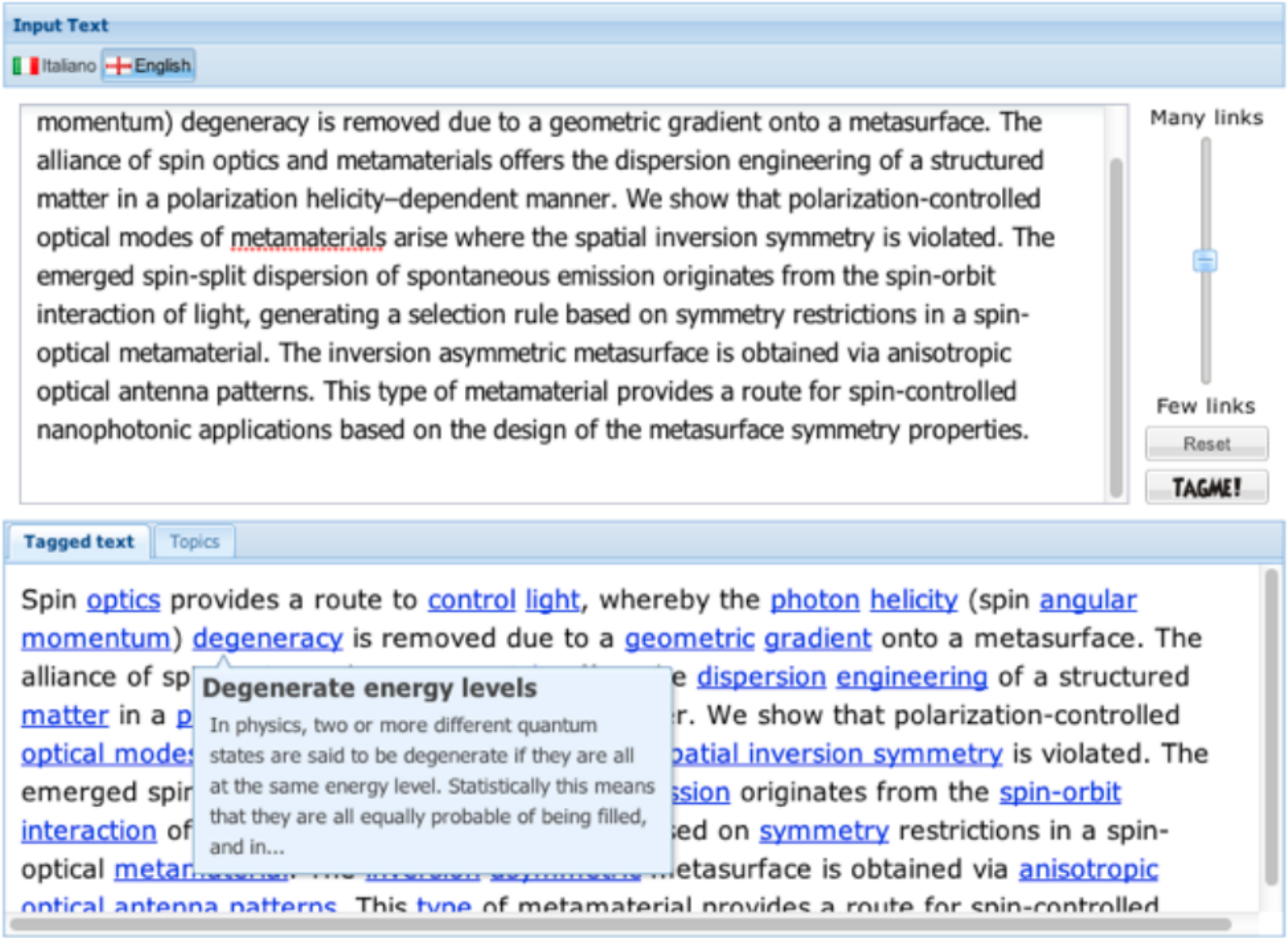
- Entitly linking needs to handle
  - Name variations (entities are referred to in many different ways)
  - Entity ambiguity (the same string can refer to more than one entity)

Entity Linking: Introduction

- We will take Wikipedia as the knowledge base to understand the task.
- With Wikipedia as the knowledge base, this task is commonly known as *Wikification*.

