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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?

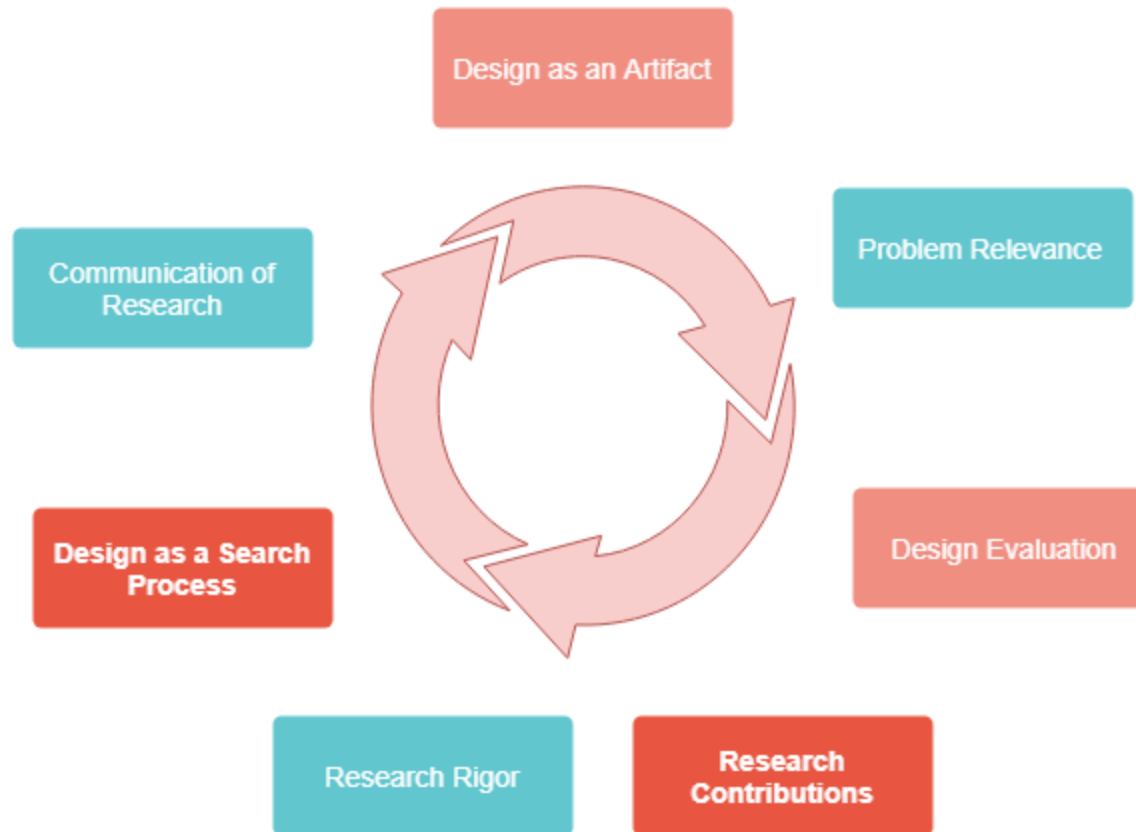
RELATED WORK

- 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

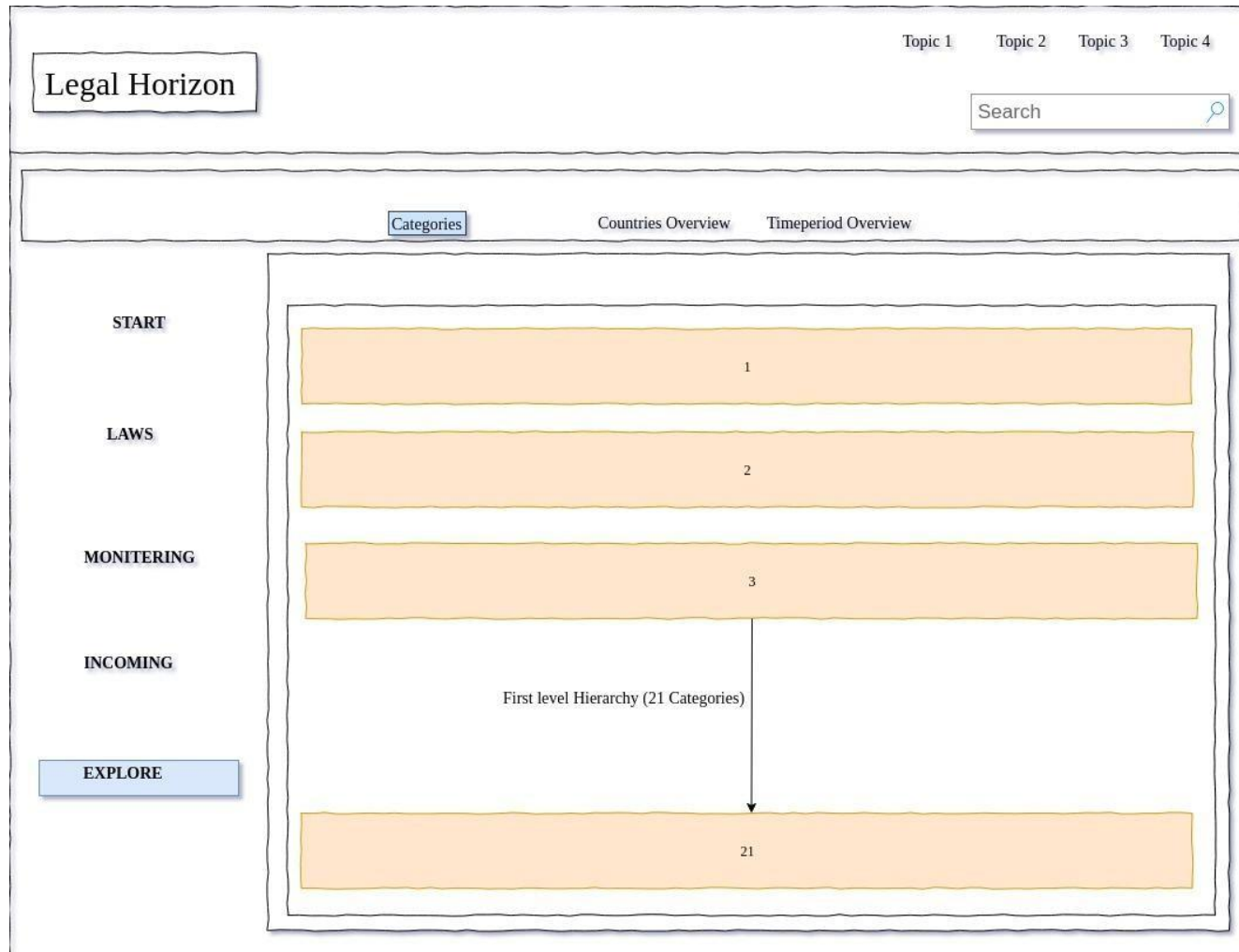
GOALS

- 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

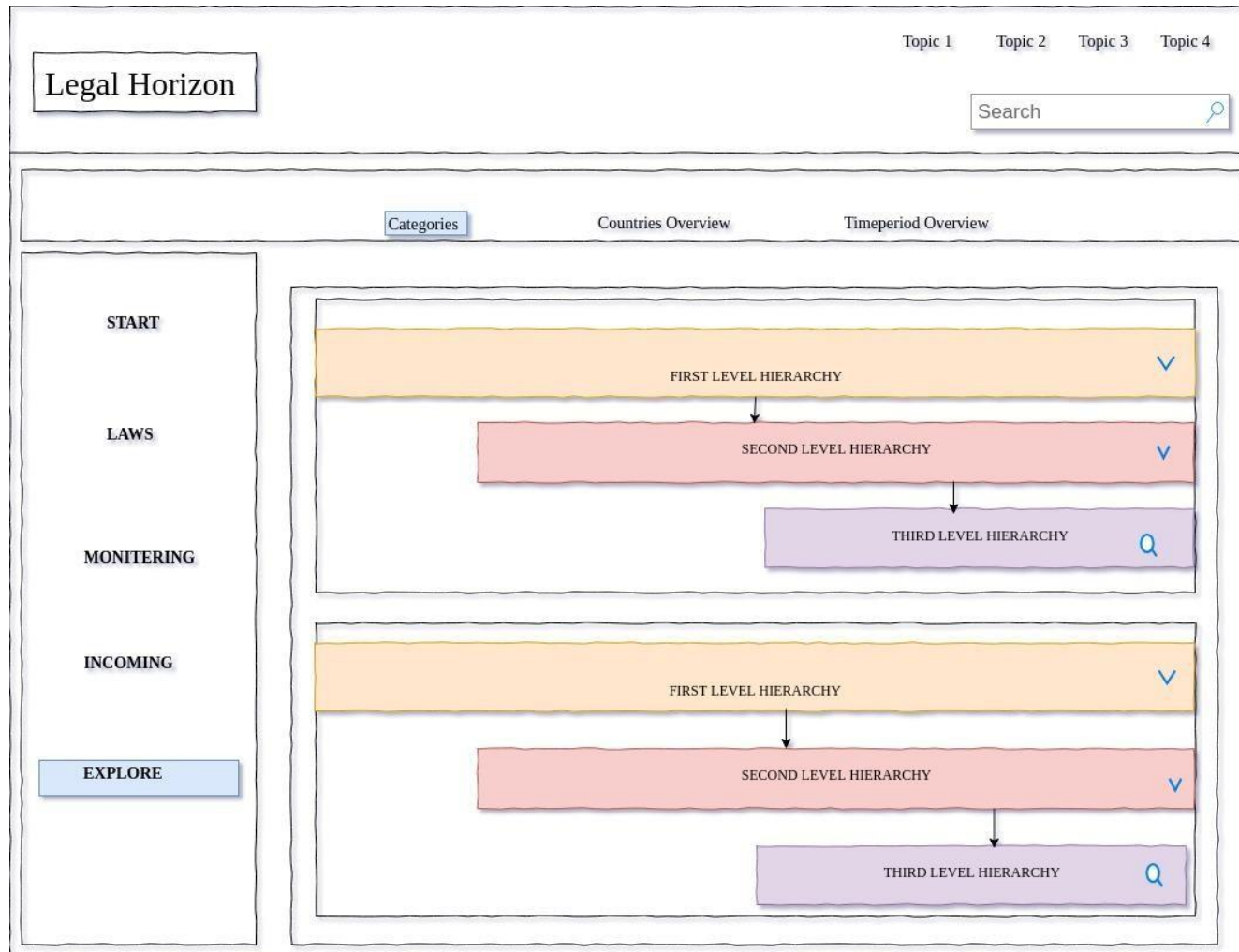
RESEARCH METHODOLOGY



PROTOTYPES



PROTOTYPES



PROTOTYPES

Legal Horizon

Topic 1Topic 2Topic 3Topic 4

Search

Search

START

LAWS

MONITERING

INCOMING

EXPLORE

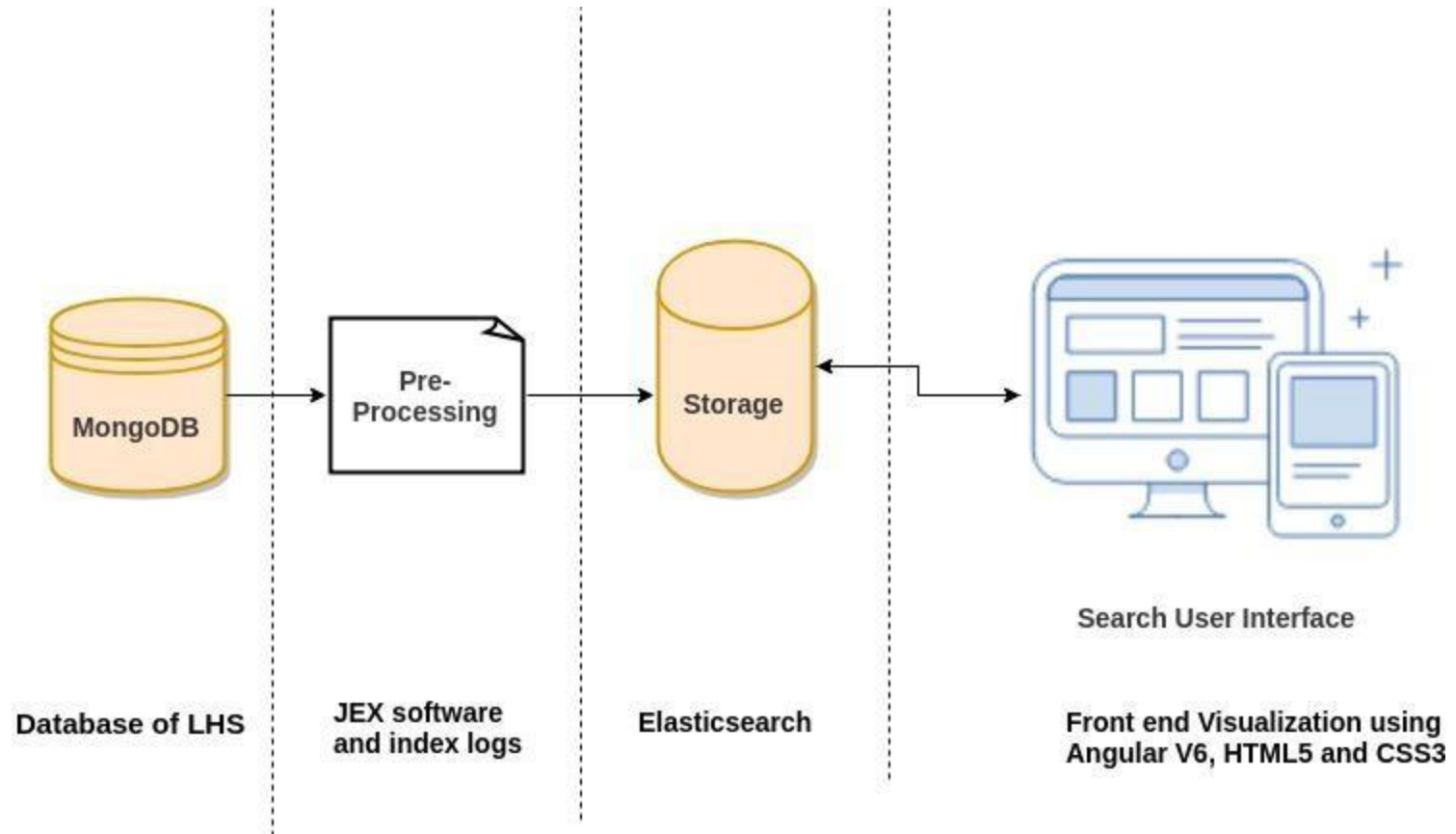
Categories

