



GESI Pizza Day

The GESI research group the Universitat Politècnica de Catalunya (UPC) conducts research in many fields of software engineering, with particular emphasis on:

- Requirements Engineering
- Software Modeling
- Software Architecture
- Service-oriented Computing
- Open Source Ecosystems
- Sustainability in Software Engineering

Currently, we have several works to carry on (see a description below). If you are interested to collaborate in them, just contact us.

Requirements Engineering

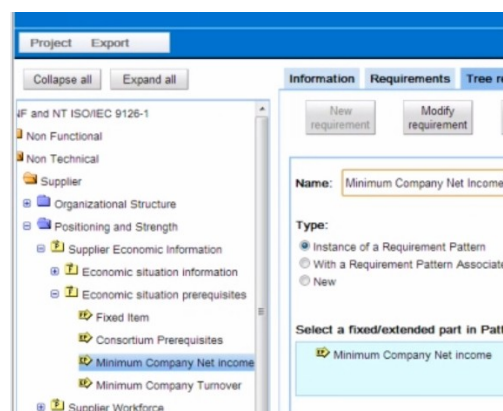
Title: Requirement Patterns Search and Recommender System

Description: PABRE-Proj is a tool that helps Requirement Analysts during the elicitation and specification of requirements. This tool is based in the use of Software Requirement Patterns (SRP, (<http://www.upc.edu/gessi/PABRE/index.html>),

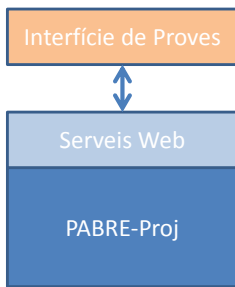
which are collected and stored in an SRP Database. This work consists on developing new functionalities for the PABRE-Proj tool that allow searching SRP in the database and developing recommender functionalities to the RA. The recommendations will be based on the previous SRP applied during elicitation and relationships and categorization of SRP that are necessary to be added to the SRP database schema.

Technologies: Google Web Toolkit (GWT), Web Services, Java, Hibernate, Derby

Contact: Carme Quer (cquer@essi.upc.edu)



Title: Development of web services for the PABRE-Proj tool.



Description: PABRE-Proj (<http://www.upc.edu/gessi/PABRE/index.html>) is a tool that helps Requirement Analysts during the elicitation and specification of requirements. This tool is based on the use of Software Requirement Patterns (SRP), which are collected and stored in an SRP Database. This work consists on developing web services to allow Requirement Management Tools (RMT) to access data and functionality that PABRE-Proj provides. Specifically, these RMT should be able to access the requirements in a project and the classification schema of these requirements, and also to search for an SRP. In order to test the optimal behaviour of the web services, an interface will be also developed.

Technologies: Google Web Toolkit (GWT), Web Services, Java, Hibernate, Derby

Contact: Carme Quer (cquer@essi.upc.edu)

Title: Development of a Requirements Management Tool on Android.

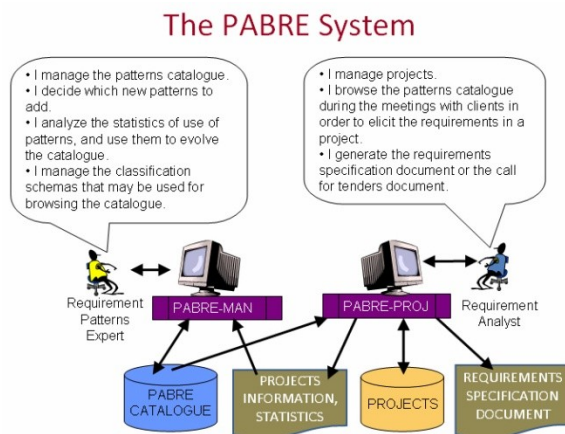
Description: This work consists on developing a simple intelligent editor that may help a Requirements Analyst during elicitation of requirements. During the edition of new requirements, the editor will search in a glossary of requirements engineering terms and in a Software Requirements Pattern (SRP, <http://www.upc.edu/gessi/PABRE/index.html>) database, and will propose changes in the wording of the requirements in order to improve the consistency and quality of software requirements specification documents.