What is Entity Linking?



What is Entity Linking?

Iranian POW negotiator holds talks with Iraqi ministers

The head of **Iran**'s **prisoner of war** commission met with two **Iraqi** Cabinet ministers Saturday in a bid to glean information about thousands of Iranian POWs allegedly in Iraq, the official Iraqi News Agency reported.

Iraqi Foreign Minister **Mohammed Saeed al-Sahhaf** told Abdullah al-Najafi that the two states needed to ``speed up the closure of what remains from the POW and Missing-In-Action file,'' INA said.

The issue of POWs and missing persons remains a stumbling block to normalizing relations between the two neighbors.

Iraq has long maintained that it has released all Iranian prisoners captured in the **1980**-88 **Iran-Iraq War**. The countries accuse each other of hiding POWs and preventing visits by the **International Committee of the Red Cross** to prisoner camps.

The ICRC representative in **Baghdad**, Manuel Bessler, told The **Associated Press** that his organization has had difficulty visiting POWs on both sides on a regular basis.

In April, Iran released 5,584 fied as civil law detainees in the largest exchange since **1990**.

More than 1 million people w

Baghdad

Baghdad is the capital of Iraq and of Baghdad Governorate. With a metropolitan area estimated at a population of 7,000,000, it is the largest city in Iraq. It is the second-largest city in the Arab world (after Cairo) and the second-largest city in southwest Asia (after Tehran).

open in wikipedia

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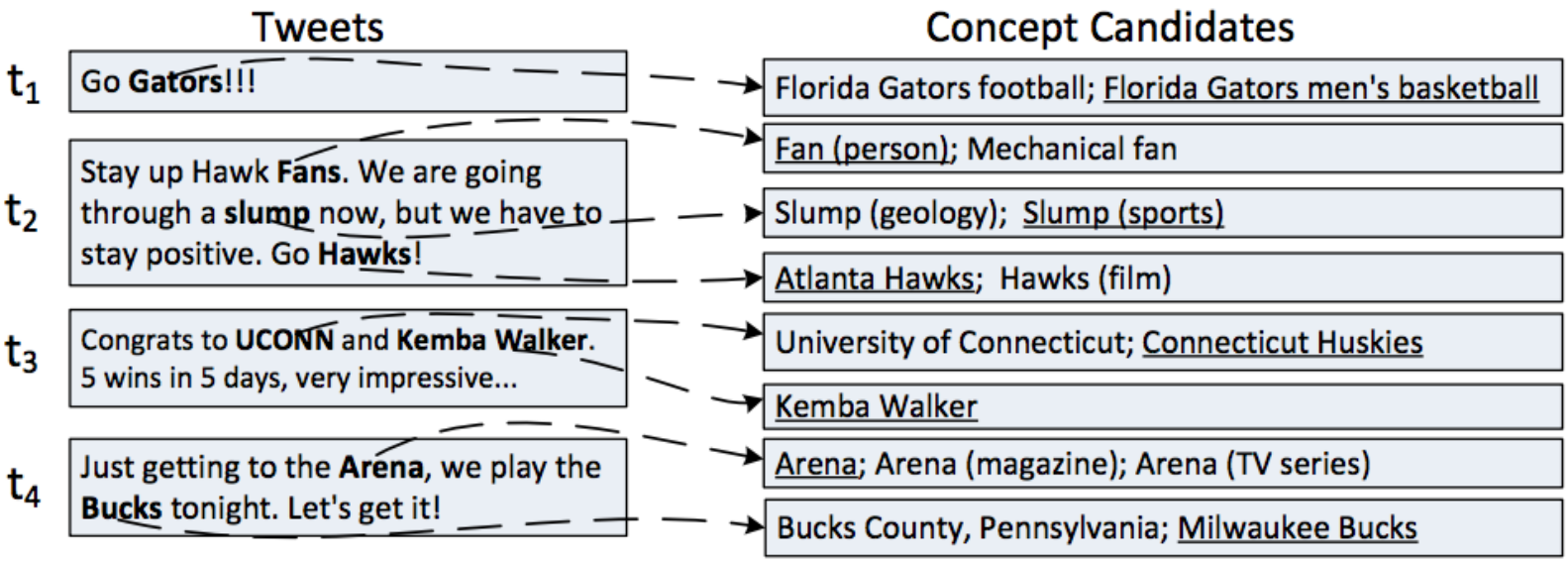