☐
☐
☐
☐

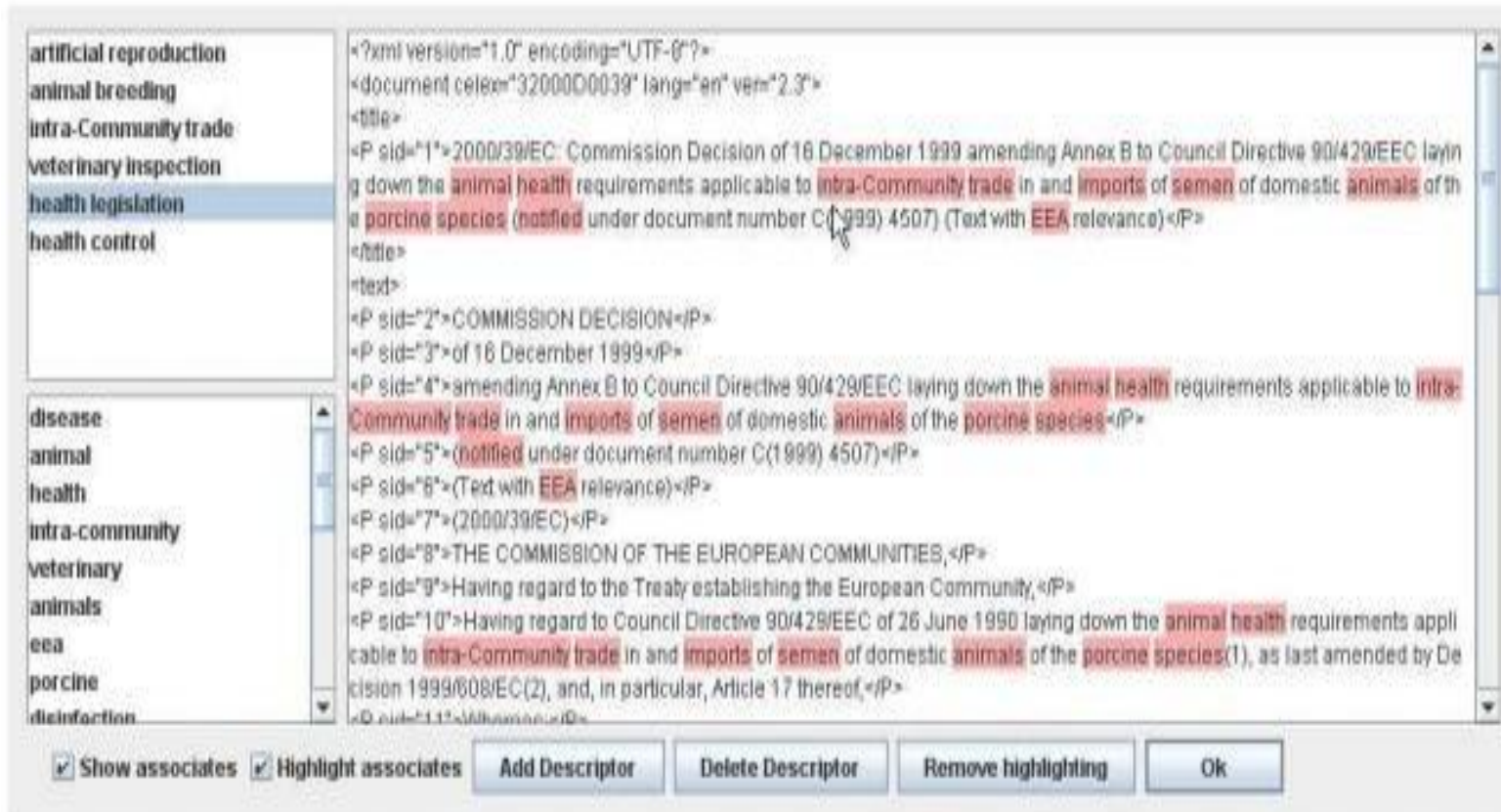
Country

Timeperiod

SYSTEM ARCHITECTURE



JEX SOFTWARE



The screenshot shows the JEX Software interface. On the left is a sidebar with two lists of categories. The top list includes 'artificial reproduction', 'animal breeding', 'intra-Community trade', 'veterinary inspection', 'health legislation' (highlighted), and 'health control'. The bottom list includes 'disease', 'animal', 'health', 'intra-community', 'veterinary', 'animals', 'eea', 'porcine', and 'diseinfection'. The main area displays XML data with several paragraphs of text. Some words are highlighted in red, including 'animal health', 'intra-Community trade', 'imports', 'semen', 'domestic animals', and 'porcine species'. At the bottom, there are four buttons: 'Add Descriptor', 'Delete Descriptor', 'Remove highlighting', and 'Ok'. There are also two checkboxes: 'Show associates' and 'Highlight associates', both of which are checked.

artificial reproduction
animal breeding
intra-Community trade
veterinary inspection
health legislation
health control

disease
animal
health
intra-community
veterinary
animals
eea
porcine
diseinfection

