

# Language Technology 1: Exercise for QA lecture

**Günter Neumann**

# Question Answering

- What are the major differences between information retrieval and question answering ?
- What are important challenges for ODQA?
- Describe the general QA architecture
  - Figure and description of main components
- What is open-domain question answering and what are the major challenges?

# Question Answering

- Determine the question type and the expected answer type for the following questions:
  - Who is the president of U.S.A.?
  - What type of bridge is the Golden Gate Bridge?
  - How many towns in Germany have more than 1 million inhabitants?
  - What is the capital of Somalia?
  - Name all Nobel price winners in Physics?
  - What is a battery?
  - Who is the organizer of the Olympic Games in 2018?

# Relevance of Syntax

- For the Question „When was Microsoft established?“ and the sentence „Microsoft plans to establish manufacturing partnerships in Brazil and Mexico in May.“
  - Why would it be difficult for a simple String-Matching Algorithm to find out that „May“ would not be a correct answer?
  - How could a syntax-driven Approach help?

# Evaluating QAS

- Assuming two QA systems called QA1 and QA2.
- Both have to answer the question: “What is the capitol of Germany”. (Correct answer is “Berlin”)
- Both systems return a ranked list of 5 candidates.
- Which system is better?

## **QA1:**

- 1. Hamburg**
- 2. Berlin**
- 3. Saarbruecken**
- 4. Hannover**
- 5. Muenchen**

## **QA2:**

- 1. Muenchen**
- 2. Hamburg**
- 3. Berlin**
- 4. Berlin**
- 5. Saarbruecken**

# Query Reformulation

- Transform the following questions to statements and send them as quoted queries to a search engine.
- Check, whether you can find the answer in the first ten snippets returned.
- Expand the query by additional material so to increase the recall and precision for the search.
- Questions:
  - What is Belgium's second-biggest town?
  - Who is the President of the World Bank?
  - When was Baring Brothers established?
  - Which institution did Nick Leeson work for before being arrested?

# QANUS

- open-source, Java-based, QA framework QANUS (pronounced KAY-NESS)
- QANUS makes it easy to build new QA systems as only a minimal set of components needs to be implemented on top of the provided framework.
- QANUS is released under the Open Software License (OSL) v3.0.

# Generic Pipeline

- (1) information source preparation
- (2) question processing
- (3) answer retrieval and
- (4) evaluation.

# Components of QANUS – QA-sys

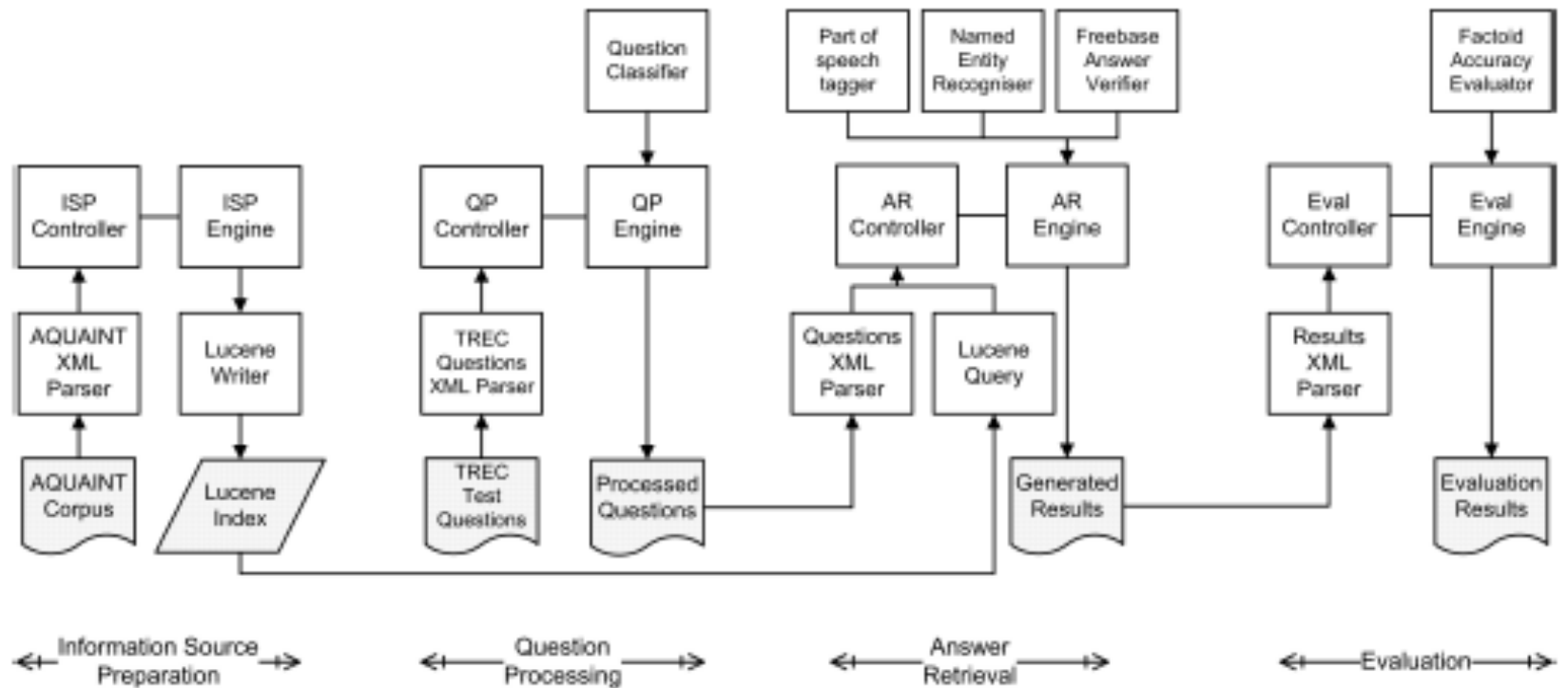


Figure 3: Actual components implemented in QA-SYS on top of the QANUS framework.

# Evaluation

- Accuracy ::=  $\frac{\text{no. of correctly answer questions}}{\text{total no. of test factoid questions}}$ 
  - no. of correctly answer questions
  - Divided by
  - total no. of test factoid questions
- TREC 2007 QA system scores
  - Between 0.706 and 0.206
  - QA-SY, currently 0.119