



Laboratorio de I+D  
en Inteligencia Artificial

## Multimedia Elements in a Hybrid Multi-Agent System for the Analysis of Web Usability

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- Web usability
- Usability analysis techniques
- The Multi-Agent System
- Usability issues
- Considerations for the future

- The evolution of Web sites:
  - From plain text to including/becoming complex multimedia objects.
  - Increasing popularization.
  - Different types of users.
- In this context, usability becomes very important.
  - ISO 9241-11: “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.”

- Usability can be analysed using different techniques:
  - Some can be automated.
- In this work, we use artificial intelligence techniques like:
  - Multi-agent systems: A group of intelligent agents who share information and cooperate in order to achieve a goal.
  - Combinations of agent architectures: Reactive, deliberative.
  - Evolutionary computation: To improve the learning process.

- Two types of agents:
  - User agents.
  - HTML Analyser agent.
- Two kinds of analyses:
  - “Static”: The content of a web page is analysed in order to detect usability issues (HTML Analyser agent).
  - “Dynamic”: The browsing process of the human users is simulated (User agents + HTML Analyser agent).

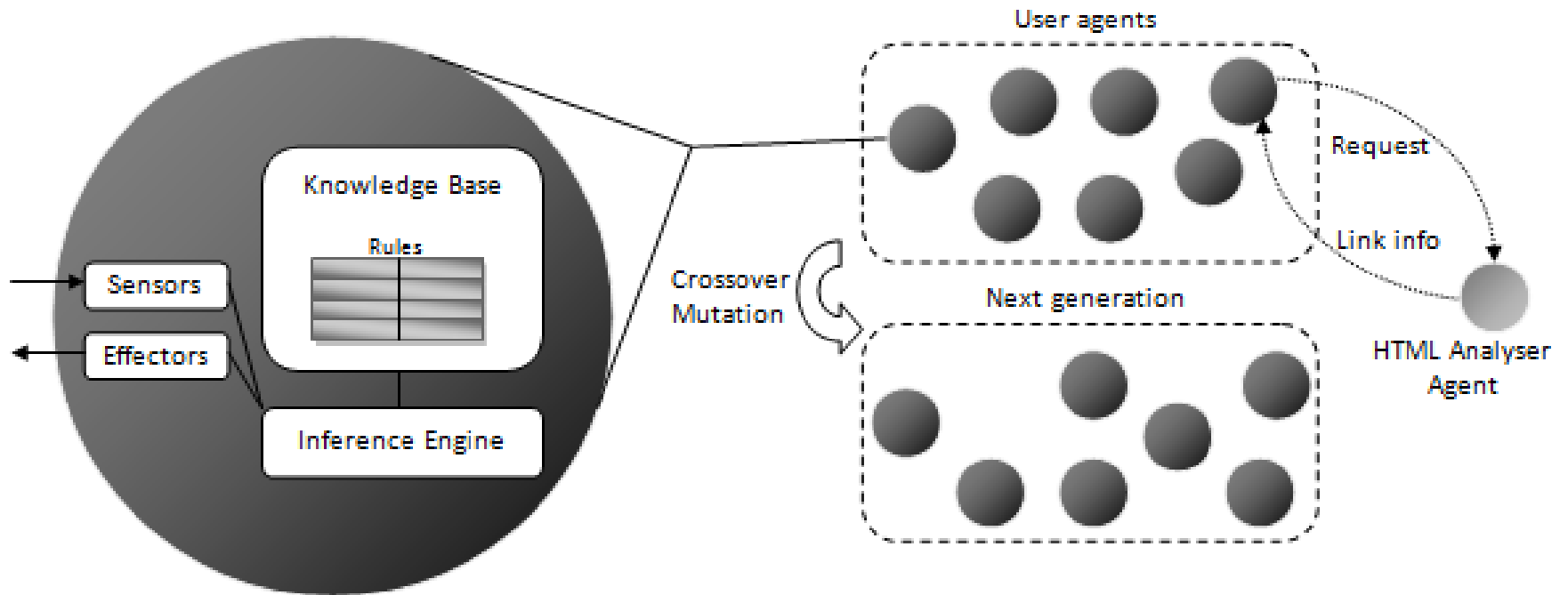
- User agents model human users.
- The user agent starts from an initial URL and tries to reach a specific destination URL (it can also be a file).
- The agent possesses a set of key phrases that represent the idea of the information the user seeks or the actions the user wants to perform (e.g., “download video presentation”).
- The relevant links should approximate this idea.
- Examples of bad link texts: “click here”, “download 1100 KB MPEG file”.