<?xml version="1.0" encoding="UTF-8"?>
<document celex="32000D0039" lang="en" ver="2.3">
<title>
<P sid="1">2000/39/EC: Commission Decision of 16 December 1999 amending Annex B to Council Directive 90/429/EEC laying down the animal health requirements applicable to intra-Community trade in and imports of semen of domestic animals of the porcine species (notified under document number C(1999) 4507) (Text with EEA relevance)</P>
</title>
<text>
<P sid="2">COMMISSION DECISION</P>
<P sid="3">of 16 December 1999</P>
<P sid="4">amending Annex B to Council Directive 90/429/EEC laying down the animal health requirements applicable to intra-Community trade in and imports of semen of domestic animals of the porcine species</P>
<P sid="5">(notified under document number C(1999) 4507)</P>
<P sid="6">(Text with EEA relevance)</P>
<P sid="7">(2000/39/EC)</P>
<P sid="8">THE COMMISSION OF THE EUROPEAN COMMUNITIES,</P>
<P sid="9">Having regard to the Treaty establishing the European Community,</P>
<P sid="10">Having regard to Council Directive 90/429/EEC of 26 June 1990 laying down the animal health requirements applicable to intra-Community trade in and imports of semen of domestic animals of the porcine species(1), as last amended by Decision 1999/608/EC(2), and, in particular, Article 17 thereof,</P>
</document>

☒ Show associates ☒ Highlight associates

Add Descriptor Delete Descriptor Remove highlighting Ok

IMPLEMENTATION

Data set:

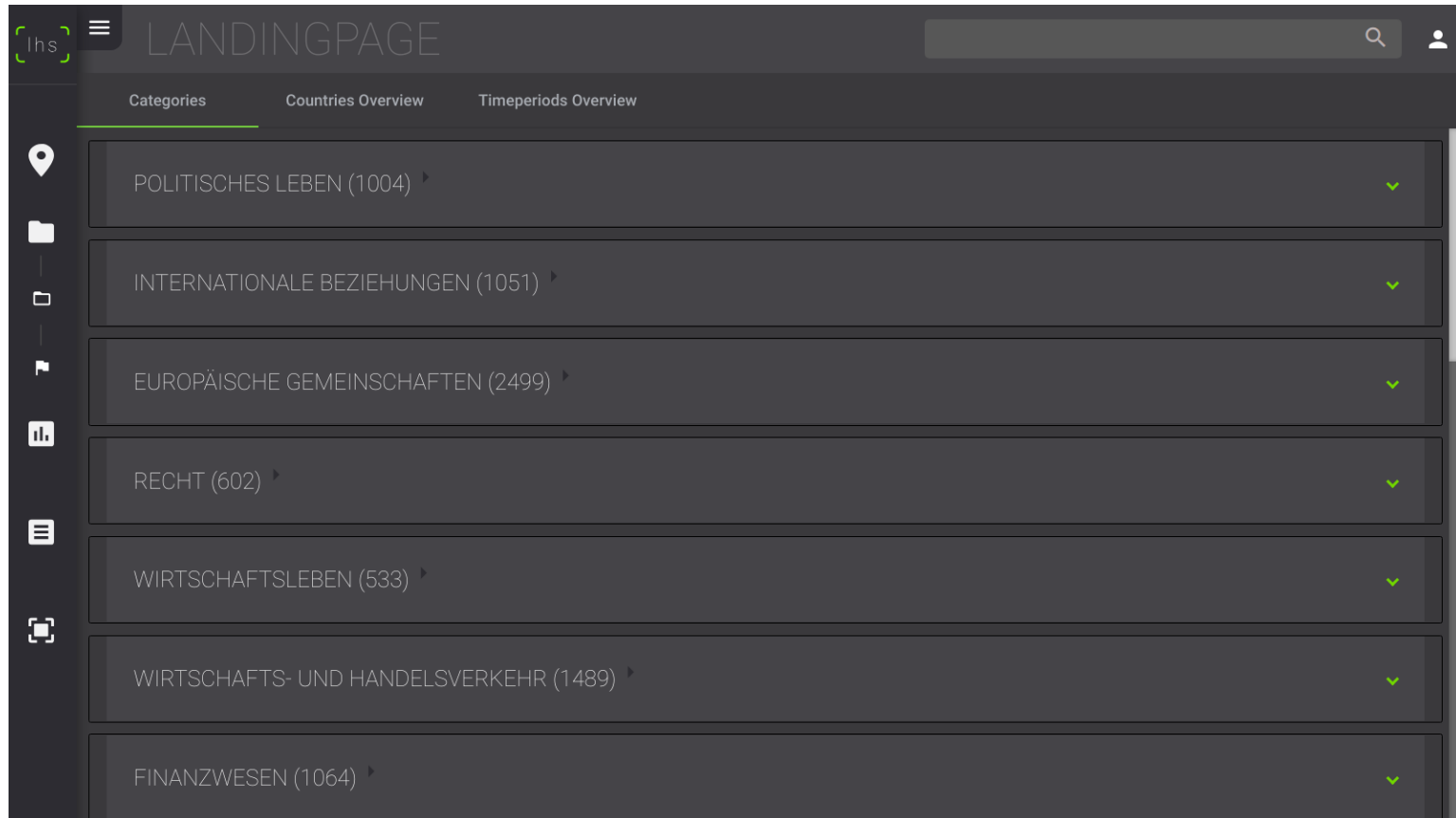
- Existing Legal Horizon data set consists of 8091 laws
- All these law documents are curated with metadata.