Entity Linking: Common Steps

Determine "linkable" phrases

mention detection - **MD**

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Rank/Select candidate entity links

link generation - **LG**

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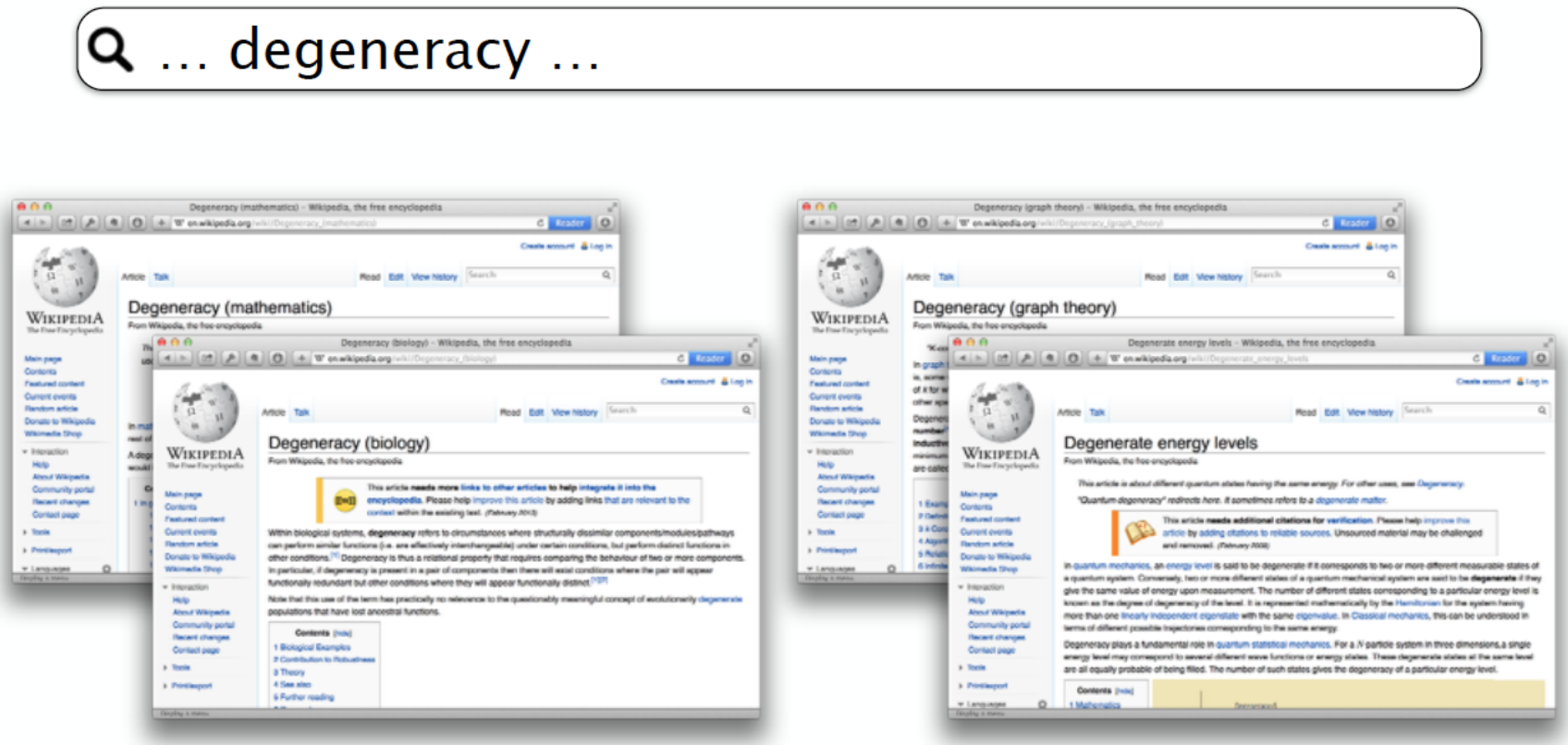
Use "context" to disambiguate/filter/improve

