# UNIVERSITÀ DELLA SVIZZERA ITALIANA

# FACULTY OF COMPUTER SCIENCE

# Master in Artificial Intelligence

# Topic: Intelligent Information Access - Question Answering

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# Question Answering

IR techniques have proven quite successful at a location within large collections of documents for the user query. Often, however, the user wants not whole documents but brief answers to specific questions:

How old is the president of the United States? Who was the second person on the moon? When was the storming of the Bastille? Recently several search projects have investigated the computational techniques needed for effective performance at this level of granularity focusing on the questions that can be answered in few words taken as a passage directly from a single text left aside, for the answering of longer more complex answers, such as ( stories about events, description of objects, compare and contracts discussions, arguments of opinions ,,, etc ).

The systems being built in these projects exhibit a fairly standard structure, all create a query from the user's questions, perform IR with query to locate (segments of ) documents likely to contain an answer, and then pinpoint the most likely answer within candidate documents, the most common difference of approach in the pinpointing.

A (pure IR) approach would segments that best match the query, and return them as an answer, the change here would be (to make it so small as to be just an answer-sized but still long enough to be indexable).

A (pure NLP) approach would be to match the parse and/or semantic interpretation of the questions against the parse and/or semantic interpretation of each sentence in the candidate answer containing documents and return the best matches, the challenge here would be (to perform parsing, interpretation and matching fast enough to be practical, given argue volumes of the text to be handled ).

Answering short questions thus becomes a problem of finding the best combination of word-level (IR) and syntactic/semantic-level (NLP) techniques, the former to produce as short a set of likely candidate segments as possible because languages allow paraphrasing and inference, however, working out the details is not entirely straightforward.

# Question Type

An idiomatic categorization of questions for porpoises of distinguishing between different processioning and/or answer formats, eg. TREC2003

1. FACTOID: “How many far is it from Earth to the moon? ”
2. LIST: “List the names of chewing gums “ 3.DEFINITION: “Who is Voled the impaler? “
3. RELATIONSHIP: ”What is the connection between Trotsky & Lenin ?”
4. SUPPER RELATIVE: “What is the largest city on the earth ?”
5. YES OR NO: ”Is Saddam Hussein Alive ?”
6. OPINION: “What do most Americans think of gun control ?”
7. CAUSE OF EFFECT: “Why did Iraq invade Kuwait?”

# Answer Type

The classes of the object sought by the question, eg. :

1. PERSON: ( “ From”, “Who?” )
2. PLACES: ( “From”, “Where?” )
3. DATE: (“From”, “When?” )
4. NUMBER:( “From”,” How many ?” )
5. EXPLANATION:(“From”,” Why?” )
6. METHODS:(“From”, “How?”)

“Answer types are usually tied intimately to the classes recognized by the system’s named entity recognizer.”

# Question Focus

The property or entity that is being sought by the question,e.g. “In what state is the Code of Hammurabi ?”

“What is the population of Russia ?”

# Question Topic

The object (person, place, …. ), or event that the question is about, the question might be about a property of the topic, which will be the question focus, e.g. “What is the height of the Tower of Babel ?”, the focus, Tower of Babel, is the topic.

# Harder Questions

Factoid questions answering is quite simple, a more interesting task is one where the answers are fluid and depend on the fusion of the material from disparate texts over time. e.g. Who is Hannibal? Who is Nebuchadnezzar ?

# Web and Q.A

In TREC (the text retrieval conference) (and most commercial applications), retrieval is performed against a smallish closed collection of texts, the diversity of creativity in how people express themselves necessitates all that works to bring the question and the answer texts together, but on the Web popular factoids are likely to be expressed in a very large number of different ways, at least of a few of which will likely match the way the question was asked, so why not just grep (or agree) the web using all price of the original question.

# The TREC QA TASK

QA covers a broad of activities from simple (yes/no) responses to (true/false) questions to the (presentation) of complex results synthesized. From multiple data sources, the specific task in the TREC track was to return text snippets drawn from a large corpus of newspaper articles in response to fact-based short answer questions such as “How many calories are there in one liter of milk?

“The TREC task was restricted in that only closed-class questions were used, yet the subject domain was essentially unconstrained since the documents set were newspaper articles.

# Q.A Test Collection

The primary way TREC has been successful in improving documents retrieval performance is by (creating appropriate test collections for researchers to use when developing their systems ) while creating a large collection can be (time- consuming) and expensive ,one of the Rey goals of the QA track was to build a reusable QA test collection that is to devise a means to evaluate a QA run that uses the same document and question sets but not among the runs judged by the assumes ,unfortunately, the judgment sets produced by the assessors for the TREC , QA track do not constitute a reusable test collection because the unit that is judged is the entire answer string, different QA runs very seldom return exactly the same the same answer strings and it’s quite difficult to determine automatically whether the difference between a new string and judged string is significant with respect to the correctness of the answer , to an approximate solution to the problemist created a set of Perl string-matching patterns from the set strings that the seasons judged correct ,An answer string that matches any pattern for its question is marked correct ,an answer string matches any pattern for its questions is marked correct ,and marked in correct otherwise.