Technologies: Android, Web Services, Java, Hibernate, Derby

Contact: Carme Quer (cquer@essi.upc.edu)

Title: Analysis and Improvement of the Usability, Maturity and Interoperability of PABRE.



Description: The PABRE system (<http://www.upc.edu/gessi/PABRE/index.html>) is composed of two tools: PABRE-Proj and PABRE-Man. This work consists on performing a detailed and rigorous analysis of the usability and maturity of each one of these tools, and also the interoperability between them. Once identified the possible aspects to improve, they will be implemented.

Technologies: Google Web Toolkit (GWT),

Java, Hibernate, Derby

Contact: Carme Quer (cquer@essi.upc.edu)

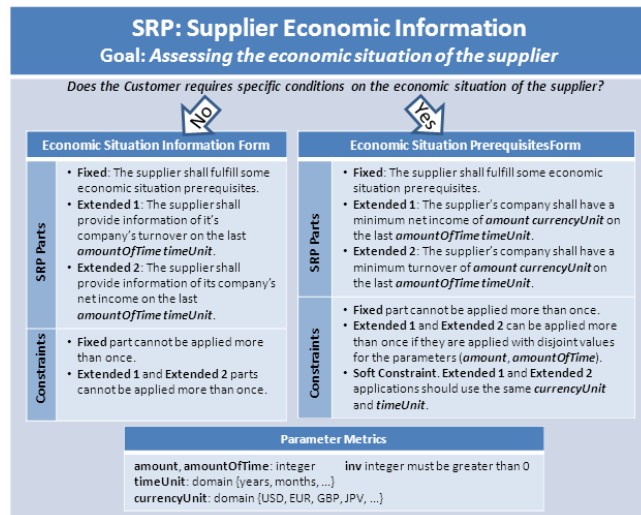
Title: Construction of Requirement Patterns for an Specific Domain.

Description: This work is implemented in two phases. First, to study one software or services domain; for instance: the Cloud Computing services domain. Once studied, Software Requirement Patterns (SRP, <http://www.upc.edu/gessi/PABRE/index.html>) for the elicitation of products or services on this domain will be defined.

This is a work that does not include any implementation. The construction of SRP will be made by analyzing information sources found in the Internet, eventually some requirement specification coming from real projects, and using analysis information tools as ATLAS.TI. Once defined, the SRP will be introduced in a SRP database through the PABRE-Man tool.

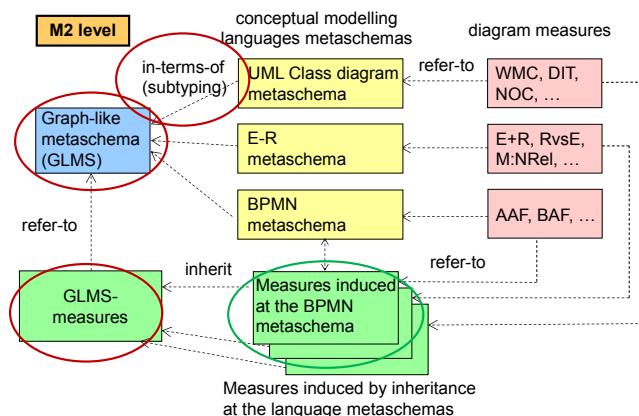
Technologies: ATLAS.TI, PABRE-Man

Contact: Carme Quer (cquer@essi.upc.edu)



Software Modeling

Title: Tool support for the definition of measures over conceptual schema diagrams based on metamodeling