Data set pre-processing

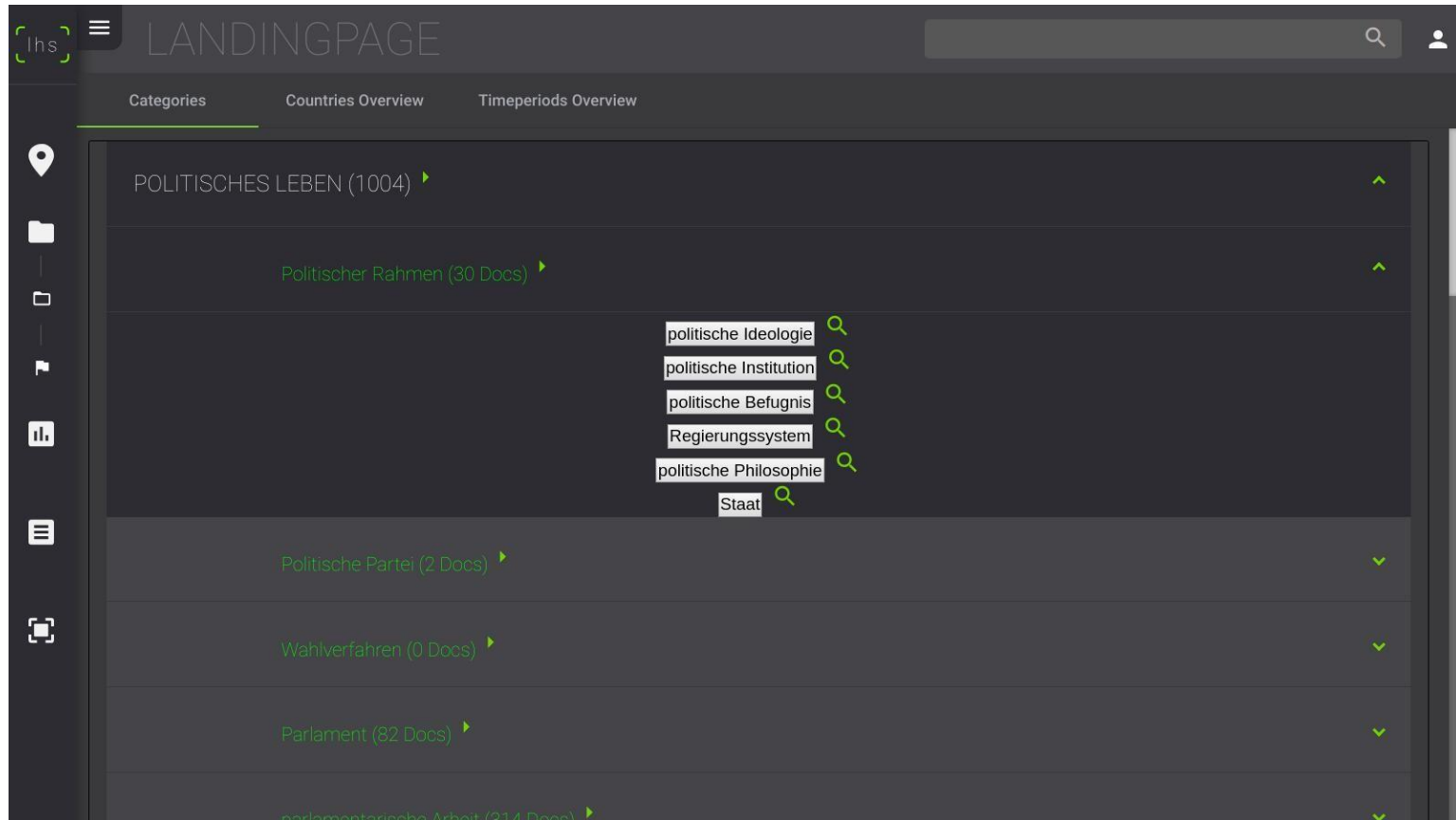
- Training the law collection with JEX software
- Adding metadata to Elastic search.

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

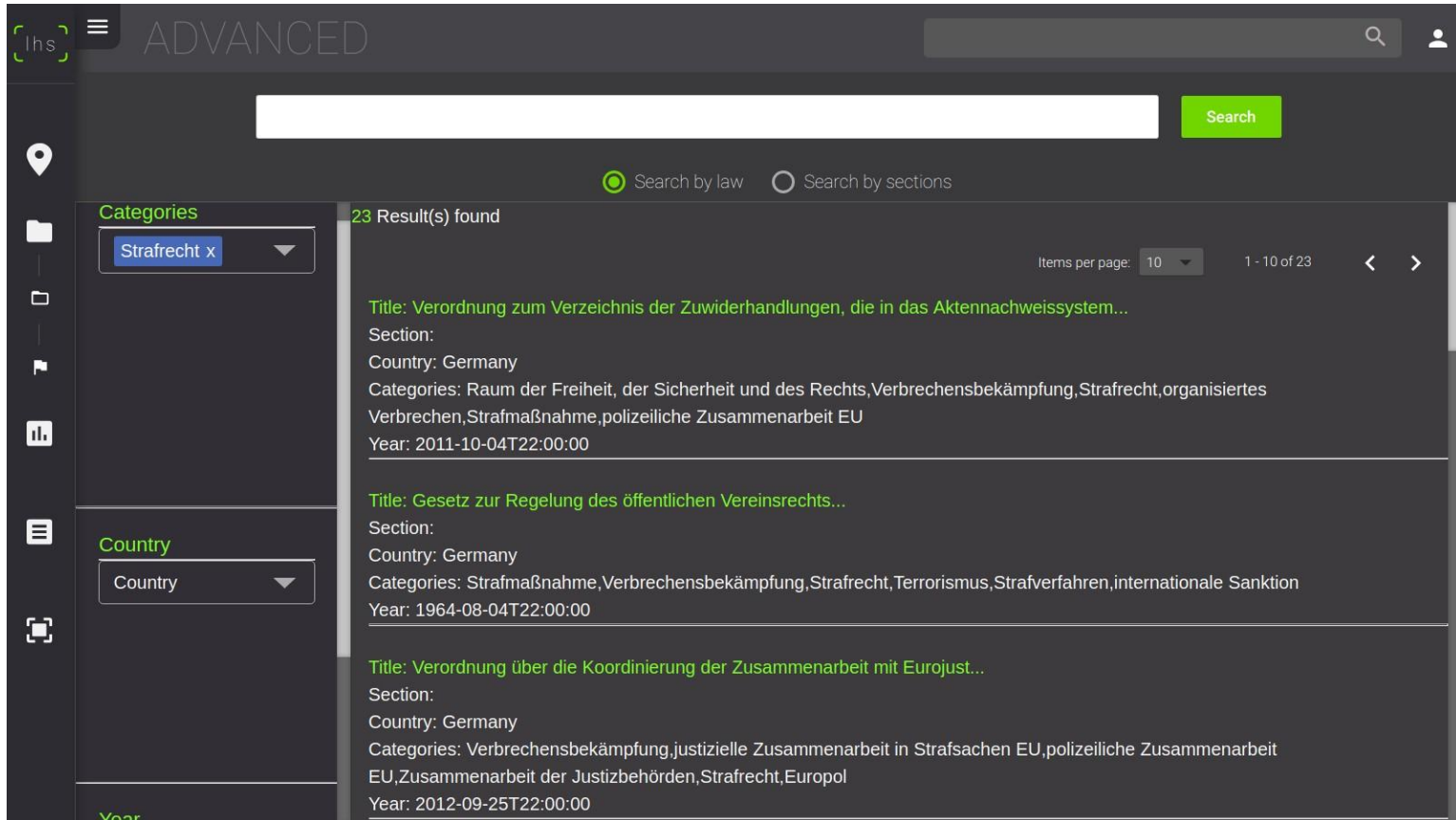
IMPLEMENTED SEARCH UI



IMPLEMENTED SEARCH UI



IMPLEMENTED SEARCH UI



The screenshot shows a web-based search interface with a dark theme. At the top, there's a navigation bar with a hamburger menu, the word "ADVANCED", a search bar, and a user icon. Below the navigation bar, there's a large white search input field and a green "Search" button. To the left of the main content area is a sidebar with various filters: "Categories" (with a dropdown showing "Strafrecht x"), "Country" (with a dropdown showing "Country"), and "Year". The main content area displays "23 Result(s) found" and two radio buttons for "Search by law" (selected) and "Search by sections". Below this, there are three search results, each with a title, section, country, categories, and year. The results are: 1. Title: Verordnung zum Verzeichnis der Zuwiderhandlungen, die in das Aktennachweissystem...; Section: ; Country: Germany; Categories: Raum der Freiheit, der Sicherheit und des Rechts, Verbrechenbekämpfung, Strafrecht, organisiertes Verbrechen, Strafmaßnahme, polizeiliche Zusammenarbeit EU; Year: 2011-10-04T22:00:00. 2. Title: Gesetz zur Regelung des öffentlichen Vereinsrechts...; Section: ; Country: Germany; Categories: Strafmaßnahme, Verbrechenbekämpfung, Strafrecht, Terrorismus, Strafverfahren, internationale Sanktion; Year: 1964-08-04T22:00:00. 3. Title: Verordnung über die Koordinierung der Zusammenarbeit mit Eurojust...; Section: ; Country: Germany; Categories: Verbrechenbekämpfung, justizielle Zusammenarbeit in Strafsachen EU, polizeiliche Zusammenarbeit EU, Zusammenarbeit der Justizbehörden, Strafrecht, Europol; Year: 2012-09-25T22:00:00. The interface also includes a "Items per page" dropdown set to 10 and a pagination indicator "1 - 10 of 23".

