INF

FACULTY OF
COMPUTER SCIENCE

User Interface with Advanced Filtering Mechanisms for Searching Legal Documents

Master Thesis Presentation

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CONTENTS

- Motivation: Support users with hierarchical navigation through document collection
- Related Work: State of the art methodologies
- Approaches: Document clustering, Hierarchical faceted search
- Implementation
- Evaluation: Comparing with the existing Legal Horizon search interface
- Conclusion of developed model and Future Work

MOTIVATION

- Traditionally documents are retrieved with the help of search interface with a simple search box.
- Usability comes into question when there is a huge document collection
- To address this problem, Conceptual properties of document collection are used for filtering the search results.

MOTIVATION

LegalHorizon AG
Regulatory Compliance

- Legal Horizon scanning helps companies to keep track of laws, legal documents and their changes over time.
- In order to help users efficiently, a search UI with advanced filtering mechanisms is necessary

RESEARCH QUESTIONS

- To what degree does using advanced filtering mechanisms(hierarchical faceted metadata and faceted search) facilitate success in search interface usability?

- To what extent does the visualization of hierarchical faceted metadata could facilitate in effective information retrieval?

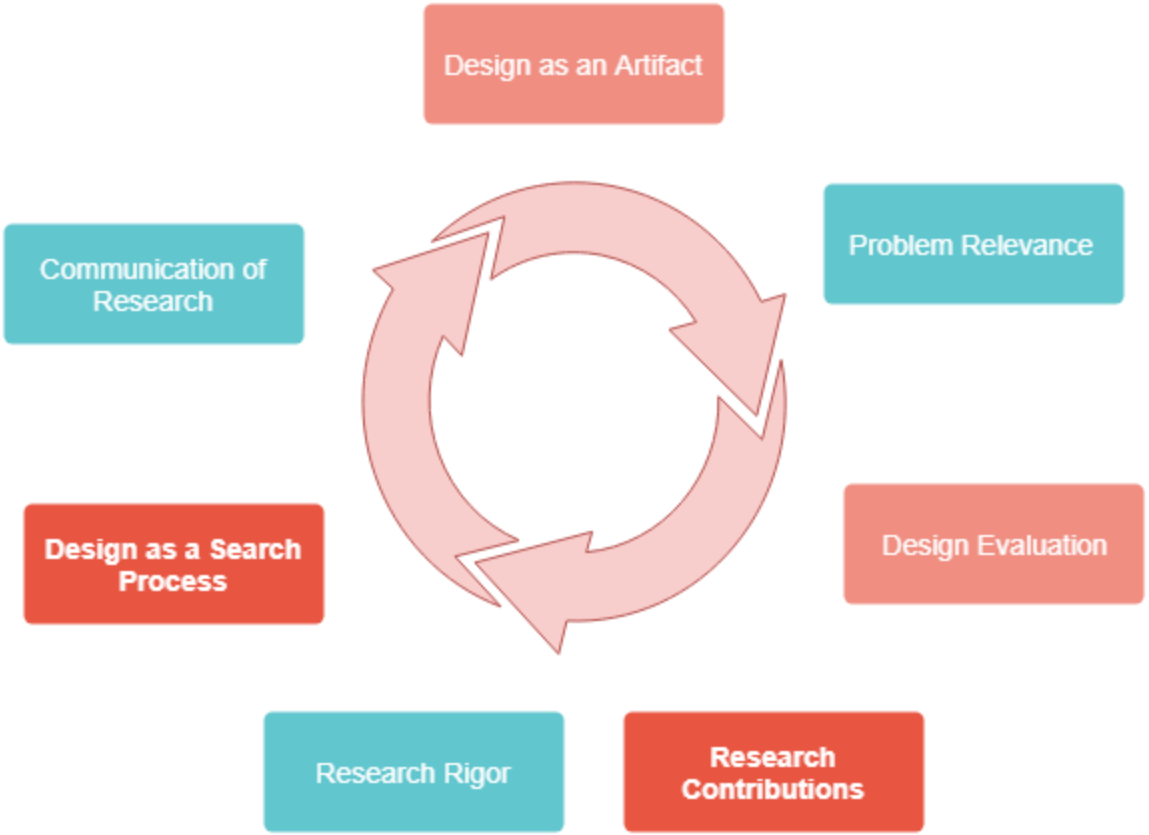
RELATED WORK

- Human Computer Interaction
  - Effectiveness, Efficiency, Satisfaction
- Information Retrieval
  - Classic model of IR, Standard model of IR
- Faceted Search
  - Facets, Hierarchical facets
- Taxonomies
  - Faceted taxonomies
- Information Exploration
  - Clustering, JEX software

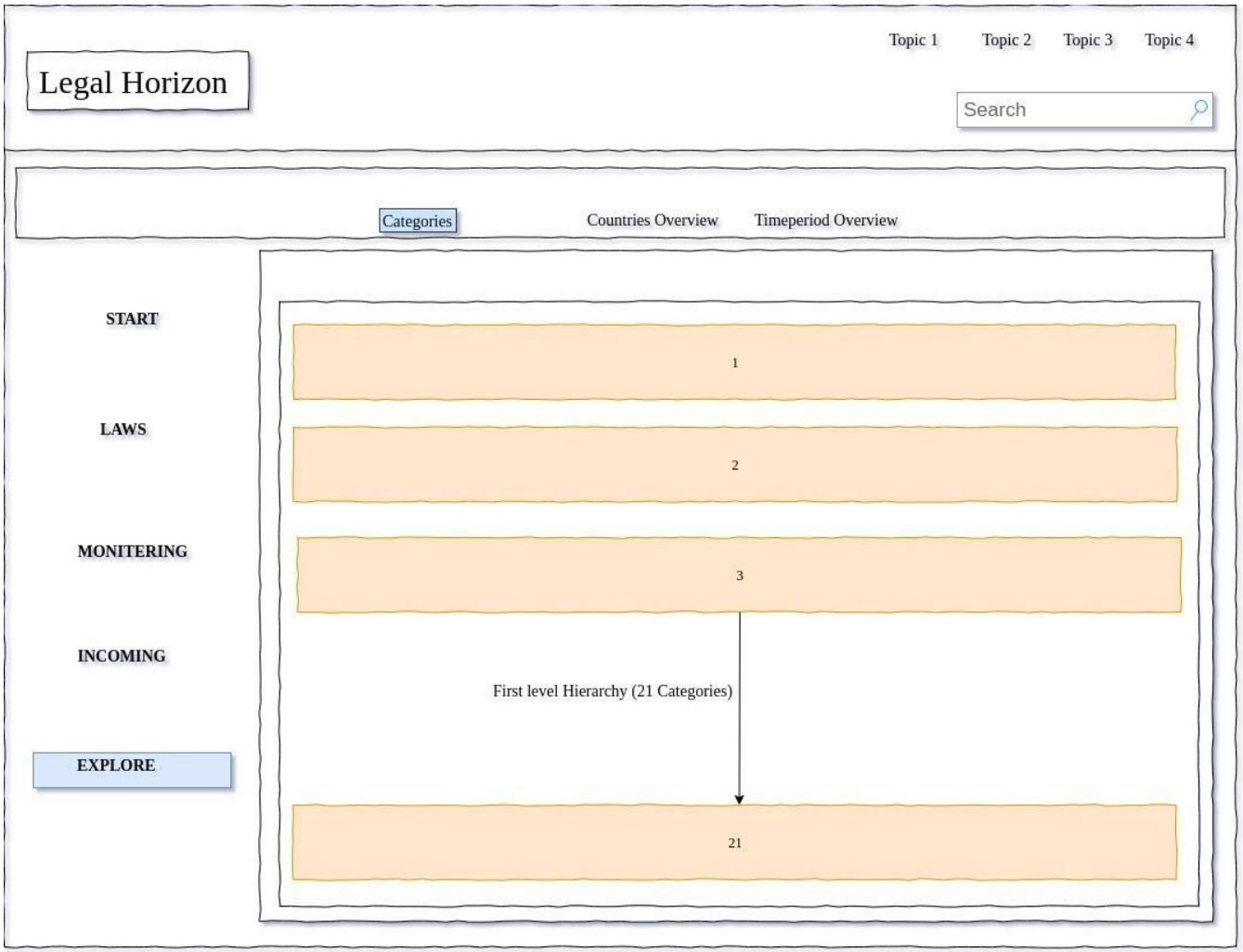
GOALS

- Develop a search UI which can make use of hierarchical faceted metadata
- Improve the usability by providing better navigation
- Design the navigation flow for the user which includes visualizing metadata
- Analyze the search scenarios of the user by taking user requirements into consideration

