APPLICATIONS OF SEMANTIC WEB TECHNOLOGIES TO IMPROVE THE COMPREHENSION OF TEMPORAL-SPATIAL INTERRELATIONS AMONG CULTURAL HERITAGE RESOURCES AND CONTEXTS

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MOTIVATION OF THE WORK

Without knowing the history, it is impossible to build a better country.
Youk Chhang

- The system exploits the existing digital cultural heritage repositories in the development of new tailor-made interactive entertainment experiences for History learning.

- Bring together the reasoning capabilities based on knowledge discovery from the Semantic Web, and technologies for content adaptation, context-awareness and personalization in mobile edutainment applications.

- The novel of the approach lies within the fact that we take advantage of the situational curiosity and serendipity to increase the retention of cross-border historical facts, gaining insight into the question of how the same facts may be interpreted differently from different social realities.

- The knowledge gained in this learning through the interactive experience, it has never been explored before.

THESIS OBJECTIVES

• Contribute to models of education and entertainment related to cultural heritage, using mobile devices, semantic web technologies to improve the comprehension of temporal-spatial transcendence events.

• Study the different open source tools related to project, the same shall this must be tested and improved (if is necessary) to integrate them in environments of edutainment (education through entertainment).

• Develop a platform to new learning model in cultural heritage environments and different areas that might be conducive to reach users with edutainment experiences and using the open source tools analyzed and common technological devices within society.

• Suggest new learning methods to improve the knowledge of various events developed in the history and any time or space through ICTs.

• Build an intelligent application with the referred methodological proposals and technology implemented to enhance the meaningful learning, validating processes in different environments, contrasting their effectiveness in relation to other existing techniques.

• Based on the information obtained in the previous step, tests will be performed with the tools and repositories selected to identify its current mode of operation, make the necessary changes according to our needs and present their improvements and results.

• When the tools are consolidated, the aim is to integrate them to form a group of technological resources through a user friendly interface, lead to appropriate learning and understanding of historical events with a platform interactive entertainment.

• Having developed technology, this should be implemented in an environment of historic cultural heritage and the results ought be analyzed in some way. This may be left for future projects.

