A Semantic-Web based Framework for Developing Applications to Improve Accessibility in the WWW

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Aim of the research

- Improve usability of the WWW for blind people.
  - Efficiency and effectiveness of information seeking process.
    - Browsing strategies.
Problems of blind users in browsing the web

- Across document browsing.
- Not quick access to navigational aids.
- Scanning text for relevancy estimation.
Problems of blind users in browsing the web

- Within document browsing.
- Sight dependant functions.
- No use of visual cues such as colors, headlines, tables. (Misuse of HTML layout tags)
- Sight oriented web design (desktop metaphor and misuse of TABLE tag).
- Serialization as the main mechanism of adaptation.
Inspiring ideas

- Transcoding servers (Tagaki & Asawaka, Huang & Sundaresan)
- Semantic web
  - A metadata layer build upon the current web.
  - Use metadata to communicate missed information to blind users.
- Annotea project
- Community formation
The framework scheme

Knowledge Representation

Ontology Editors

Semantic Annotation

RDF

Other Annotation Tools

Annotation tool

Ontology Storage Server

Semantic-Web Based Framework

Knowledge Utilization (for accessibility problems solution)

SeEBrowser

Other agents using annotations
Knowledge Representation

- Ontology creators
- OWL
  - Ontological approach
  - Design freedom
- ONAR
  - GUI for editing ontologies
  - Collaborative design

Other ontology editors

ONAR
Semantic Annotation

- Annotators
- RDF
  - Basic standard of semantic web
  - Extensibility through vocabularies
- Annotation tool
- Annotation storage server
  - Use of HTTP
  - User authorization
Knowledge Utilization

- Agent developers
- End users
- SeEBrowser
- Voice web browser
- Shortcuts to annotated elements
  - Faster access to content entry points
  - Faster transition amongst page sections
Framework community

Ontology Creators

Annotators

Agent developers & End Users

Feedback

Vocabulary

Annotations
Is it realistic?

- Community commitment
- Open (based on RDF, OWL)
- Extensible (development of various vocabularies)
- Scalable (network of storage servers)
- Autonomous community (No need to be an expert in the standards if you have the right tools)
Preliminary evaluation results

- Frequent use of shortcuts functions
- Satisfaction by its use
- Bookmarks feature
- Notepad feature
- Difficulty in reading tables
Further research

- Vocabularies development and exploitation
- Automatic annotation
  - Syntactic analysis
  - Semantic analysis
- Other uses of annotations
  - User profiles
  - Semantic web usage mining
Conclusion

- Accessibility on the WWW is a complex problem.
- The framework uses the Semantic Web as a metadata layer built upon the current web.
- It supports and encourages the development of a variety of software for the web.
- It supports and encourages the collaboration amongst people that care for accessibility problem.
Thank you for your attention

http://erodios.it.teithe.gr/Archimedes