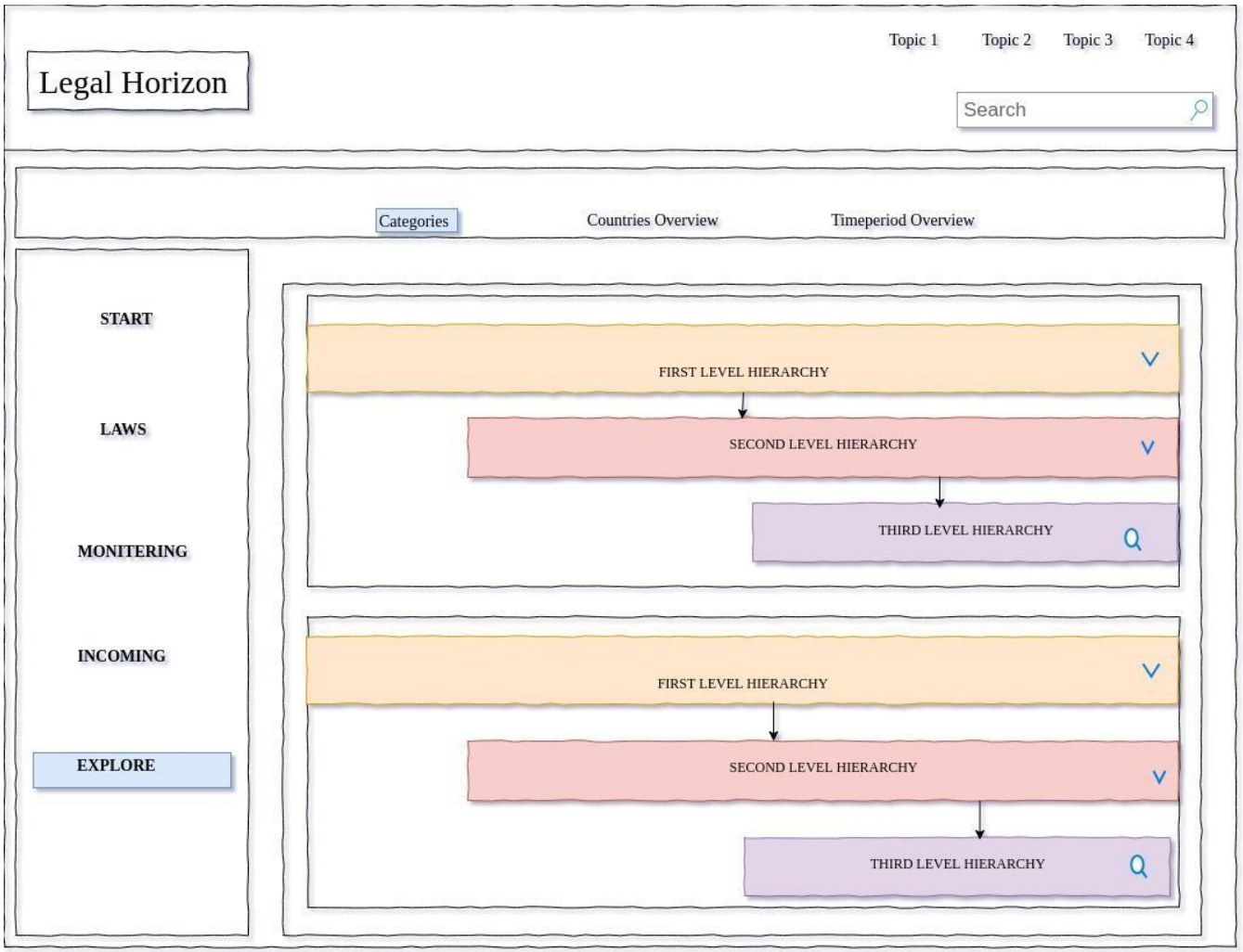
RESEARCH METHODOLOGY



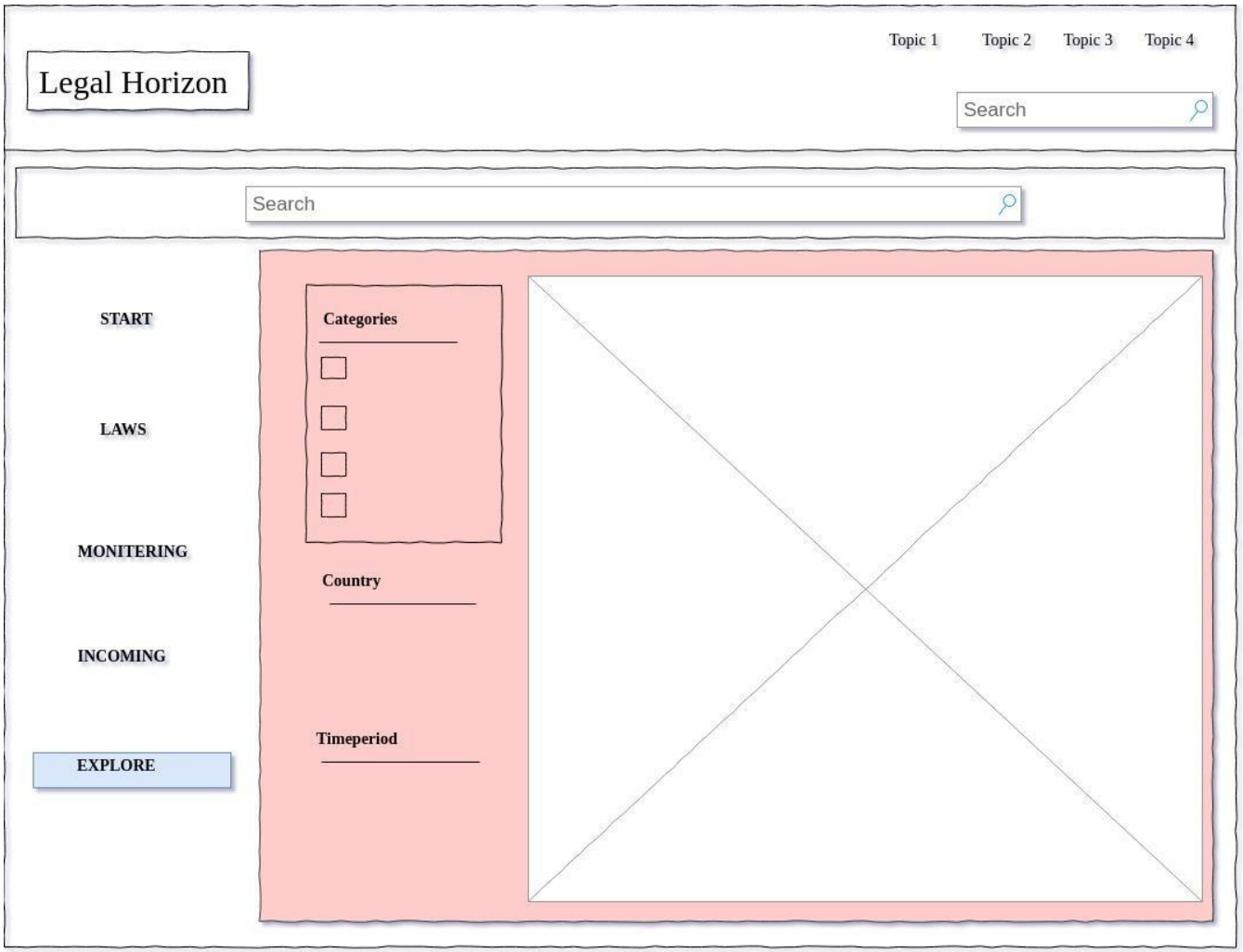
PROTOTYPES


Legal Horizon
Topic 1
Topic 2
Topic 3
Topic 4
Search
Categories
Countries Overview
Timeperiod Overview
START
LAWS
MONITERING
INCOMING
EXPLORE
1
2
3
First level Hierarchy (21 Categories)
21

