# Master‘s Thesis Presentation

## A User Interface for Semantic Full Text Search

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# Outline

- motivation
- search content and queries
- the user interface
- realization
- summary

# Motivation

- search engines like Google, Yahoo or Bing are very popular
- queries are a number of keywords and results contain these keywords
- consider more intricate query: “Movies directed by Steven Spielberg that are about one of the world wars”

# Motivation

- there also exist search engines that can process semantic information in queries:
  - ontology only: powerful and efficient but limited to fact retrieval (e.g. RDF-3X, Sesame)
  - combination ontology and full-text search: enable search in document collections with semantic queries (e.g. ESTER, CONTENTUS)

# Motivation

- semantic query creation is a challenge: queries need a format that enables a search engine to understand the semantics
  - natural language queries: most intuitive and convenient for users but complicated and difficult to implement
  - special query languages (e.g. SPARQL): powerful but unintuitive and need special knowledge
  - special user interfaces: hide complex details without limiting the capabilities of the search engine
- we implemented a new special user interface

# Outline

- motivation
- search content and queries
  - search content
  - query language
  - query results
- the user interface
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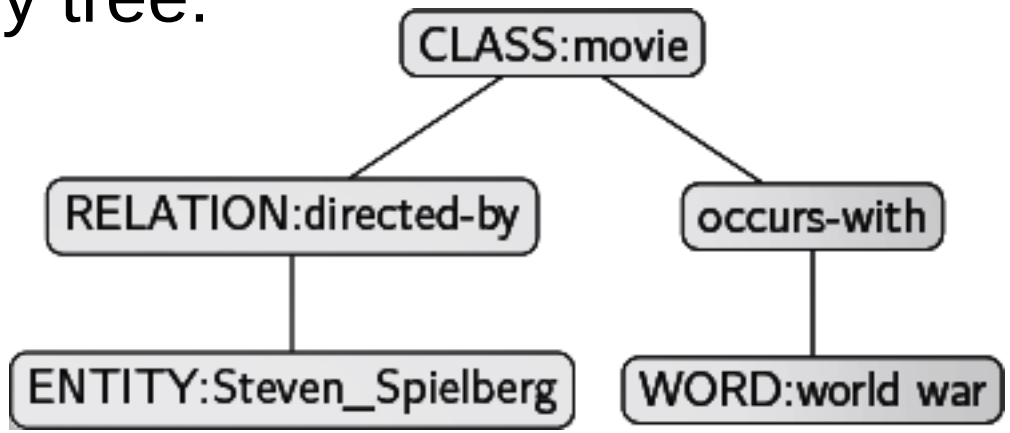
# Search Content

- search content: the type of data a search engine is designed to search in
- dictates the kind of information that needs to be displayed to the user
- our search engine: semantic full-text search in a text collection that is linked with an ontology
- current prototype: English Wikipedia as text collection and YAGO as linked ontology

# Query Language

- our queries can be described as trees with the following types of nodes:
  - class, entity, cooccurrence, relation, value, word
- some rules define how these types of nodes can be connected
- example query tree:



# Query Results

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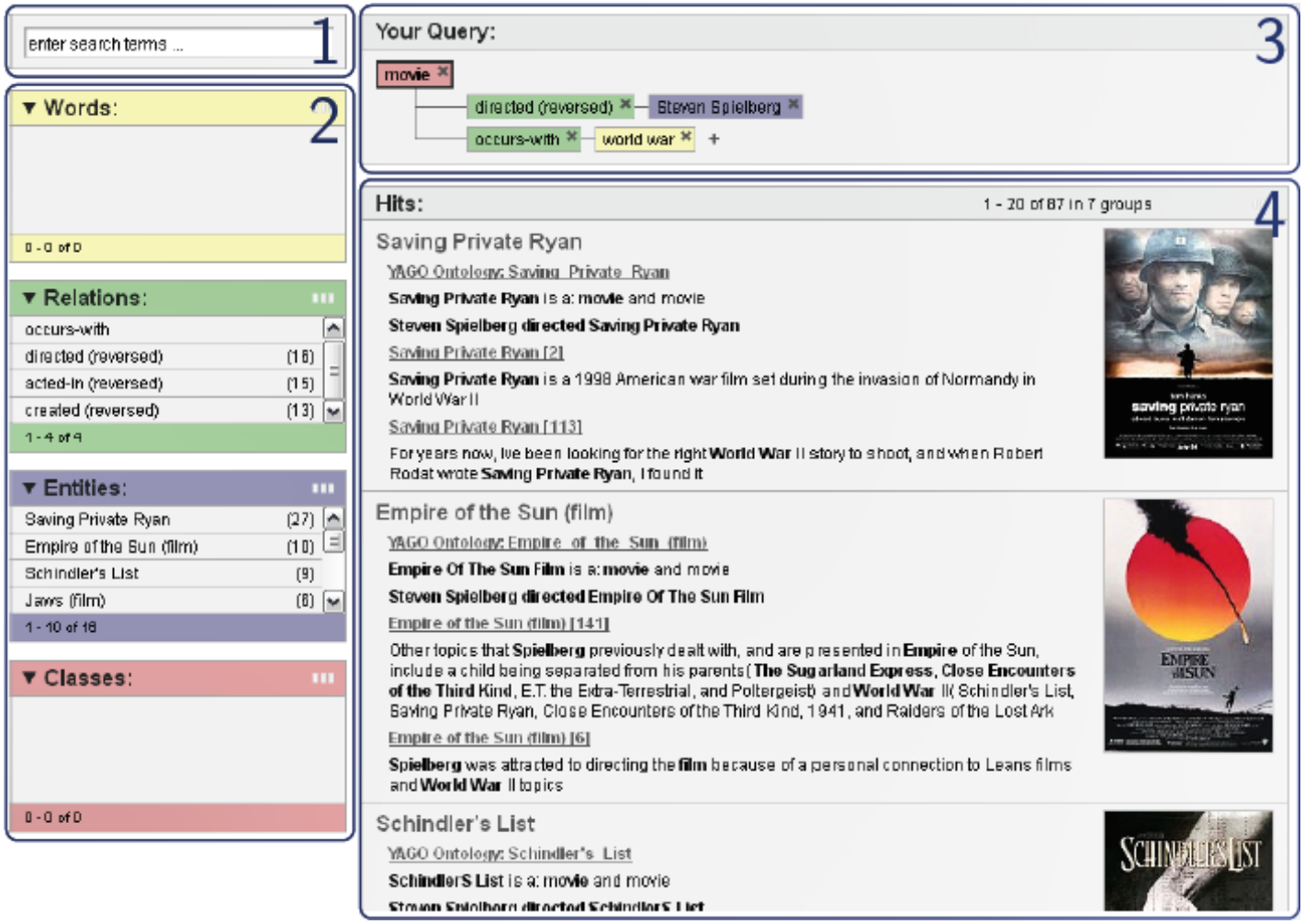
- search engine can deliver two types of results for a query:
  - normal hits that consist of ontology facts and text documents
  - proposals for the different tree nodes for the query creation

# Outline

- motivation
- search content and queries
- the user interface
  - overview
  - main features
  - live demo with examples
- realization
- summary

# UI - Overview


enter search terms ...
1
Your Query:
3
movie
directed (reversed)
Steven Spielberg
occurs-with
world war
+
Words:
2
0 - 0 of 0
Relations:
occurs-with
directed (reversed) (16)
acted-in (reversed) (15)
created (reversed) (13)
1 - 4 of 9
Entities:
Saving Private Ryan (27)
Empire of the Sun (film) (10)
Schindler's List (9)
Jaws (film) (8)
1 - 10 of 18
Classes:
0 - 0 of 0
Hits:
1 - 20 of 87 in 7 groups
4
Saving Private Ryan
YAGO Ontology: Saving_Private_Ryan
Saving Private Ryan is a: movie and movie
Steven Spielberg directed Saving Private Ryan
Saving Private Ryan [2]
Saving Private Ryan is a 1998 American war film set during the invasion of Normandy in World War II
Saving Private Ryan [113]
For years now, Ive been looking for the right World War II story to shoot, and when Robert Rodat wrote Saving Private Ryan, I found it
Empire of the Sun (film)
YAGO Ontology: Empire_of_the_Sun_(film)
Empire Of The Sun Film is a: movie and movie
Steven Spielberg directed Empire Of The Sun Film
Empire of the Sun (film) [141]
Other topics that Spielberg previously dealt with, and are presented in Empire of the Sun, include a child being separated from his parents ( The Sugarland Express, Close Encounters of the Third Kind, E.T. the Extra-Terrestrial, and Poltergeist) and World War II( Schindler's List, Saving Private Ryan, Close Encounters of the Third Kind, 1941, and Raiders of the Lost Ark
Empire of the Sun (film) [6]
Spielberg was attracted to directing the film because of a personal connection to Leans films and World War II topics
Schindler's List
YAGO Ontology: Schindler's_List
SchindlerS List is a: movie and movie
Steven Spielberg directed SchindlerS List

