BioASQ

A challenge on large-scale biomedical semantic indexing and question answering

www.bioasq.org

Project Quick Facts

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Concept and Objectives

BioASQ is driven by a central information management problem that biomedical knowledge workers face: to synthesise and filter information from multiple, extremely large and fast-growing sources. Existing search engines (e.g., PubMed, GOPUBMED, EBIMED) only partially address this need. They focus on a limited range of resources (e.g., only PubMed articles and concepts from the Gene Ontology or MeSH), whereas multiple sources (e.g., including specialised drug databases and ontologies) often need to be combined to produce satisfactory answers. Semantic indexing, i.e., annotating resources with concepts from established semantic taxonomies or, more generally, ontologies, provides a means to combine multiple sources and facilitates matching questions to answers. Current semantic indexing, however, is largely performed manually, and needs to be automated to cope with the vast amount of new information that becomes available daily. At the same time, current semantic indexing and Question Answering (QA) methods require a significant push to reach a level of quality and efficiency acceptable to biomedical experts.

It is exactly this push that BioASQ aims to provide, by setting up ambitious, yet feasible and clearly defined challenge tasks, intended to lead to integrated, efficient, and effective semantic indexing and QA methods for the biomedical domain. Additionally, BioASQ will help towards establishing an evaluation framework for biomedical QA systems, by developing benchmark datasets and adopting (or refining) existing evaluation measures for its challenge tasks.
The BioASQ challenge will evaluate the ability of systems to perform various tasks in the biomedical QA process (fig. 1):

1. **large-scale classification of biomedical documents** onto ontology concepts (semantic indexing),
2. **classification of biomedical questions** onto relevant concepts,
3. **retrieval** of relevant document snippets, concepts and knowledge base triples, and
4. **delivery** of the retrieved information in a concise and **user-understandable form**.

First Challenge

Task 1a: Large-scale online biomedical semantic indexing
Large-scale semantic indexing will be evaluated on the whole of PubMed. In particular, participants will be asked to classify incoming documents before the human curators do:

- BioASQ will distribute new unclassified PubMed documents.
- Participants will have a limited response time to attach MeSH terms.

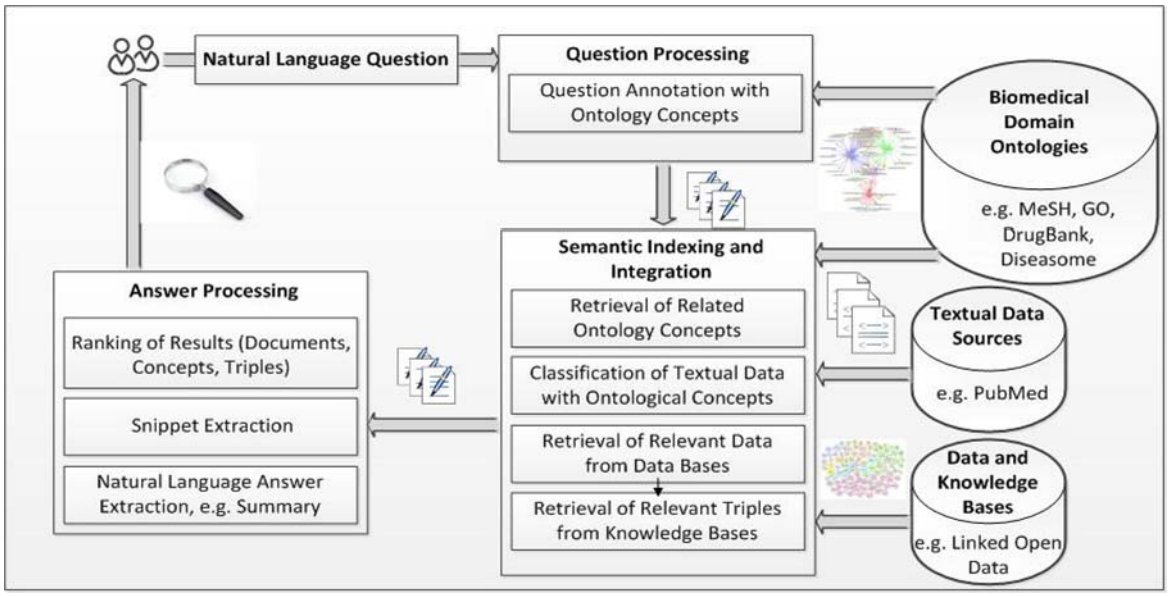

Figure 1: Overview of semantic indexing and question answering in the biomedical domain

Task 1b: Biomedical semantic QA

Benchmarks containing development and evaluation questions, as well as gold standard (reference) answers, will be developed. The gold standard answers will be produced by a team of biomedical experts from research teams around Europe. Established methodologies from QA, summarisation, and classification will be followed to produce the benchmarks and evaluate the participating systems. In the first year, the task will run in two phases:

Phase A:

- BioASQ will transmit simultaneously questions from the benchmark.
- Participants will have limited time to respond with concepts, snippets, triples.

Phase B:

- BioASQ will distribute questions + concepts, snippets, triples.
- Participants respond with facts, summaries, etc.
- Evaluation with gold answers, majority and manually (sample)

A second version of the challenge will run in the second year of the project. However, one of BioASQ's main goals is to make the challenge sustainable after the end of the project. For this purpose, a special BioASQ social network will be developed, supporting the construction of new benchmarks and evaluation campaigns. During the project we will seek to attract a large community of experts in the social network.