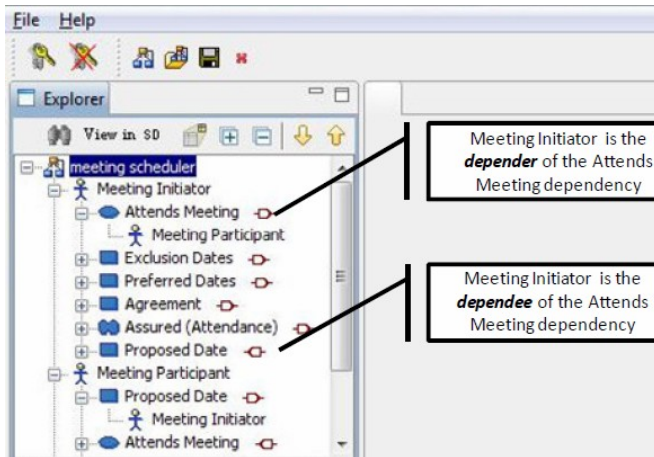
Description: Measures over conceptual schema diagrams evaluate properties of those diagrams in order to assess their quality. Some measures evaluate the syntactic structure of conceptual schemas: their size, their shape, etc. In the GESSI group, a unifying framework for the definition of measures has been developed. The proposal is based on the use of a generic metaschema: the GLMS. The GLMS metaschema

facilitates the definition of generic measures that can be inherited by the metaschemas of specific languages (BPM, UML, ER, etc.) and simplifies the definition of new measures over them. The project has the goal of developing a support tool providing the following functionalities: Implementation of the GLMS metaschema; Implementation of a catalogue of GLMS measures; Automatic refactoring of specific metaschemas; Support to the definition of new specific measures as combinations of GLMS measures.

Technologies: The tool should be implemented as an Eclipse plug-in

Contact: Dolores Costal (dolores@essi.upc.edu)

Title: Managing inheritance in an agent-oriented model editor.



Description: The *i** framework is a goal- and agent-oriented framework widely used in requirements engineering that includes a modeling language and some analysis techniques. In our group, we have developed an editor called HiME for *i** models that covers most of the capabilities of this language. However, this editor includes just some basic constructs for dealing with inheritance and has not

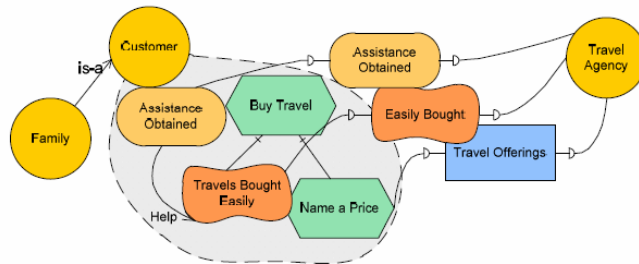
implemented any technique managing correctly this construct. In this project, we propose to implement the full notion of inheritance and implement some selected treatment, remarkably backwards propagation.

Technologies: Eclipse (RCP), Java

Contact: Lidia Lopez (llopez@lsi.upc.edu)

Title: Graphical representation for *i models.**

Description: Currently, models managed by the HiME editor mentioned in the previous project assignment are represented in a hierarchical way (like the folder tree in an operating system). This is not the usual way to represent these models. Other existing *i**



editors represent them graphically, using the constructors/shapes defined in the language. In this project, we propose to extend the HiME editor including the graphical view of the models.

Technologies: Eclipse (integration in a RCP), Java

Contact: Lidia Lopez (llopez@lsi.upc.edu)

Software Architecture

Title: Data processing and analysis of a survey about software reference architectures

Description: This survey is being done in a multinational IT consulting firm, in which their project managers, software architects and application developers have been interviewed about their daily work in software reference architecture projects. Software reference architectures allow reusing architectural knowledge and software components for the design of concrete software architectures of systems. Therefore, they are becoming widely adopted in the software industry. Nine software reference architectures, which are used by big organizations (i.e., banks, public services, industry enterprises and insurances companies), are being studied. The work consists of processing face-to-face interviews and online questionnaires that have been already made to the involved stakeholders. This data analysis aims to understand and evaluate relevant aspects of software reference architectures, such as quality attributes, architectural knowledge and decisions or business qualities. Also, this work requires the development of a tool that helps to this analysis.

Technologies: Statistical analysis programs like SPSS and R, Programming languages

Contact: Silverio Martinez (smartinez@essi.upc.edu)

Title: Acquiring and sharing architectural knowledge

Description: This project has 3 parts: 1. Research: search in the web/books/etc information about architectural knowledge used when building software architectures (architectural styles, components, technologies, etc). 2. Formalization: unify the acquired knowledge using an already existing tool, ArchiTech (<http://www.upc.edu/gessi/architech/index.html>). This part includes learning to use the tool and the related terminology. 3. Sharing: create a web based interface to show the architectural knowledge, and allow navigating through it. The ArchiTech tool generates a XML file that could be used to this end. The developed web must be reusable to any new knowledge.