# UI – Main Features

- interactive and proactive:
  - rich internet application that uses JavaScript and Ajax
  - no search button, input is processed automatically
  - asynchronous reloading of information
- the proposal boxes:
  - the key why users do not need knowledge about the underlying ontology
  - context sensitive to the current query
  - can be filtered with the help of the input field
  - color-coded by type

# UI – Main Features

- the query panel:
  - our advanced breadcrumbs display
  - displays the current query tree
  - can be used to refine the query (add new nodes, remove nodes, replace nodes …)
- the hits area:
  - displays the hits for the current query
  - groups hits by entities if possible
  - shows a Wikipedia article image for each group if possible

# UI – Live Demo

- example query:

  “Movies directed by Steven Spielberg that are about one of the world wars”

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# Realization

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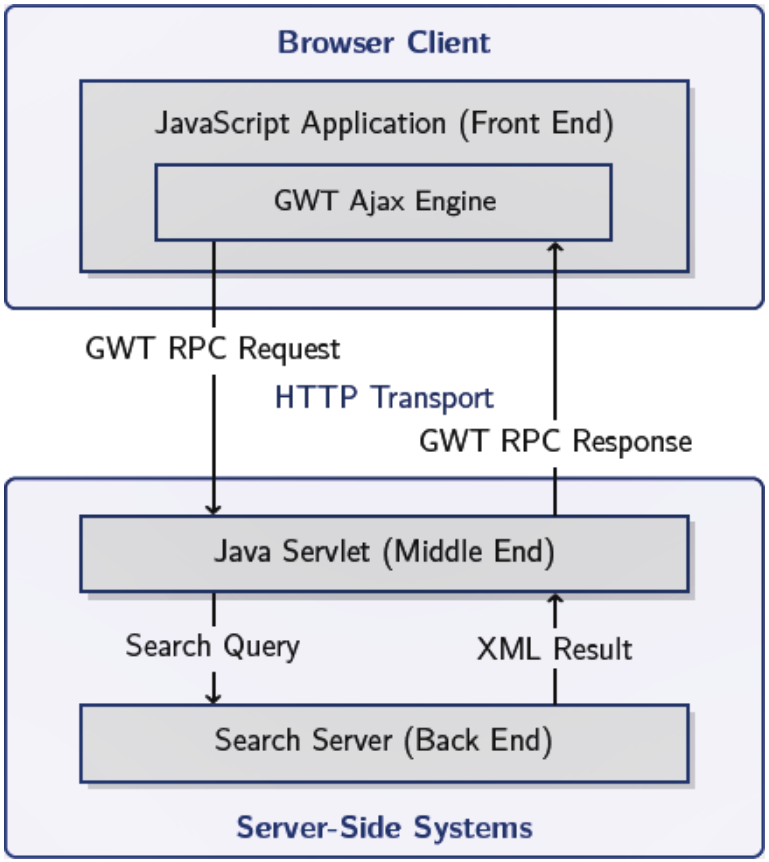
- implemented with Google Web Toolkit (GWT)
- using GWT applications are programmed in Java and compiled into JavaScript
- advantages:
  - fully object oriented programming
  - comfortable programming and debugging with any Java IDE
  - code optimizations at compile time
  - code reuse for java server applications and easy client-server communication

# Realization

- three-tier client-server architecture:



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# Summary

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- motivation why special semantic search user interfaces are needed
- the search content and queries for which the user interface was built
- overview of the created user interface including its functionality and a live demo
- basic realization of the user interface using GWT

# The End

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- thank you for your attention!
- any questions?