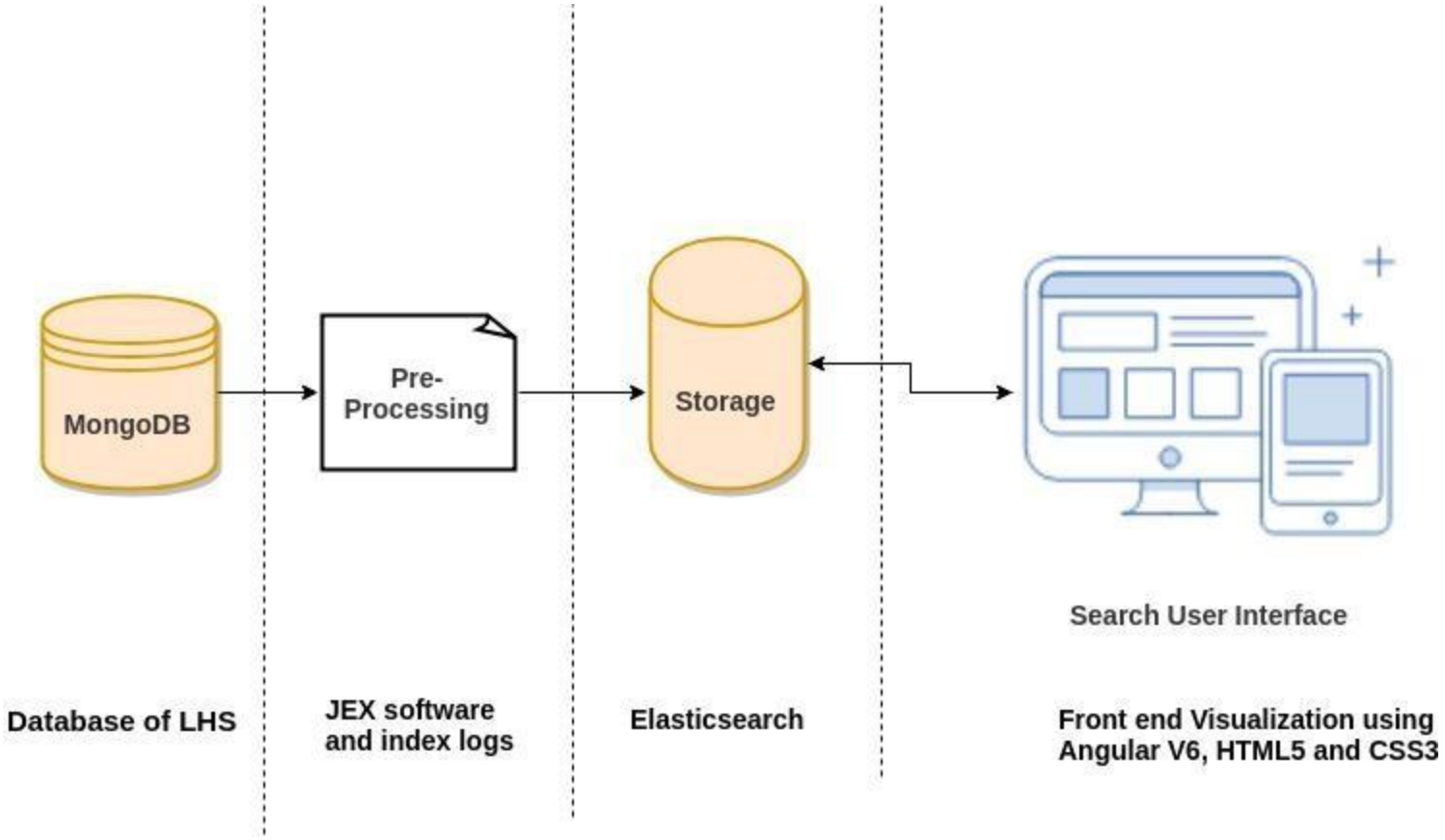
PROTOTYPES


Legal Horizon
Topic 1
Topic 2
Topic 3
Topic 4
Search
Categories
Countries Overview
Timeperiod Overview
START
LAWS
MONITERING
INCOMING
EXPLORE
FIRST LEVEL HIERARCHY
SECOND LEVEL HIERARCHY
THIRD LEVEL HIERARCHY
FIRST LEVEL HIERARCHY
SECOND LEVEL HIERARCHY
THIRD LEVEL HIERARCHY