[hs] ADVANCED

Search

Search by law Search by sections

23 Result(s) found

Items per page: 10 1 - 10 of 23

Categories
Strafrecht x

Country
Country

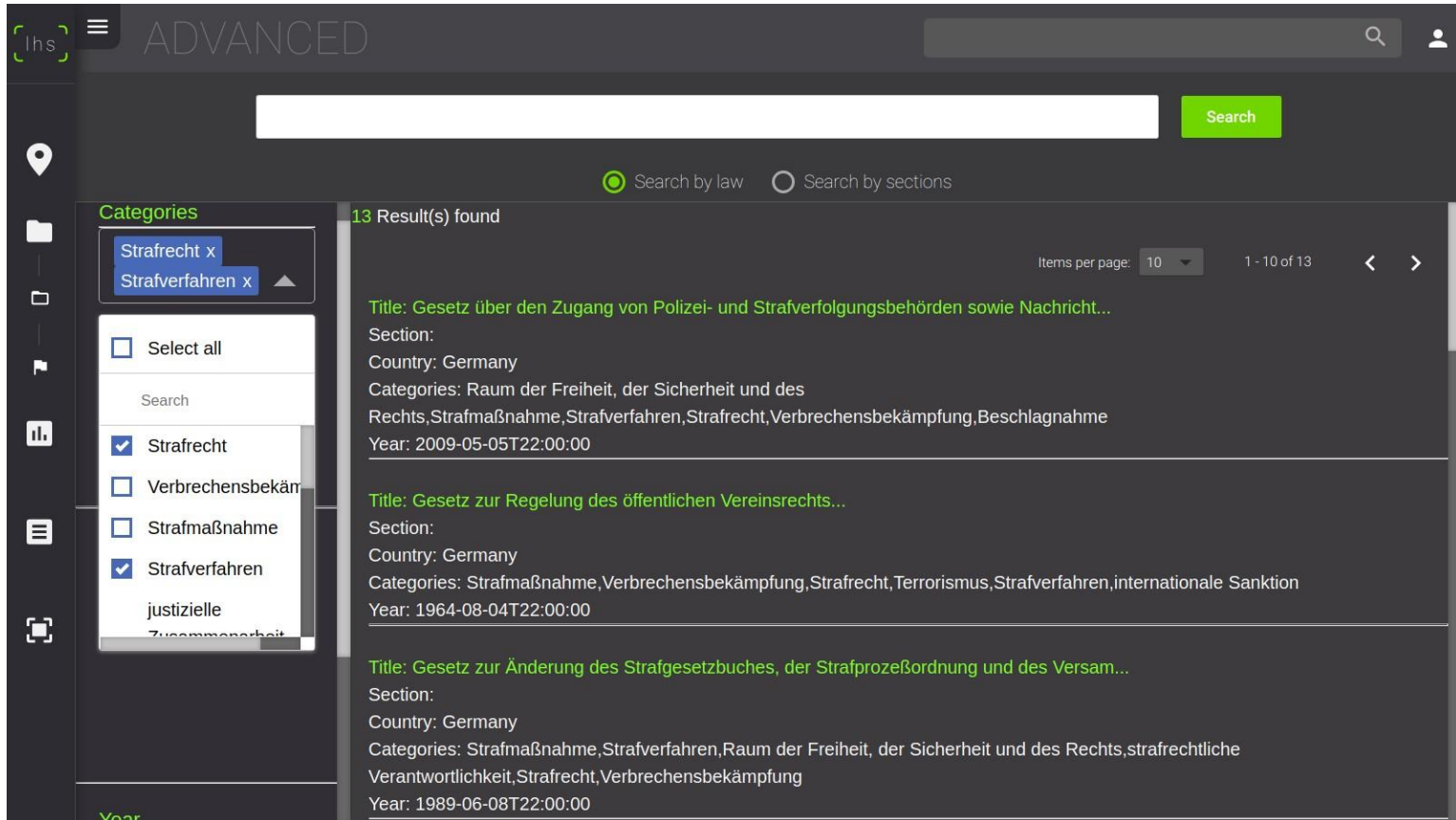
Year

Title: Verordnung zum Verzeichnis der Zuwiderhandlungen, die in das Aktennachweissystem...
Section:
Country: Germany
Categories: Raum der Freiheit, der Sicherheit und des Rechts, Verbrechenbekämpfung, Strafrecht, organisiertes Verbrechen, Strafmaßnahme, polizeiliche Zusammenarbeit EU
Year: 2011-10-04T22:00:00

Title: Gesetz zur Regelung des öffentlichen Vereinsrechts...
Section:
Country: Germany
Categories: Strafmaßnahme, Verbrechenbekämpfung, Strafrecht, Terrorismus, Strafverfahren, internationale Sanktion
Year: 1964-08-04T22:00:00

Title: Verordnung über die Koordinierung der Zusammenarbeit mit Eurojust...
Section:
Country: Germany
Categories: Verbrechenbekämpfung, justizielle Zusammenarbeit in Strafsachen EU, polizeiliche Zusammenarbeit EU, Zusammenarbeit der Justizbehörden, Strafrecht, Europol
Year: 2012-09-25T22:00:00

IMPLEMENTED SEARCH UI



The screenshot shows a web application interface for searching legal documents. The top navigation bar includes a hamburger menu, the word "ADVANCED", a search bar, and a user profile icon. Below the navigation bar, there is a large white search input field and a green "Search" button. Below the search bar, there are two radio buttons: "Search by law" (selected) and "Search by sections".

On the left side, there is a sidebar with a "Categories" section. It contains a list of categories with checkboxes: "Strafrecht x", "Strafverfahren x", "Select all", "Search", "Strafrecht" (checked), "Verbrechensbekämpfung", "Strafmaßnahme", "Strafverfahren" (checked), "justizielle", and "Zusammenarbeit".