Technologies: Eclipse, XMI, Web

Contact: David Ameller (dameller@essi.upc.edu)

Title: ReqAK: a tool for combining requirements engineering and architectural decision-making

Description: This project aims at integrating two existing tools that provide complementary functionalities. One tool, RE-Tools, has been developed by a research group at the Univ. of Dallas at Texas (UTD). This tool (<http://www.utdallas.edu/~supakkul/tools/RE-Tools/>) supports the construction of requirement models. The second tool, ArchTech, has been developed by the GESSI research group at the UPC (<http://www.upc.edu/gessi/architech/index.html>). It supports the decision of architectural choices starting from a requirement model. The goal of this project is to connect the output of RE-Tools as input of ArchTech. This goal requires two kinds of alignments: 1) logical alignment of the metamodels used in the two tools, 2) technological alignment because RE-Tools is based on .Net technologies whilst ArchTech uses Eclipse (although RE-Tools has some XMI export feature that could probably be used).

Technologies: Eclipse, XMI, .Net

Contact: David Ameller (dameller@essi.upc.edu)

Title: Web-based tool to manage Architectural Knowledge

Description: The ArchiTech tool (<http://www.upc.edu/gessi/architech/index.html>) is currently developed for the Eclipse platform, the objective of this project is to migrate this tool to a web interface. The tool have to parts, one to manage the architectural knowledge and one to reason about it. One or both parts have to be migrated, depending on the amount of credits of the project.

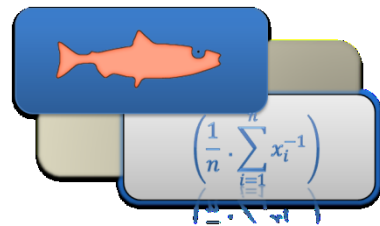
Technologies: Eclipse, Web

Contact: David Ameller (dameller@essi.upc.edu)

Service-oriented Computing

Title: Computing-derived quality metrics in Service Based Systems.

Description: Service Based Systems are highly dynamic software systems composed of several services from different providers. In contrast to other traditional software systems, their dynamic behavior requires monitoring at runtime to assess its Quality of Service (QoS), e.g. response time, availability. The QoS is computed in terms of basic and derived quality metrics. Whereas basic quality metrics are gathered directly from the monitor, derived quality metrics need to be calculated from other metrics through the definition and computation of formulas. The goal of this project is to build a system to define and compute highly expressive derived quality metrics at runtime. The resulting system will be included in SALMon, a service based monitoring framework from GESSI that has been used in different universities and research institutions around Europe (<http://gessi.lsi.upc.edu/salmon>).



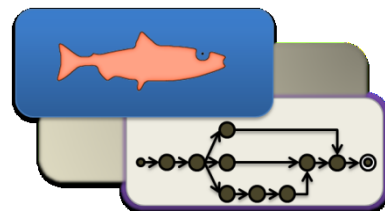
Whereas basic quality metrics are gathered directly from the monitor, derived quality metrics need to be calculated from other metrics through the definition and computation of formulas. The goal of this project is to build a system to define and compute highly expressive derived quality metrics at runtime. The resulting system will be included in SALMon, a service based monitoring framework from GESSI that has been used in different universities and research institutions around Europe (<http://gessi.lsi.upc.edu/salmon>).

Technologies: Eclipse, Java, web services.

Contact: Marc Oriol (moriol@lsi.upc.edu)

Title: Testing the Quality of Service in Service Based Systems.

Description: Service Based Systems are highly dynamic software systems composed of several services from different providers. Their dynamic behavior requires techniques to assess its Quality of Service (QoS) at runtime. These techniques can be divided in two big categories: passive monitoring and online testing. Passive monitoring consists on observing the consumption of the service, whereas online testing consists on defining and invoking a set of test cases to the service to gather its QoS. Online testing presents some advantages on different situations, being useful for stress testing, proactive adaptation, etc. The goal of this project is to build a system able to define and execute complex test cases over services at runtime. The resulting system will be included in SALMon, a service based monitoring framework from GESSI used in different universities and research institutions around Europe (<http://gessi.lsi.upc.edu/salmon>).