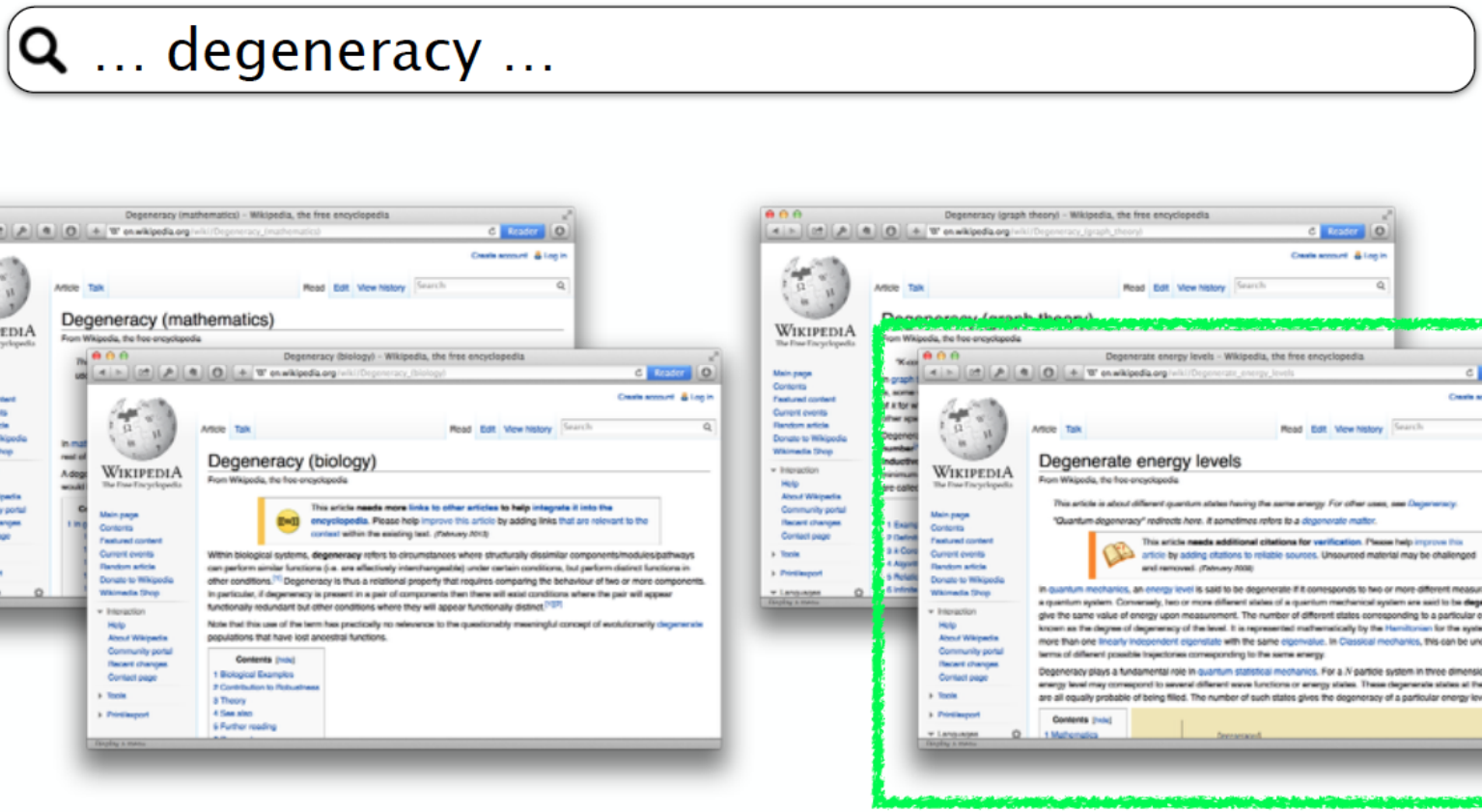
disambiguation - **DA**

Mention Detection (MD)