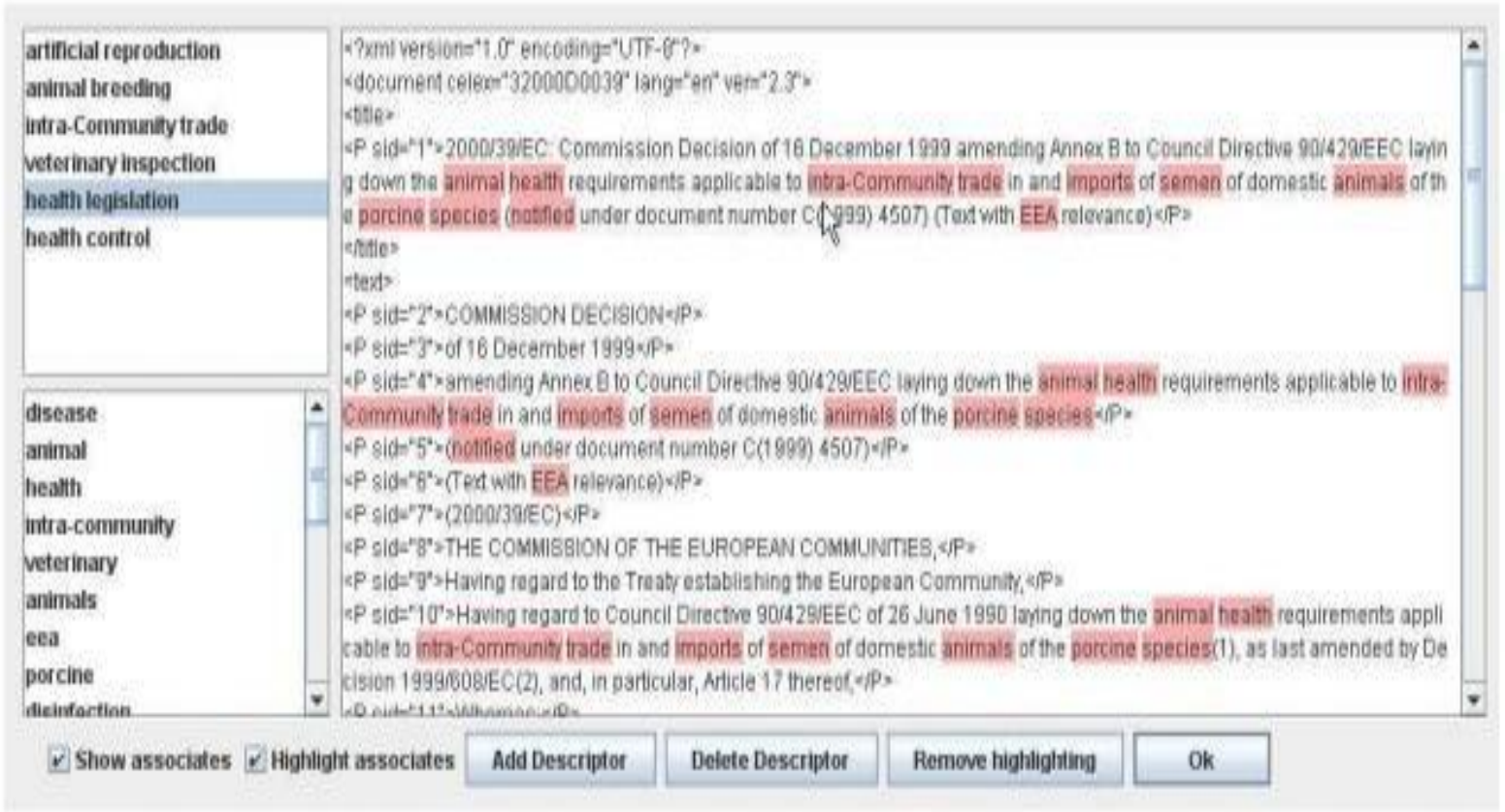
PROTOTYPES


Legal Horizon
Topic 1
Topic 2
Topic 3
Topic 4
Search
Search
START
LAWS
MONITERING
INCOMING
EXPLORE
Categories
Country
Timeperiod

SYSTEM ARCHITECTURE



JEX SOFTWARE



IMPLEMENTATION

Data set:

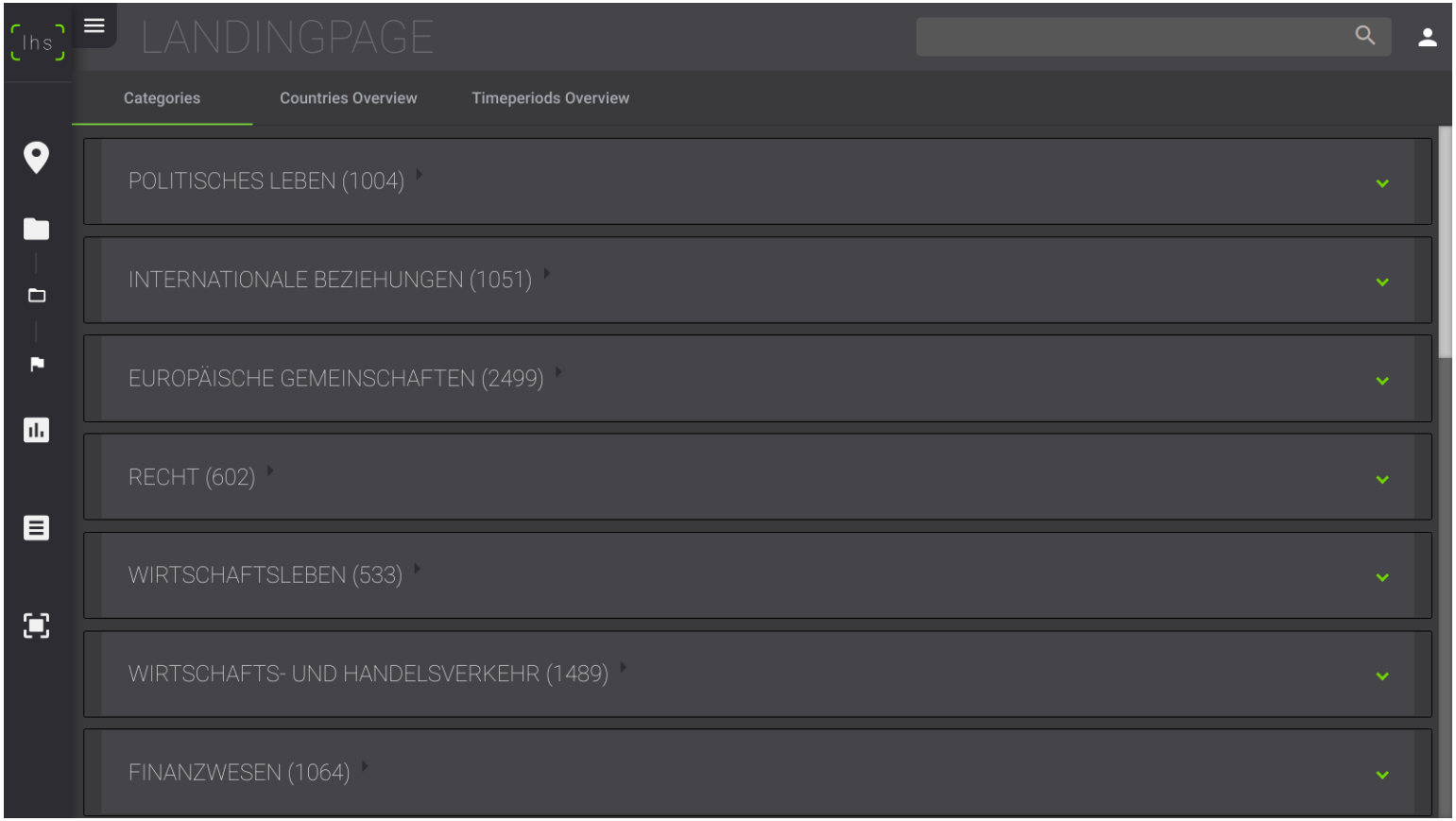
- Existing Legal Horizon data set consists of 8091 laws
- All these law documents are curated with metadata.