- The population of agents models different types of human users with different parameters.
- User agents obtain different results, sometimes failing or giving up (the point is to model imperfect behaviour).
- User agents learn only from experience (reactive behaviour, reinforcements).
- The learning process is fine-tuned by evolutionary algorithms (“controlled randomness”).

- The HTML Analyser agent examines the HTML code of a web page with the aim of studying its usability:
  - Detecting well-known usability problems.
  - Using heuristics for more subjective issues.
  - Generating reports.
- It can operate:
  - On its own.
  - Interacting with user agents:
    - ✓ Providing information on demand (e.g., broken links).
    - ✓ Analysing the web pages in the path traversed by user agents.



# The system at work




- Putting the system into action, we may find many kinds of usability problems.
- Usability issues with regard to achieving the goals:
  - Unreachable destination.
  - Long navigation paths.
  - Confusing navigation paths.
  - Inadequate link texts/surrounding text.
  - Broken links.

- Usability issues in HTML code:
  - General (e.g., estimated page size, programming problems, flexibility problems).
  - Form-specific (e.g., validations, easy-to-click controls).
  - Table-specific (e.g., formatting problems).
  - Link-specific (e.g., URL problems, links to multimedia files).
  - Image-specific (e.g., formatting problems, accessibility issues).

- General usability issues in multimedia files:
  - Compatibility problems.
  - Lack of consistency.
  - Switch between different ways of navigating.
  - Non-proprietary formats.
  - Type of software needed:
    - ✓ Commercial.
    - ✓ Shareware.
    - ✓ Freeware.

- Usability issues in images:
  - Image dimensions:
    - ✓ Images that do not fit on an average screen.
    - ✓ Formatting problems due to not declaring the height/width (HTML attributes) in which it will be displayed.

- Accessibility issues:
  - ✓ Lack of text for users who are not able to see images properly :
    - Alternative text (should not be too long).
    - Long description.
  - File size (has an impact on download time).
  - Image maps (pictures in which different areas contain links to different URLs).


**Usability-Sw, HTML analyzer for the study of web usability**

The URL was analyzed correctly :: http://www.itg.es

[Home](#)  
[Analyze new URL](#)  
[General Menu](#)  


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[Web Page](#)  
[Links](#)  
[Forms](#)  
[Images](#)  
Image details  
[All images](#)  
[w/o Alt](#)  
[w/o Long Desc](#)  
[w/o Height](#)  
[w/o Width](#)  
[w/ Map](#)  


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[Lists](#)  
[Tables](#)  
[Text](#)  
[Useful Information](#)

Below is the selected image, and on the right its details




Image details	
Src tag	/imagenes/logo_gris.jpg
Real Source	http://www.itg.es/imagenes/logo_gris.jpg
Mimetype	image/jpeg
Is the MIME type correct?	The MIME type belongs to an image.
Alternative text	
Recommended max. alt length	15
Alt text	None
Alt length	The image doesn't have the alt attribute.
Longdesc text	The image doesn't define the longdesc attribute.
Positioning & Weight	
Attribute height	The image has not declared the <i>height</i> attribute
Attribute width	The image has not declared the <i>width</i> attribute
Weight	12.639 kb
UseMap	
The image does not have an associated map	

|| [General menu](#) >> [Menu of Images](#)

This software has been designed and implemented by (C) [LIDIA Laboratory](#)

- The internal characteristics of whatever multimedia formats become standard/popular has a huge impact on the analyses that can be performed:
  - Intrinsic usability characteristics (e.g., accessibility features).
  - Ease of obtaining information (e.g., parsing HTML5 to get the display size, video/audio format, codec, etc.).
  - Outcome of format wars (e.g., Flash vs. HTML5).