Technologies: Eclipse, Java, web services, SOAP protocol.

Contact: Marc Oriol (moriol@lsi.upc.edu)

Title: WeSSQoS: Web service selection by QoS

Description: The work proposed is about the evolution towards Web service selection at runtime on workflow environments, generating a new matching algorithm between QoS information and stakeholder requirements. A part of this work, the WeSSQoS system (<http://appserv.lsi.upc.edu/wessqos/>) needs to evolve towards Service Level Agreements (SLA) management where the stakeholder requirements take the form of SLA with restrictions instead of current QoS data managed for the framework.

Tecnologies: Web service, java, axis2, sql, glassfish, ajax, javascript, etc.

Contact: Oscar Cabrera (cabrera_bejar8f@hotmail.com)

Open Source Ecosystems

Title: Managing Risk and Cost in Open Source Software Adoption (RISCOSS)

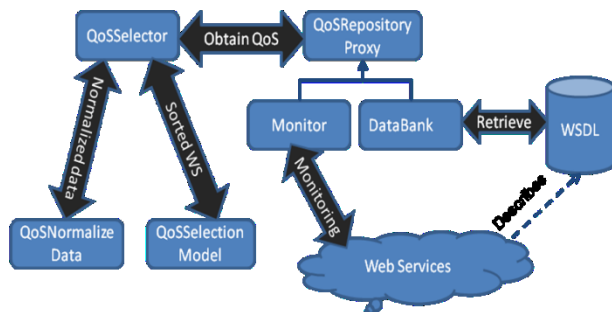
Description: RISCOSS is a european funded project that has just started (November 2012). It is related to Open Source Software (OSS) adoption. OSS has become a strategic asset for a number of reasons, such as its short time-to-market software service and product delivery, reduced development and maintenance costs, and its customization capabilities.

OSS technologies are currently embedded in almost all commercial software.

In spite of the increasing strategic importance of OSS technologies, IT companies and organizations face numerous difficulties and challenges when making the strategic move to integrate in their processes the open source way of working. This project's goals are: Strategic modelling and analysis of OSS-based ecosystems; Risk management of OSS projects; Business models and services for OSS solutions; Deployment of a software engineering platform for supporting decision-making.

Although no specific projects for students are defined so far, project opportunities for students will be defined soon.

Contact: Claudia Ayala (cayala@essi.upc.edu)



Sustainability in Software Engineering

Sustainability can be defined as "the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs". This capability includes the satisfaction of four dimensions: environmental, social, economic and human. Currently, sustainability has become a driving force of society. Concerns about the impact of human activities are increasing and efforts have been initiated worldwide to reduce consumption and increase energy efficiency.

As IT systems have become ubiquitous in our society, computer systems have been identified as an important asset for sustainability. In this context, in this project we want to study the impact of sustainability in software engineering. Our aim is to propose a consolidated view of the impact of sustainability in the software development process.

Specific project opportunities for students will be available soon.

Contact: Claudia Ayala (cayala@essi.upc.edu)

SCORE Student Contest 2013: Call for Participation

The third edition of the Student Contest on Software Engineering (SCORE) will be part of the 35rd International Conference on Software Engineering (ICSE 2013).

SCORE is a worldwide competition for undergraduate and master's level students. It emphasizes the engineering aspects of software development, not limited to programming. Student teams participating in the contest are able to choose from a number of project topics proposed by the SCORE Program Committee, which cover diverse application fields and types.

Info: <http://2013.icse-conferences.org/content/scoreCFP>

If you are interested in SCORE, you are a team of 3 or more students, and you plan to register in the project courses PES (Software Engineering Project) or PSI (Information Systems Project) next semester, we offer to recognize the SCORE Project as the course Project (with some requirements, for details contact the PES or PSI coordinator).

In the last edition (2011), a group of 4 students was selected as finalist and travelled to the most important Software Engineering conference (ICSE) held in Hawaii to present their work.

Contact: Pere Botella (botella@essi.upc.edu)