Data set pre-processing

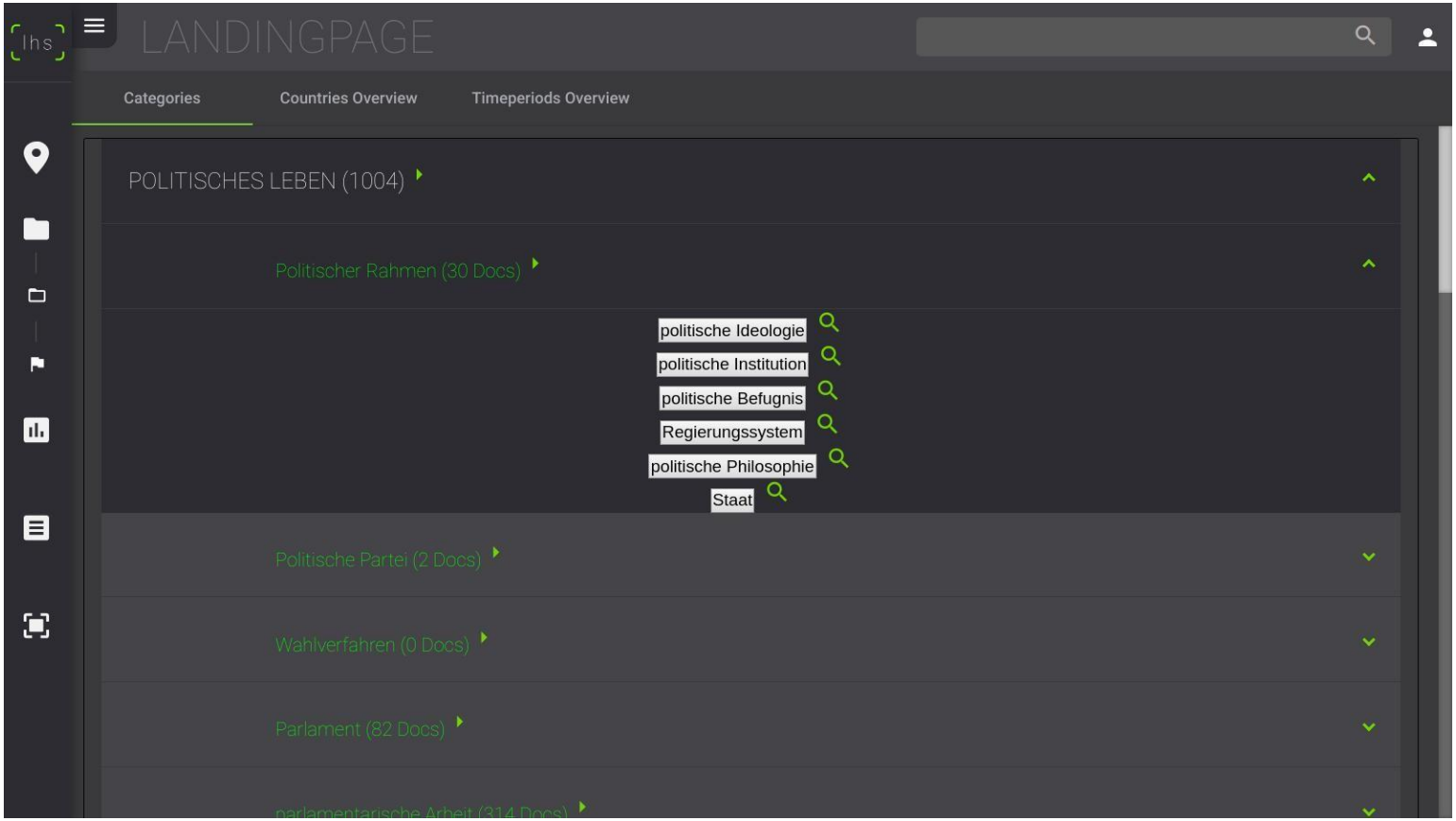
- Training the law collection with JEX software
- Adding metadata to Elastic search.

```
"metadata": {
  "properties": {
    "abbreviation": {…},
    "categories": {…},
    "country": {…},
    "createdDate": {…},
    "entries": {…},
    "importedDate": {…},
    "lastChangedDate": {…}
  }
```