The main content area displays "13 Result(s) found". It includes a pagination bar with "Items per page: 10" and "1 - 10 of 13". The results are listed in a table-like format with the following columns: Title, Section, Country, Categories, and Year.

| Title | Section | Country | Categories | Year |
|---|---------|---------|--|---------------------|
| Gesetz über den Zugang von Polizei- und Strafverfolgungsbehörden sowie Nachricht... | | Germany | Raum der Freiheit, der Sicherheit und des Rechts, Strafmaßnahme, Strafverfahren, Strafrecht, Verbrechensbekämpfung, Beschlagnahme | 2009-05-05T22:00:00 |
| Gesetz zur Regelung des öffentlichen Vereinsrechts... | | Germany | Strafmaßnahme, Verbrechensbekämpfung, Strafrecht, Terrorismus, Strafverfahren, internationale Sanktion | 1964-08-04T22:00:00 |
| Gesetz zur Änderung des Strafgesetzbuches, der Strafprozeßordnung und des Versam... | | Germany | Strafmaßnahme, Strafverfahren, Raum der Freiheit, der Sicherheit und des Rechts, strafrechtliche Verantwortlichkeit, Strafrecht, Verbrechensbekämpfung | 1989-06-08T22:00:00 |

EVALUATION

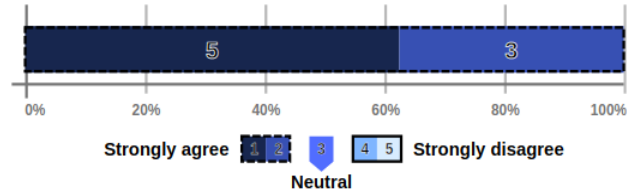
- Determine whether the performance of newly implemented interface is desirable
- Usability
- Comparative assessments
- Results documentation
- Task based evaluation approach is followed

TASK BASED EVALUATION

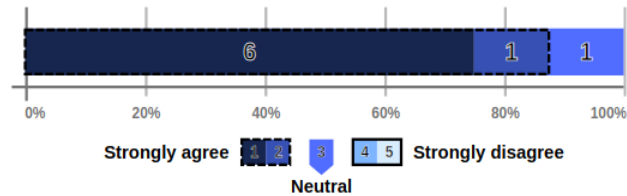
- Participants
 - 8 people
- Questionnaire
 - One for each search UI
- User questioning
 - Asking user opinion
- Likert plots

RESULTS

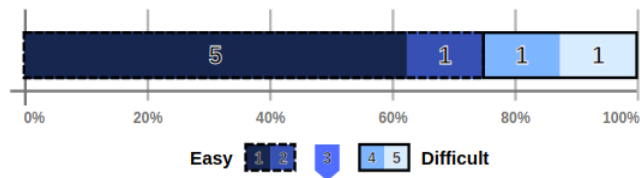
User interface allows you to find required information



