

# Question Answering

# Advanced: Answering Complex Questions



# Answering harder questions

**Q:** What is *water spinach*?

**A:** Water spinach (*ipomoea aquatica*) is a semi-aquatic leafy green plant with long hollow stems and spear- or heart-shaped leaves, widely grown throughout Asia as a leaf vegetable. The leaves and stems are often eaten stir-fried flavored with salt or in soups. Other common names include *morning glory vegetable*, *kangkong* (Malay), *rau muong* (Viet.), *ong choy* (Cant.), and *kong xin cai* (Mand.). It is not related to spinach, but is closely related to sweet potato and convolvulus.



# Answering harder question

**Q:** In children with an acute febrile illness, what is the efficacy of single medication therapy with acetaminophen or ibuprofen in reducing fever?

**A:** Ibuprofen provided greater temperature decrement and longer duration of antipyresis than acetaminophen when the two drugs were administered in approximately equal doses.  
(*PubMedID: 1621668, Evidence Strength: A*)



# Answering harder questions via query-focused summarization

- The (bottom-up) snippet method
  - Find a set of relevant documents
  - Extract informative sentences from the documents (using tf-idf, MMR)
  - Order and modify the sentences into an answer
- The (top-down) information extraction method
  - build specific answerers for different question types:
    - definition questions,
    - biography questions,
    - certain medical questions



# The Information Extraction method

- a good **biography** of a person contains:
  - a person's **birth/death, fame factor, education, nationality** and so on
- a good **definition** contains:
  - **genus** or **hypernym**
    - *The Hajj is a type of ritual*
- a **medical answer about a drug's use** contains:
  - **the problem** (the medical condition),
  - **the intervention** (the drug or procedure), and
  - the **outcome** (the result of the study).



# Information that should be in the answer for 3 kinds of questions

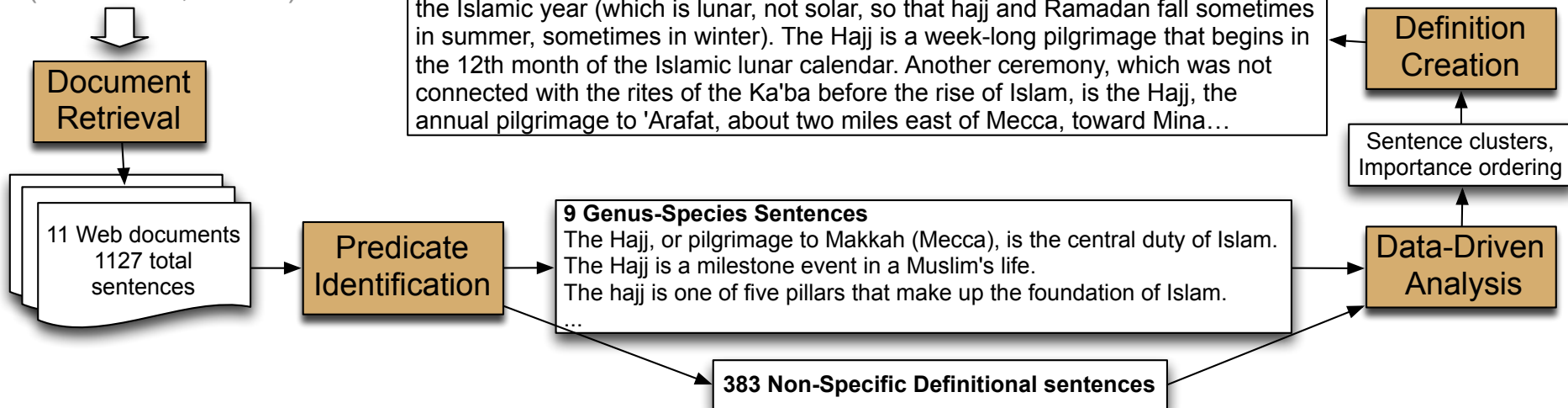
Definition	
<b>genus</b>	The Hajj is a type of ritual
<b>species</b>	the annual hajj begins in the twelfth month of the Islamic year
<b>synonym</b>	The Hajj, or Pilgrimage to Mecca, is the central duty of Islam
<b>subtype</b>	Qiran, Tamattu', and Ifrad are three different types of Hajj
Biography	
<b>dates</b>	was assassinated on April 4, 1968
<b>nationality</b>	was born in Atlanta, Georgia
<b>education</b>	entered Boston University as a doctoral student
Drug efficacy	
<b>population</b>	37 otherwise healthy children aged 2 to 12 years
<b>problem</b>	acute, intercurrent, febrile illness
<b>intervention</b>	acetaminophen (10 mg/kg)
<b>outcome</b>	ibuprofen provided greater temperature decrement and longer duration of antipyresis than acetaminophen when the two drugs were administered in approximately equal doses



# Architecture for complex question answering: definition questions

S. Blair Goldenson, K. McKeown and A. Schlaikjer.  
2004. Answering Definition Questions: A Hybrid Approach.

"What is the Hajj?"  
(Ndocs=20, Len=8)



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