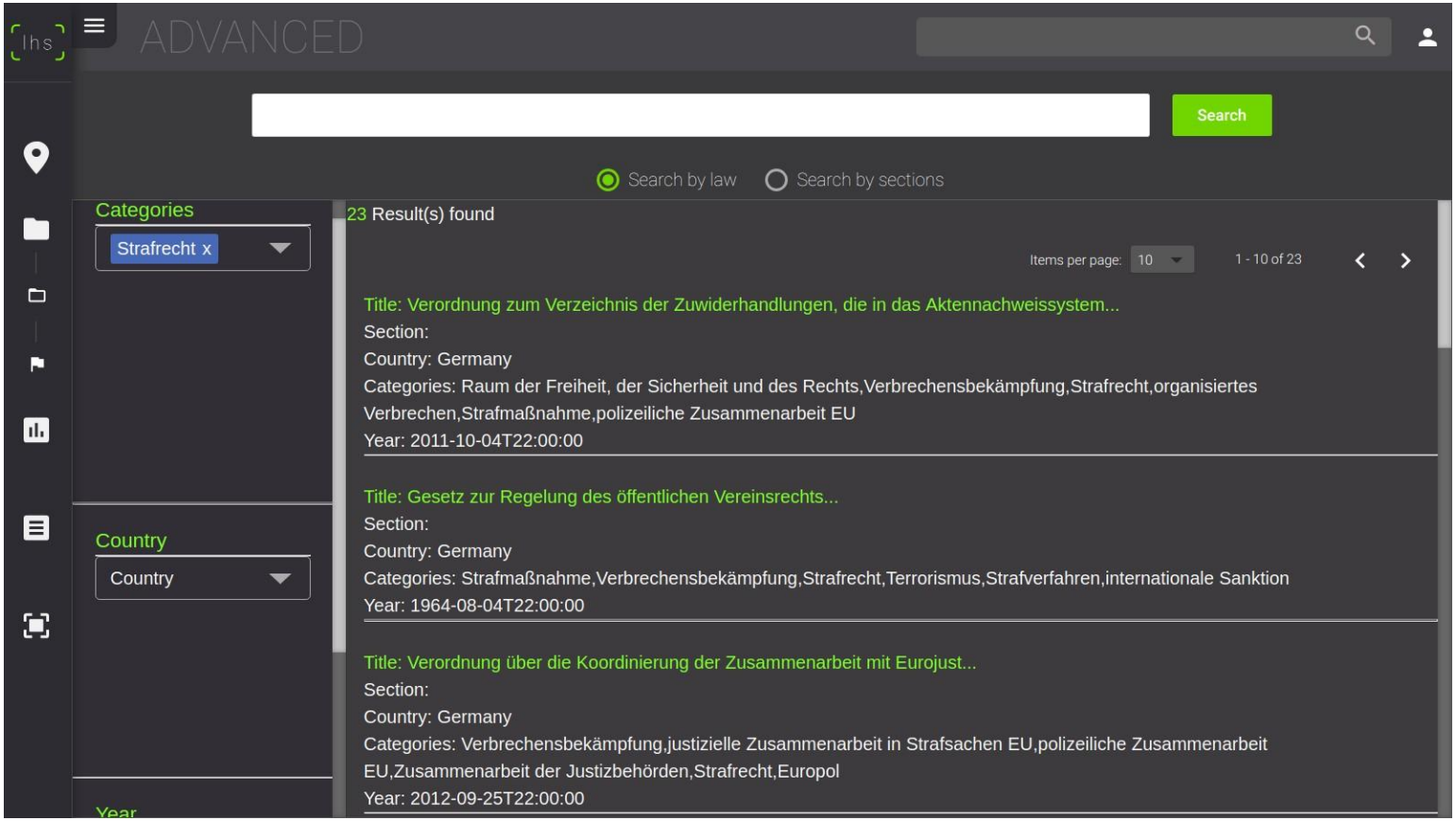
IMPLEMENTED SEARCH UI



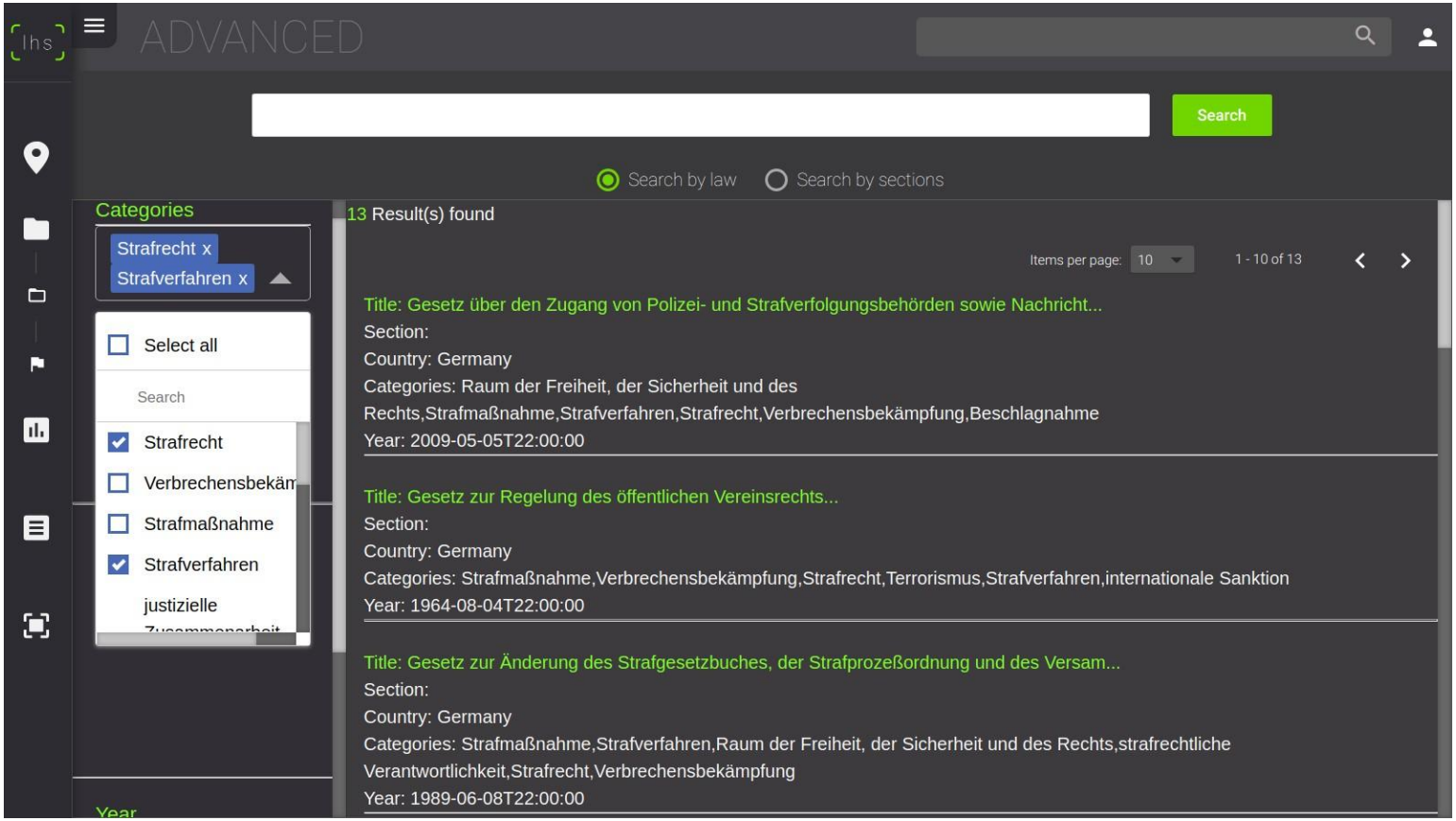
IMPLEMENTED SEARCH UI



IMPLEMENTED SEARCH UI



IMPLEMENTED SEARCH UI



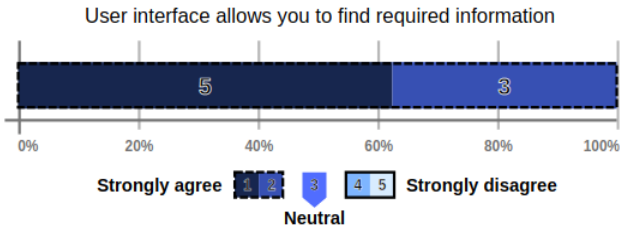
EVALUATION

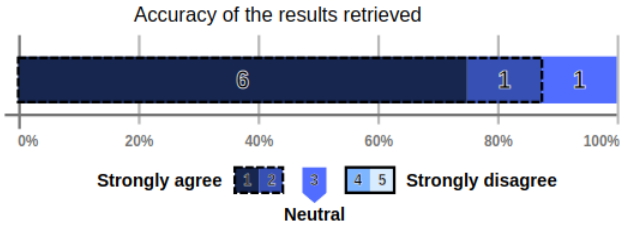
- Determine whether the performance of newly implemented interface is desirable
- Usability
- Comparative assessments
- Results documentation
- Task based evaluation approach is followed

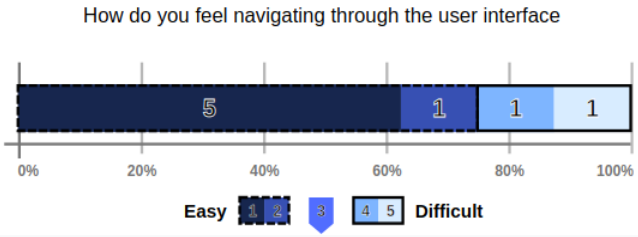
TASK BASED EVALUATION

- Participants
  - 8 people
- Questionnaire
  - One for each search UI
- User questioning
  - Asking user opinion
- Likert plots

RESULTS

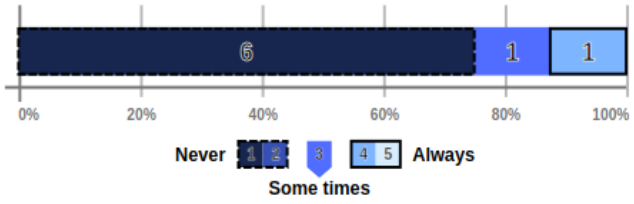

User interface allows you to find required information
5
3
0%
20%
40%
60%
80%
100%
Strongly agree
1 2
3
4 5
Strongly disagree
Neutral


Accuracy of the results retrieved
6
1
1
0%
20%
40%
60%
80%
100%
Strongly agree
1 2
3
4 5
Strongly disagree
Neutral

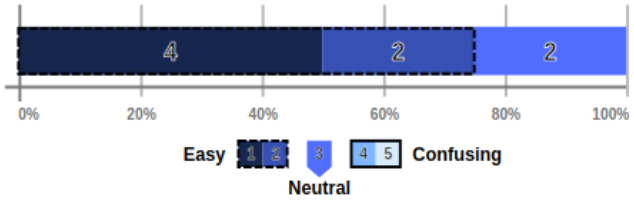

How do you feel navigating through the user interface
5
1
1
1
0%
20%
40%
60%
80%
100%
Easy
1 2
3
4 5
Difficult