Link Generation (LG)



Disambiguation (DA)

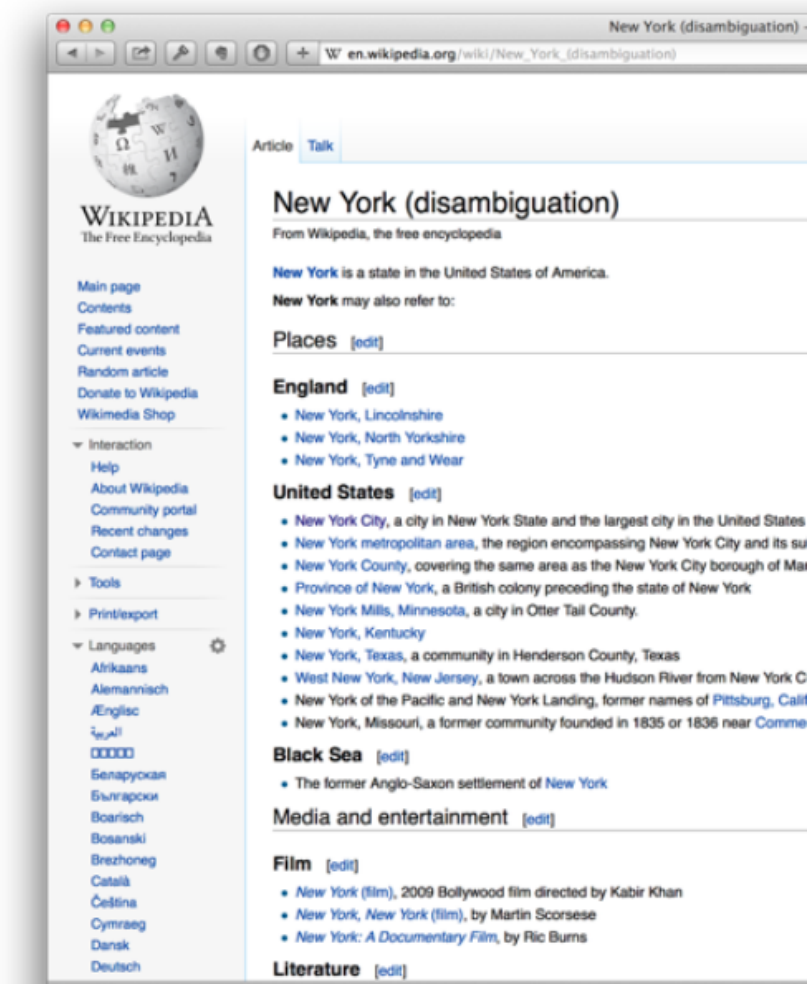


Preliminaries: Wikipedia

- Basic element: article (proper)
- But also
  - redirect pages
  - disambiguation pages
  - category/template pages
  - admin pages
- Hyperlinks
  - use “unique identifiers” (URLs)
    - [[United States]] or [[United States|American]]
    - [[United States (TV series)]] or [[United States (TV series)|TV show]]

Preliminaries: Disambiguation Pages

- Senses of an ambiguous phrase
- Short description
- (Possible) categorization
- Non-exhaustive



Some Statistics

WordNet

- 80k entity definitions
- 142k senses (entity - surface forms)

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Wikipedia

- 4M entity definitions
- 24M senses

Wikipedia based methods

What can be a good measure for MD?

