Travel Report

Project Quixote

05 February, 2012

Travel Details

Destination

University of San Luis (UNSL),
Argentina

Date

29 January - 06 February, 2012

Visitors

Pedro Rangel Henriques, Universidade do Minho (Portugal)
Maria João Varanda Pereira, Instituto Politécnico de Bragança (Portugal)
Daniela da Cruz, Universidade do Minho (Portugal)
Nuno Oliveira, Universidade do Minho (Portugal)

Travel Purpose

The purpose for this visit was to follow up the project "Quixote - Desenvolvimento de Modelos do Domínio do Problema para inter-relacionar as Vistas Comportamental e Operacional em Sistemas de Software".

Financial Support / Grant

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- FCT – Departamento das Relações Europeias, Bilaterais e Multilaterais

- MinCyT – under contract PO/09/38.

- verbas próprias do gEPL (PSECs)

Travel Report synthesis

Aims & Objectives

The specific objectives for this travel were:

- to follow up the work on program comprehension (PC) tools under development by Argentinean partner;

- to introduce the work on PC tools developed by Portuguese partner;

- to discuss the effort and progress done by both partners and sum up the results attained on the use of ontologies and concept location for PC;

- to setup the future research direction and start a joint paper.

Achievements

The objectives above were fulfilled:

- Pedro Henriques did a synthesis of the outcomes so far reached and sketched a proposal for a system, *Quixote–an ontology-based suite of PC tools*, that should be considered the final result of this project.
  The basic ideia is to integrate the different tools in a PC-suite under two different schemas: *compositional* and *complementary*; then to define a PC-process supported by these tools driven by the SDG (system dependency graph).

- Maria João talked about Nuno Carvalho work and described the results attained, *Conclave system*.

- Daniela da Cruz discussed José Luis Freitas master thesis and introduced the system *Darius*.

- We listened to the (6) Argentinean students, supervised by Mario Berón, that are developing the following projects:

- *Symbol Table Visualization and Ontological Navigation for Java programs*, by Ignacio El Kadre:
  The basic idea is to extracted a complete identifier table from Java programs and to create a user friendly visualization to display it. Then a mapping between identifiers and the language ontology is built. A navigation feature over that mapping should be provided in order to improve the program comprehension process.

- *Análise de Identificadores em código Java* by Javier Aczurra:
  This is an string extractor and analyzer that deals with three kind of strings: identifiers (package, class, method, parameter, (global) variable names); comments; literals associated with I/O statements ("*carteles*"). Strings are extracted and stored in tables to be displayed after that in a user-friendly interface. At moment, comments and string-literals are stored by their own just associated with line number; regarding identifiers, the following fields are also stored: id-class (one of the five listed above); type; Java modifier; context where they appear (class and method name).

  To improve the search for concepts in the Id-Table, algorithms to split identifiers into their component words, and to expand identifiers will be implemented.

  It was recommended to focus future work on the analysis of "*carteles*" to explore their potential for PC process.

- *Extracción de Información Dinámica en Programación Orientada a Objetos* by Hernán Bernardis:
  The project aims at porting PICS instrumentation strategy from C to Java. A tool to instrument Java programs with inspectors at the begin and end of methods and cycles is underdevelopment in order to extract dynamic (execution-time) information from object-oriented (Java) source code. in order to understand program behavior The tools is being produced automatically from a Java attribute grammar with AnTLR compiler generator. At moment, the function call trace are displayed during execution and the respective information is exported in XML format for post-morten analysis. To finish the project, the XML dialect to be used shall be designed carefully, and problems inherent to the OO paradigm (like *super* calls and the *use of system(exit)*) shall be solved.

- *Una Ontologia para la descripción del Lenguage de Programmación Java* by Maria Cristina Matkovic:

This is a new project in a staring phase. The main objective is to define an ontology for Java programming Language using Protégè tool and to export it (after validation) in OWL format. The OWL description shall be used to connect with El Kadre tool (described above) in order to build a navigator that will allow to go from identifiers up to the programming languages concepts, as well as, from concepts down to the program identifiers.

– *Evaluación de Funcionalidades de Visualización de Software provistas por Librerías Gráficas* by Enrique Miranda.
The project is concerned with a comparative study of several visualization libraries in order to established a ranking that allows to select the most appropriate for a specific problem domain. The method used to obtain the ranking is LSP (Logic Scoring Performance). Three evaluation dimensions are specifically considered: cognitive models artifacts; views; SW/HW requirements.

The tool is underdevelopment in Java with NetBeans and uses Prefuse. At moment it allows to accomplish the first two steps of the evaluation process: the definition of the criteria tree (or the hierarchy of evaluation parameters); and the definition of aggregation formulas to compute a final rate.

To finish the project the tool shall be complete with support for the two last phases and the interface shall be improved (namely displaying the overall process flow, highlighting).

– *Proyecto Hoshimi: Helper* by Mariano Luzza.
The project started with a study about the domain specific languages and visual languages. The objective is to create a visual tool for teaching programming concepts to young students. More precisely this work is concerned with the programming environment, created by Hoshimi (called *Proyecto Hoshimi*), in which the main idea is to teach to beginners the concepts of OO-programming asking the students to program small robots (*nanobots*) that cooperate to a common objective.

Helper, the tool under development, creates a visual environment to help in the writing of Hoshimi programs in an easy and error free way. THe 12 Hosihmi statements appear in a dock on the left side and the syntax-directed style of *Helper* guides the programmer to complete correctly each statement. When the program is complete, Helper generates C# to be possible to execute it. Also an XML file with the program can be created.

This project is in a final state; next step is mainly the test with users.

- Two papers were planned, maybe for submission to SLATe:
  - one concerned with the work of Marianno Luzza on the *syntax-oriented editor*, Helper, for Hoshimi programming language;
  - one concerned with Quixote approach proposed.

- Other proposals for post-grade work (M.Sc. or Ph.D.) were sketched:
  - Integration of animation in Quixote – three different trends should be explored: (1) use of program animators (like Alma) to focus the comprehension on a specific procedure and get a deeper knowledge; (2) animate the execution traces that come out from dynamic analysis made with inspectors; (3) animate the PC-process advocate by Quixote proposed approached.
  - Integration of Version control information (produced by CVS like systems) analysis or Mailing-list messages analysis to improve the PC approach underlying Quixote with pragmatic knowledge.
  - Integration of SW development documentation analysis (UML models, requirement list, etc.) in Quixote.
  - Exploration of (unit) Tests as a way of improving the comprehension of the code under validation.

- Concerning the issues related with bi-lateral cooperation at post-graduation level, discussed during previous visit:
  - The possibility to prepare a proposal to the ministry of education about a PhD Program on Software Engineering;
  - The possibility to sign a bilateral agreement for a double-titulation (co-tutela) PhD Program;

  Daniel Riesco informed that the proposal was written and submitted for approval and it was decided to send to Universidade do Minho a draft for the co-tutela generic protocol.

Next meeting

Mario Berón will visit us at Braga to keep working on the project (namely, writing the proposed papers) during 15days, starting on February, 10th.