RESULTS

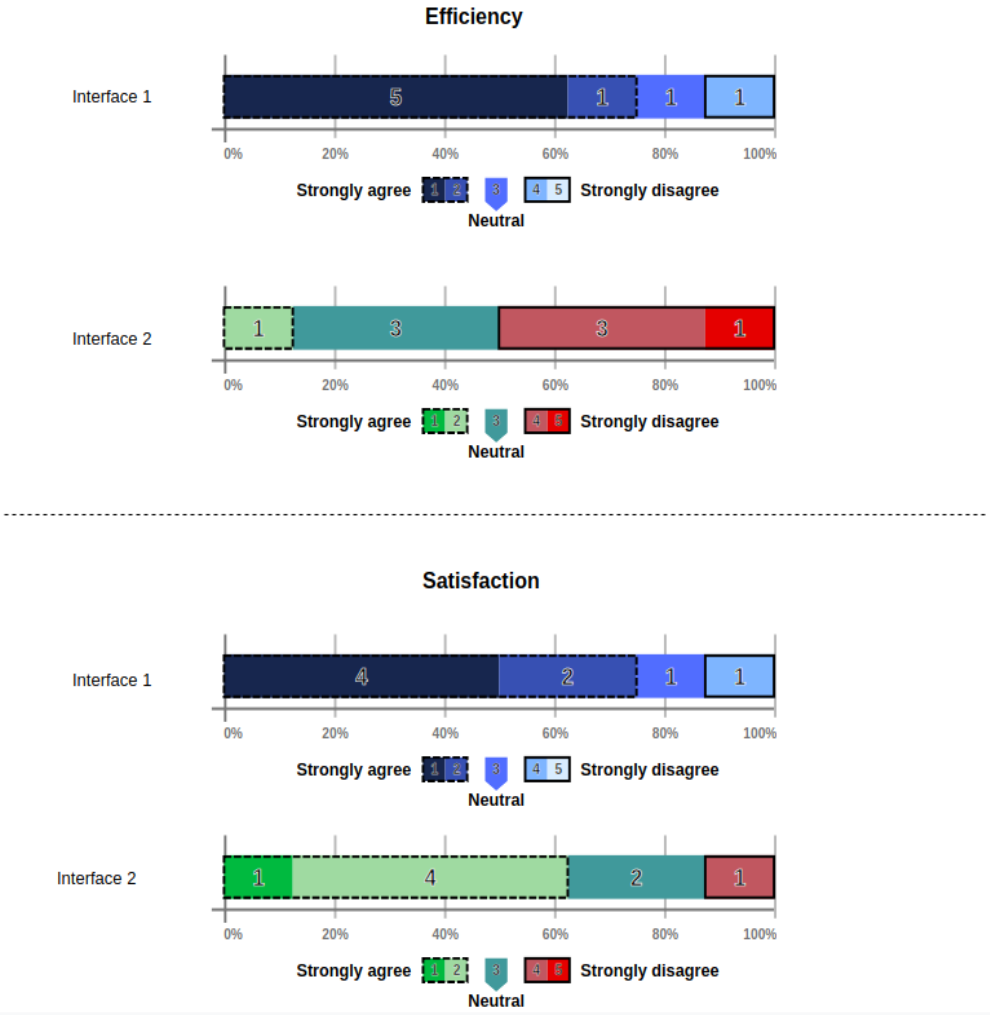
External assistance while performing a search session



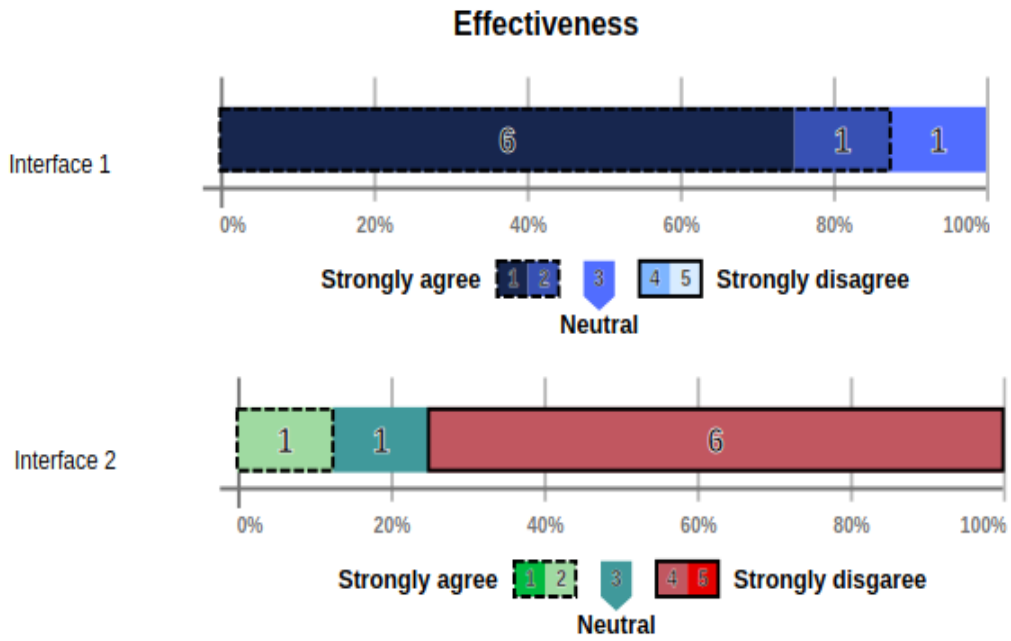
How is the integration between hierarchical categories and faceted search



RESULTS


Efficiency
Interface 1
5
1
1
1
0%
20%
40%
60%
80%
100%
Strongly agree
1
2
3
4
5
Strongly disagree
Neutral
Interface 2
1
3
3
1
0%
20%
40%
60%
80%
100%
Strongly agree
1
2
3
4
5
Strongly disagree
Neutral
Satisfaction
Interface 1
4
2
1
1
0%
20%
40%
60%
80%
100%
Strongly agree
1
2
3
4
5
Strongly disagree
Neutral
Interface 2
1
4
2
1
0%
20%
40%
60%
80%
100%
Strongly agree
1
2
3
4
5
Strongly disagree
Neutral

RESULTS


Effectiveness
Interface 1
6
1
1
0%
20%
40%
60%
80%
100%
Strongly agree
1
2
3
4
5
Strongly disagree
Neutral
Interface 2
1
1
6
0%
20%
40%
60%
80%
100%
Strongly agree
1
2
3
4
5
Strongly disgaree
Neutral

CONCLUSION

- System is designed by assessing the user needs
- The designed prototypes are implemented using the web technologies
- User studies are conducted to evaluate the newly implemented search UI
- Limitations

FUTURE WORK

- The documents can be trained with their respective JEX software version
- Providing a search bar within each hierarchy
- Multi-select option inside each hierarchy
- Bar chart visualization feature can be improved by dynamic interaction with the document collection

THANK YOU

REFERENCES

• Exploratory search: from finding to understanding by Marchionini, Gary

•From keyword search to exploration: Designing future search interfaces for the web by Bill and Schneiderman