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keyphraseness(w)

Number of Wikipedia articles that use it as an anchor, divided by the numer of articles that mention it at all.

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$$\frac{\mathrm{CF}(w_l)}{\mathrm{CF}(w)}$$

Collection frequency
term w as a link to another Wikipedia article

Collection frequency
term w

Wikipedia based methods

What can be a good measure for DA?

Wikipedia based methods

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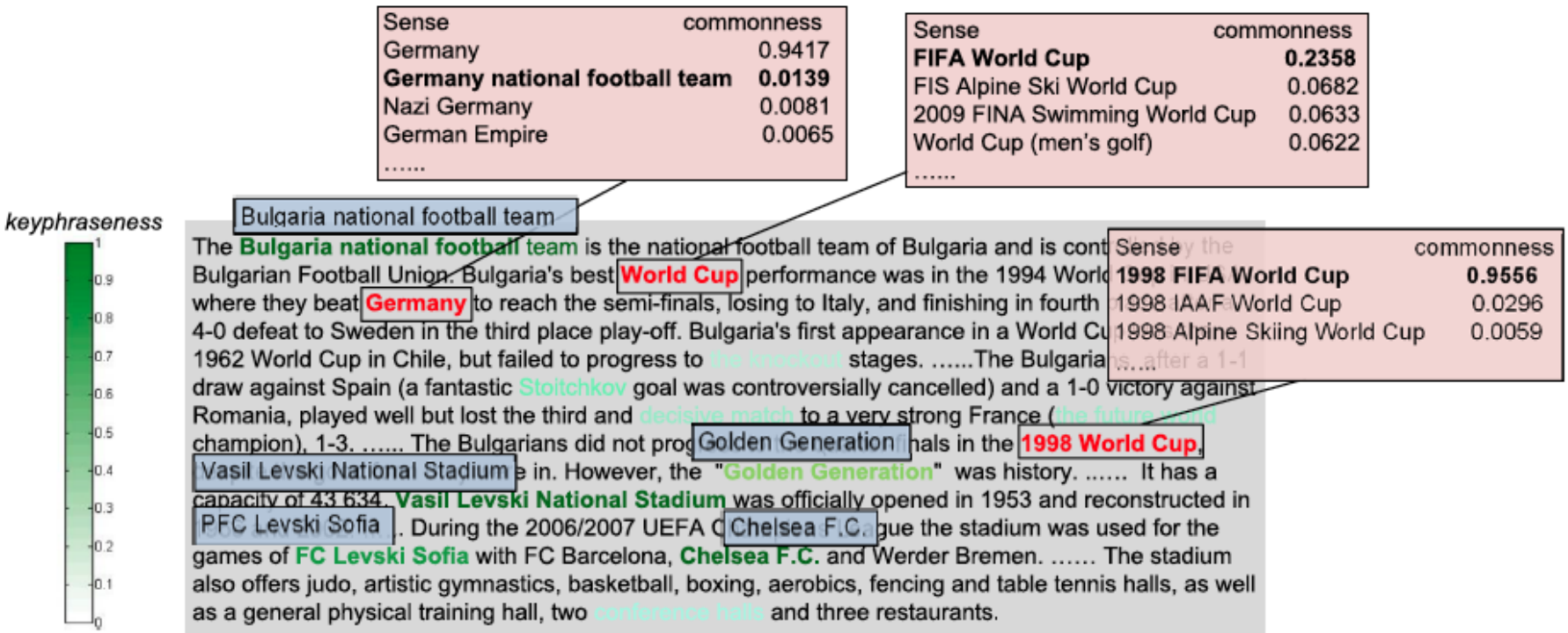
commonness(w, c)

The fraction of times, a particular sense is used as a destination in Wikipedia.

$$\frac{|L_{w,c}|}{\sum_{c'} |L_{w,c'}|}$$

Number of links
with target c' and anchor text w

Commonness and keyphraseness



Always the best decision?

Always the best decision?

- This can never help you build an accurate system, because you will always give some wrong links.
- Need to use the context.