RESEARCH PLAN

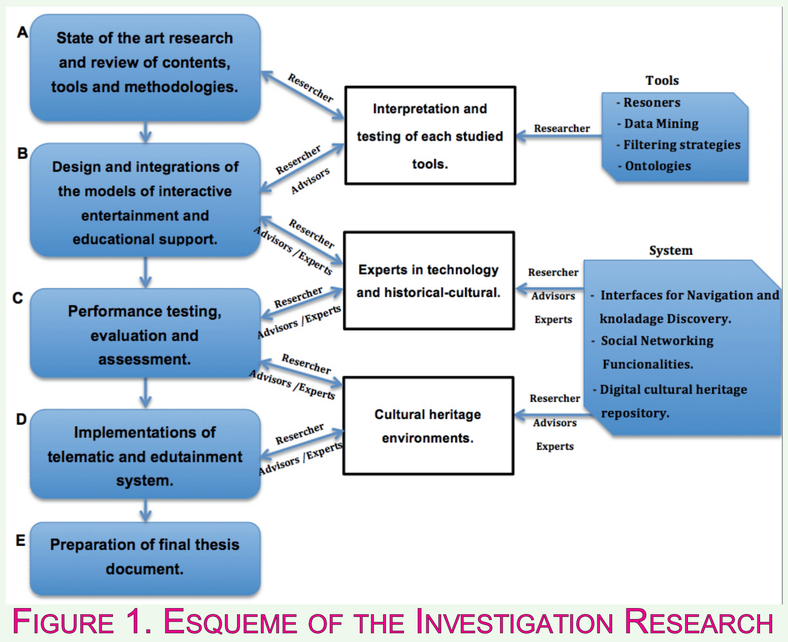

FIGURE 1. ESQUEME OF THE INVESTIGATION RESEARCH

DESIGN PROPOSAL

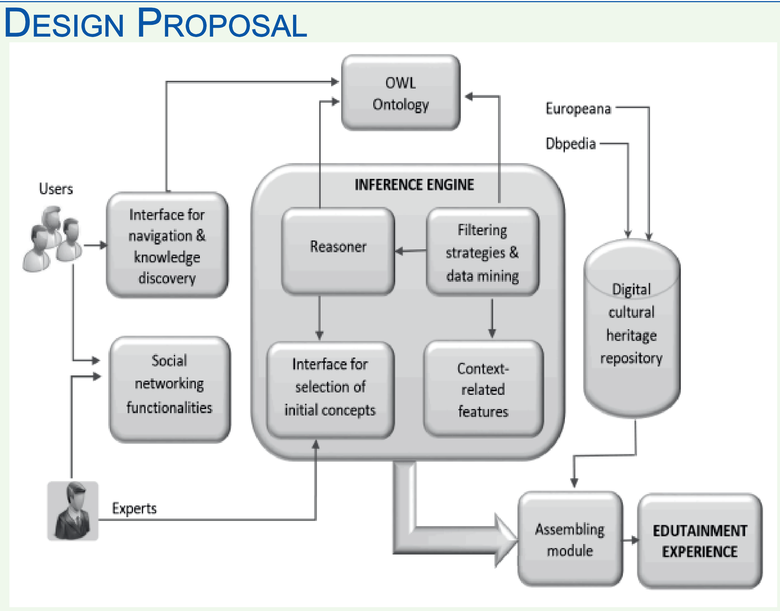

FIGURE 2. HIGH-LEVEL ARCHITECTURAL DESIGN OF THE SYSTEM

OVERVIEW OF THE SYSTEM

• The knowledge base of System is an OWL ontology, which is a network of interrelated concepts containing cultural data.

• Various interfaces are applied for the user to navigate the OWL ontology with the goal of discovering common facts (Figure 2).

• The backbone of system is the inference engine, its contents include:

• Reasoner: discovers complex semantic relationships among the concepts formalized in the OWL ontology.

• Data mining techniques & filtering strategies: bind together the knowledge discovered by the OWL reasoner and features related to the users' context.

• Assembling module: Used to process the output of data mining and filtering in order to achieve meaningful interactive edutainment experiences.

PLANNING OBJECTIVES

The research process will take over a period of 4.5 years and for this purpose the following tasks will be developed:

1. State of the art research and review of contents, tools and methodologies related to edutainment area in historical and cultural heritage environments.

2. Preparation of the elements necessary to carry out the investigation (agreements, support tools and technology, etc.).

3. Design and integration of models of interactive entertainment and educational support based in open source tools.

4. Performance testing, evaluation and assessment of experts in the technology area as the historical-cultural area.

5. Preparation of telematic tools.

6. Implementation of edutainment tools.

7. Preparation of final thesis document.

Activity(is)	Period (semester)	Estimated date of completion
1	2	March 2016
2	1	July 2016
3 y 4	4	July 2018
5 y 6	1	March 2019
7	1	July 2019

TABLE 1. PLANNING ACTIVITIES.

CONCLUSIONS AND ONGOING WORK

1) Semantic reasoning enables great opportunities to link contexts and contents in unexpected but relevant ways for individuals and groups.

2) The interconnections may derive from common facts (e.g. two assets belonging to the same or overlapping eras or places, or illustrating the same style, technology or know-how), and also from crosscutting, transversal concepts (e.g. social classes and gender issues, folklore and rituals, war or the struggle for water, food or mineral resources).

3) We are designing, implementing and testing different approaches to discover meaningful semantic interrelations and make them explicit across an unrestricted set of repositories of digital cultural heritage resources.

4) The focus is nowadays on the identification and management of temporal, spatial and miscellaneous features of context: calendar events, weather, congestion points in a venue, or popular news in the users' social media.

UNIVERSIDADE DE VIGO

UNIVERSIDAD POLITÉCNICA SALESIANA ECUADOR

PAPERS (TO APPEAR):

• CrossCult: Empowering Reuse of Digital Cultural Heritage in Context-aware CrossCults of European History
Bravo Quezada, O. G., García Vélez, R. A., Blanco-Fernández, Y., López Nores, (2015). In 7th International Conference on Intelligent Technologies for Interactive Entertainment International, Torino, Italia.