•Introduction to information retrieval by Manning

•A brief history of human-computer interaction technology by Myers and Brad A

•Search user interfaces by Marti A Hearst

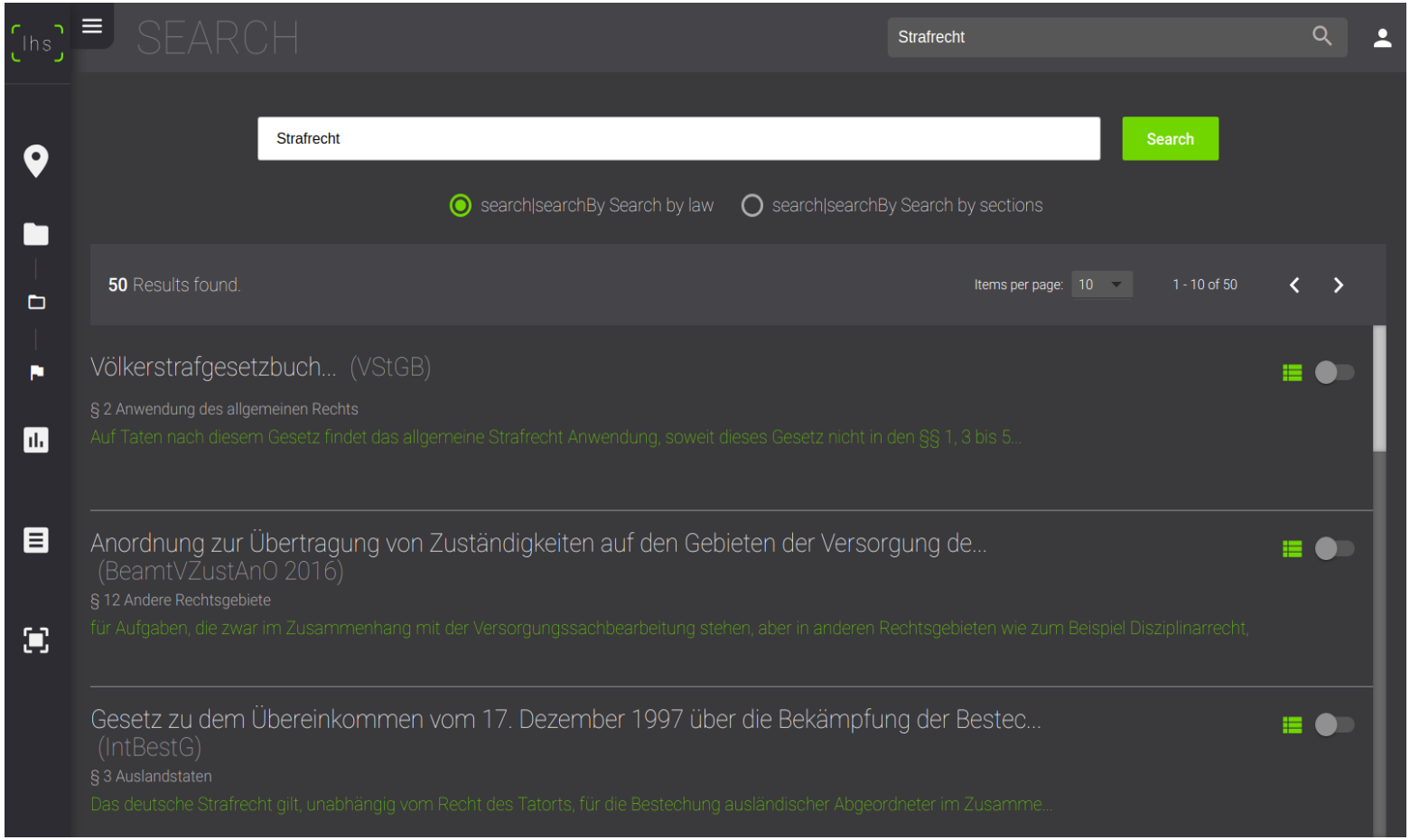
•Design science in Information systems research by Alan R

REFERENCES

- www.legalhorizon.de (image source)
- Information retrieval by Tony Russell– Rose
- likertplot.com – Plot Likert Scales“ by Max–Emanuel

BACK UP SLIDES

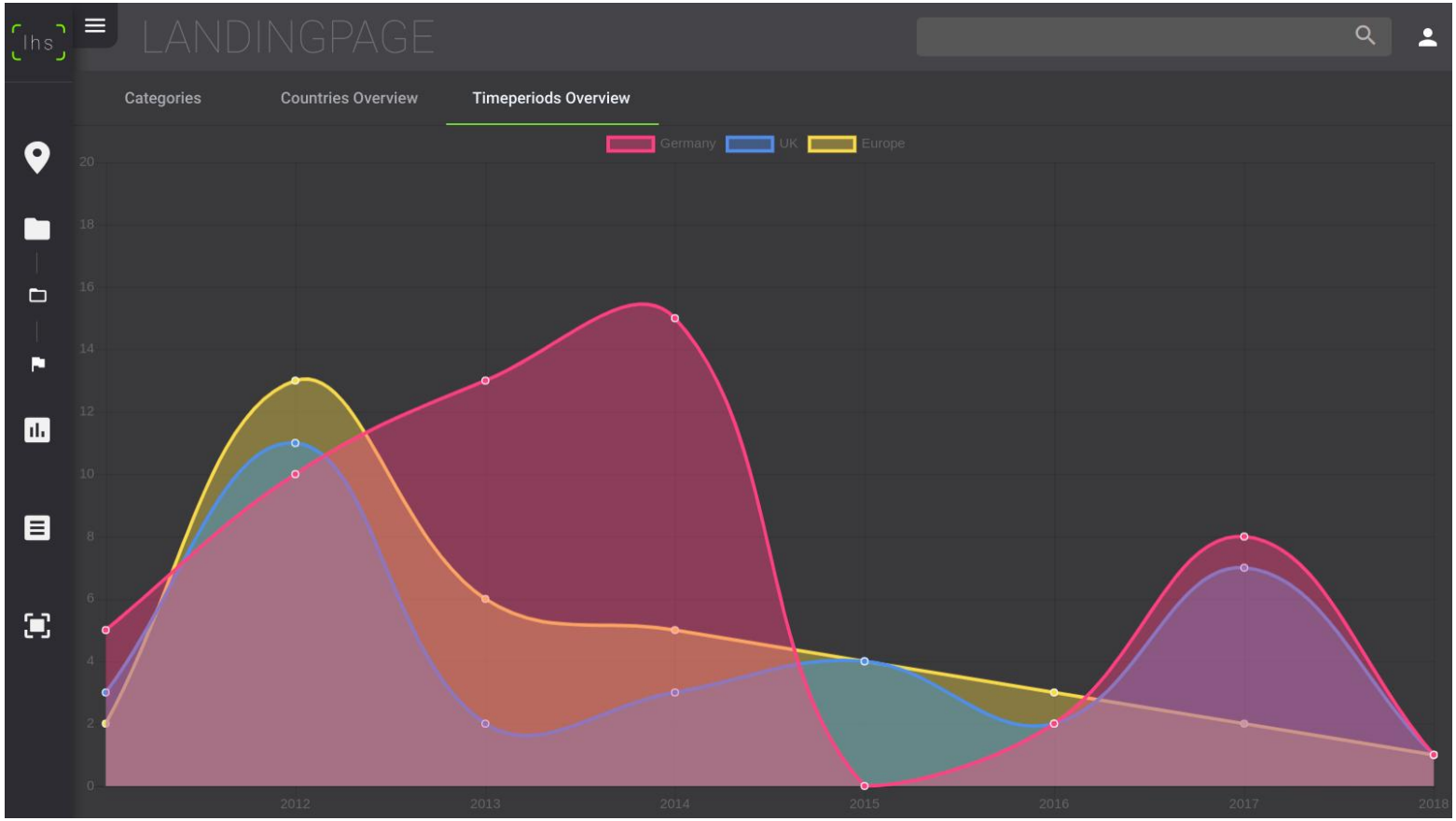
LEGAL HORIZON INTERFACE



FEATURES


lhs
LANDINGPAGE
Categories
Countries Overview
Timeperiods Overview
Legend
Germany
UK
Europe
6,000
5,000
4,000
3,000
2,000
1,000
0
Laws
Germany
UK
Europe
Country

FEATURES


lhs
LANDINGPAGE
Categories
Countries Overview
Timeperiods Overview
Germany
UK
Europe
20
18
16
14
12
10
8
6
4
2
0
2012
2013
2014
2015
2016
2017
2018