Semantic Medline

Overview and Demo

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Motivation

◆ Biomedical information is growing at an increasingly faster pace
  ● High-throughput approach to knowledge processing
◆ Information retrieval is the starting point, not the end of the journey for the researcher
  ● Towards “computable” knowledge
◆ Integration between literature and other resources is insufficient
  ● Adequate for navigation purposes
  ● Insufficient for knowledge processing
Applications

- Refined information retrieval
  - Indexing on relations in addition to concepts
  - *Find articles asserting that* \textit{IL-13 inhibits COX-2}*

- Multi-document summarization
  - Extract and visualize facts from the literature
  - *Summarize the top 300 papers on* \textit{panic disorder}*

- Question answering
  - Clinical and biological questions
  - \textit{What drugs interact with imipramine?}*

- Knowledge discovery
  - Reasoning with facts from heterogeneous resources
  - *From MEDLINE and UMLS together*
Advanced Library Services Summary

- Biomedical Literature
- Terminological Knowledge
- Structured Knowl. Bases
- Contributed Knowledge

Source selection (PubMed, annotations)

- Document Summarization
- Question Answering
- Knowledge Discovery
- Information Retrieval

MEDLINE
CT.gov
UMLS
Entrez Gene
GO
Information integration

- Transform resources into a common format
  - UMLS Metathesaurus
  - Other NCBI databases
  - Drug knowledge bases
  - ...

- Integrate resources
  - Query across resources

Diagram:
- Alzheimer disease
- Parkinson disease
- Neurodegenerative diseases
- APP
- PARK1
- has_associated_disease

APP Alzheimer disease

PARK1 Parkinson disease
Pilot Application

Populating and exploiting the Biomedical Knowledge Repository

Semantic Medline: Multi-document summarization and visualization

With Marcelo Fiszman, M.D., Ph.D. and Halil Kilicoglu, M.S.
Managing retrieval results

Information retrieval

Text mining

Network of relations

Semantic Medline

500 citations
Managing retrieval results

Search PubMed for epilepsy
Semantic Medline Live

Lister Hill National Center for Biomedical Communications

Search | SemiRep | Summarization | Translation | Visualization

Process SemiRep summary predictions from the current session

Search Term: Alzheimer's, Source: Medline, Next Recall: 5000, Start Date: 08/31/2005, End Date: 08/31/2006, Summary Type: treatment, 177 predictions extracted by summarization

Include UMLS relations

Note: The visualization application requires JRE 5.0. You can download JRE 5.0 from here.

Semantic Medline

LNP - 2008 Aug

TI - inflammation, anti-inflammation agents and Alzheimer disease. The last 12 years.

AB - Two basic discoveries have spurred research into inflammation as a driving force in the pathology of Alzheimer disease (AD). The first was the identification of activated microglia in association with the lesions. The second was the finding that mounted arteritis were relatively spared from the disease. These findings spurred the first pilot trials of a classical NSAID in the treatment of AD. This trial showed promise for ibuprofen as a useful therapeutic agent but appropriate follow up trials have not been done. However, more than 25 experimental studies have since been conducted showing a sparing effect for anti-inflammatories in AD, including four which specifically addressed the use of classical NSAIDs. Other key findings linking inflammation to AD pathology are the identification of activated complement fragments, including the membrane attack complex, as well as inflammatory cytokines in...
Advanced Library Services

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