# Master in Artificial Intelligence (UPC-URV-UB)

## Master's Thesis Proposal[1]

### General Information

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|---|---|
| Title: | Environmental Problem Solving Interface Logic Non-monotonic (EPSILoN) |
| Expiry Date: | 09/2011 |
| Modality: | ☒ technological project<br>☒ research work |
| Advisor/s: | Ulises Cortés |
| Advisor's Dept. & Univ.: | LSI, UPC |
| Advisor/s e-mail: | ia@lsi.upc.edu |
| Observations: | |
| Student's Name: (if already known) | Dario Garcia-Gasulla |

## M.Sc. Thesis Description

Main issues / Brief Description [Mandatory]:
Logic formalisms of action and change can be used for tasks such as planning and prediction. By formalising domains in those logics, decision support systems can be developed. An analysis of those formalisms is made, tools are provided and an application is developed.

1 **Each M.Sc. Th. Proposal should be in a separate file, named as follows: "MSc-Th-Proposal-2-or-3-title-first-words-Advisor/s-AcademicYear.pdf".**
For Example: "MSc-Th-Proposal-Syntactic-and-Semantic-LluisMarquez&JesusGimenez-1011.pdf"
The proposal could be elaborated with any text processor (Word, Openoffice, etc.), but **the file electronically delivered** to LSI Dept. Secretary (merce@lsi.upc.edu) **MUST BE a single PDF file**

Detailed Description including a task planning [Mandatory]:

The thesis will start by analysing the state of the art of the logic formalisms of action and change. Including formalisms such as Situation Calculus, Event Calculus and Non-monotonic causal logic. Eventually we will justify the selection of this last one as formalism to represent our domain. Based on that formalism a design of the desired application will be done. That design will show what is required and what is the goal of the final application. The core of the application will be done in Prolog, and the interface in C++. A library for connecting C++ with Prolog will be included in the design.
Once done we will interact with the experts of the domain (wastewater treatment plants). They will tell us which kind of information they have and what kind of answers they could use. According to that we will know what our decision support system should aim at.
Based on their feedback and on the design we will implement the application in Prolog, C++ and Qt4. Once finished we will make some tests to measure the performance of the software, validating them with the experts.
Finally we will write the documentation of the project.

References [Mandatory]:

E. Giunchiglia, J. Lee, V. Lifschitz, N. McCain, and H. Turner. Nonmonotonic causal theories. Artificial Intelligence, 153(1–2):49–104, 2004.

J. Mccarthy and P. J. Hayes. Some philosophical problems from the standpoint of artificial intelligence. In Machine Intelligence, pages 463–502. Edinburgh University Press, 1969.

M. Shanahan. Solving the frame problem: a mathematical investigation of the common sense law of inertia. MIT Press, Cambridge, MA, USA, 1997.

Minimal Requirements & Previous Knowledge [Optional]:

Prolog / SWI-Prolog
C++
Qt4

Other comments [Optional]:

Location and Date: Barcelona, March 14th 2011

## To the Academic Commission of the Master in Artificial Intelligence (CAIMIA)