Accuracy of the results retrieved

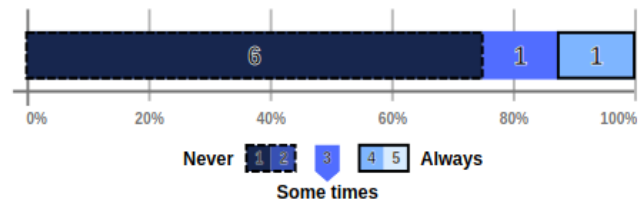


How do you feel navigating through the user interface

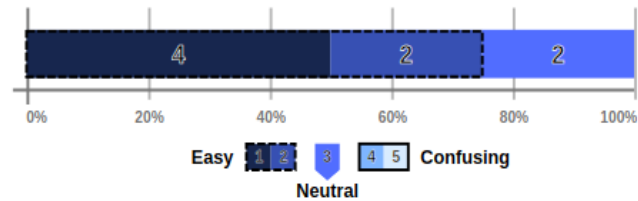


RESULTS

External assistance while performing a search session

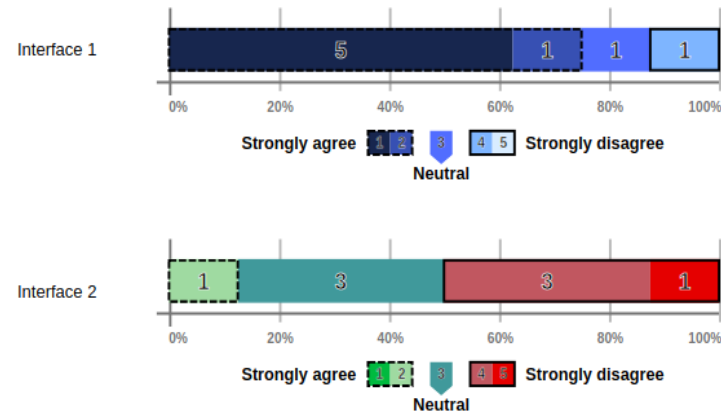


How is the integration between hierarchical categories and faceted search

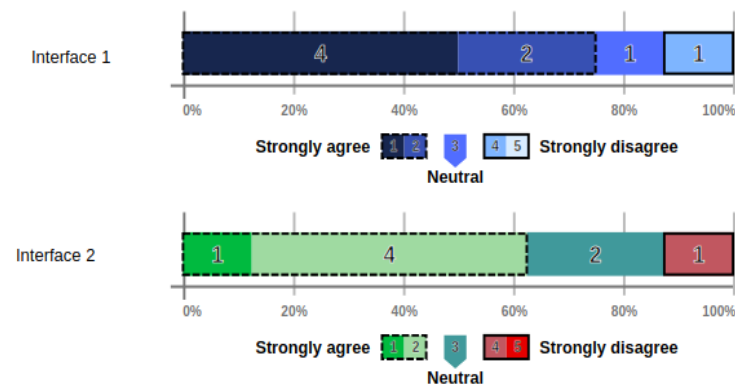


RESULTS

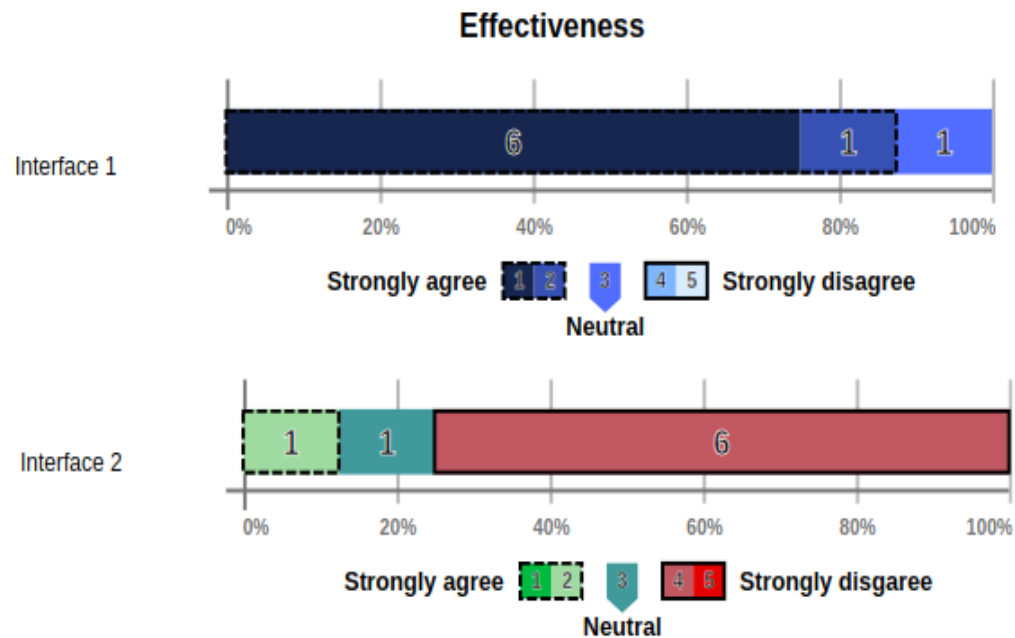
Efficiency



Satisfaction



RESULTS



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

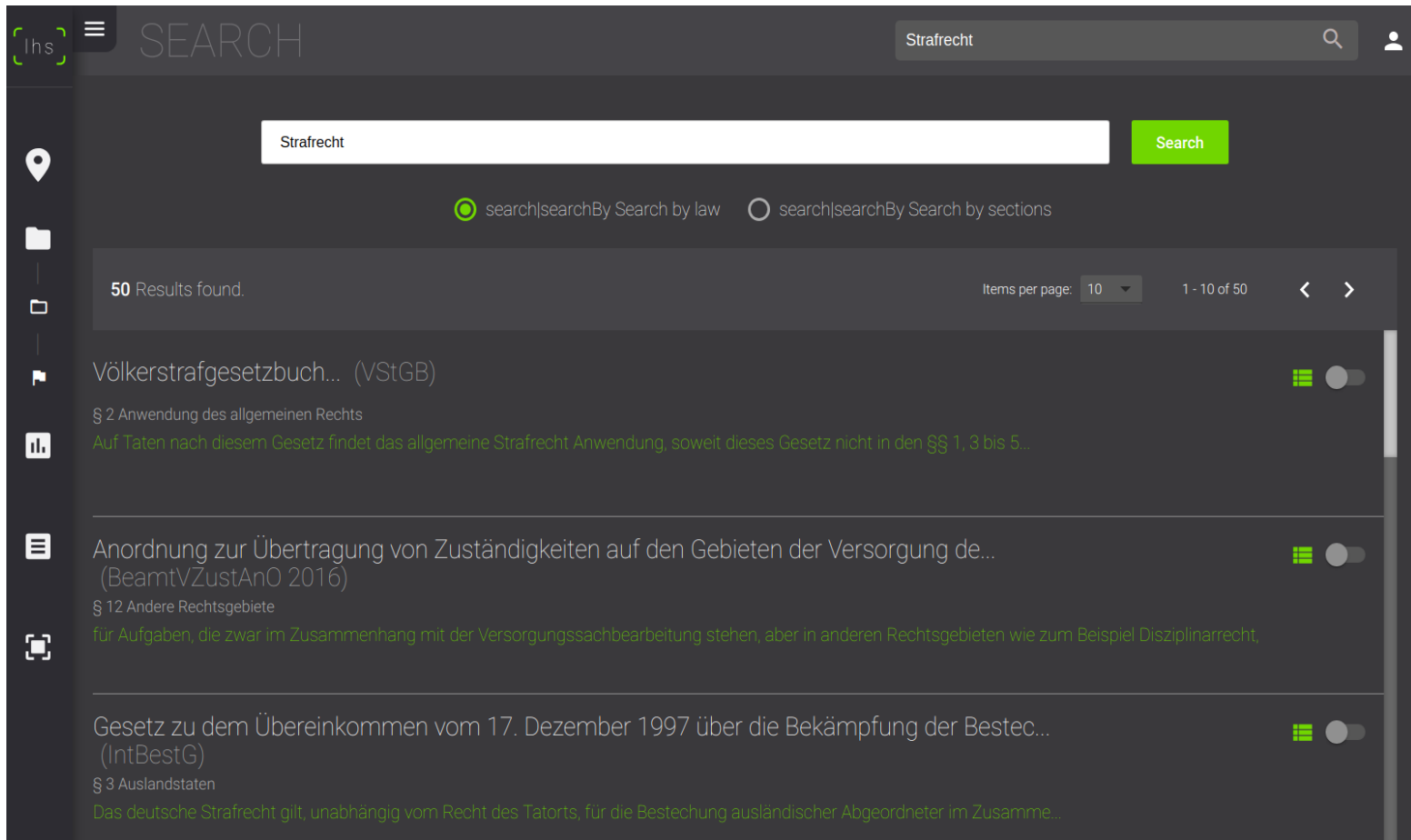
- Exploratory search: from finding to understanding by Marchionini, Gary
- From keyword search to exploration: Designing future search interfaces for the web by Bill and Schneiderman
- Introduction to information retrieval by Manning
- A brief history of human-computer interaction technology by Myers 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



The screenshot shows the 'Legal Horizon' search interface. At the top, there is a navigation bar with a hamburger menu, the word 'SEARCH', a search bar containing 'Strafrecht', and a user icon. Below the navigation bar, a sidebar on the left contains icons for location, folders, documents, and a list. The main content area features a search bar with 'Strafrecht' and a green 'Search' button. Below the search bar, there are radio buttons for 'search|searchBy Search by law' (selected) and 'search|searchBy Search by sections'. A status bar indicates '50 Results found.' and 'Items per page: 10' with a dropdown arrow, and '1 - 10 of 50' with navigation arrows. The results list shows three items, each with a list icon and a toggle switch:

- Völkerstrafgesetzbuch... (VStGB)**
§ 2 Anwendung des allgemeinen Rechts
Auf Taten nach diesem Gesetz findet das allgemeine Strafrecht Anwendung, soweit dieses Gesetz nicht in den §§ 1, 3 bis 5...
- Anordnung zur Übertragung von Zuständigkeiten auf den Gebieten der Versorgung de... (BeamtVZustAnO 2016)**
§ 12 Andere Rechtsgebiete
für Aufgaben, die zwar im Zusammenhang mit der Versorgungssachbearbeitung stehen, aber in anderen Rechtsgebieten wie zum Beispiel Disziplinarrecht,
- Gesetz zu dem Übereinkommen vom 17. Dezember 1997 über die Bekämpfung der Bestec... (IntBestG)**
§ 3 Auslandstaten
Das deutsche Strafrecht gilt, unabhängig vom Recht des Tatorts, für die Bestechung ausländischer Abgeordneter im Zusammen...

FEATURES



FEATURES

