



SEnSE: Semantic Engineering Support Environment

Project Objectives & Overview

www.semantic-engineering.info

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SEnSE

Semantic Engineering Support Environment

- **Engineering & development process** of products today ...
 - Products become **more and more complex**
 - involves **various people** (with different expertise) and **heterogeneous resources**
 - Further **complication by distribution** of groups of contributors & resources
 - Product development time and time to market needs to be **as short as possible**
- Especially for **innovative products** ...
 - Development process is **knowledge-controlled** rather than controlled by pre-defined planning
 - For agile development in highly dynamic markets **standard approaches** to project management are **no longer suitable**
- Thus, we need a focus on **communication-orientation** instead of **process-orientation** in product development processes

- **Goal**

- Development on an **Engineering Support Environment** which **improves communication** in complex **product development** processes.
- Hence, shorter time-to-market for products, especially when being redesigned

- **Specific Objectives**

- Semantic enrichment of engineering documents (CAD, text, simulation results ...)
 - Transforming information to knowledge. Various tools interoperate on the knowledge level.
- Automated learning of engineering rationales through observation of user interactions
 - „if requirement **max-velocity** changes, then adapt **engine_power** accordingly“
- Proactive support for users involved in complex engineering tasks
 - Large amount of information and complexity of the task increase possibility of overlooking dependencies and consequences of design steps

- **Redesign of existing products**

- **Crucial:** understanding interrelations between all parts of a product
- Easy access to *all relevant* information to the designer *for a specific task*
- Consequences of design decisions proactively communicated to the user
- Involvement of experts on a as-needed basis

- **Decision taking & Conflict resolution**

- **Problem:** Decisions involve *multiple* people with different expertise in a collaborative setting. Conflicts block the progress and need to be resolved asap
- Support for conflict detection and proposal of possible decision alternatives
- Required people to take a decision will be informed
- Decisions will be documented to make the decision process transparent to others

- **Intelligent Change Management**

- Change Management directly reflects the **evolution of the project**
- **Understanding the evolution** of design artifacts and **being notified** of new circumstances and changes is crucial for an effective development process
- SEnSE will provide an environment where
 - Users can **delegate change tracking** tasks to software **agents** that proactively monitor the evolution and changes of design artefacts
 - **Notifications** can be **based on the semantic structure of documents / resources** rather than simple version changes
 - Information about changes can be done for **indirectly relevant** artefacts as well

- **Austrian-funded Project (FIT-IT Funding Line)**
- **Start:** Jan 2006 (Kick-Off Meeting, Feb 10 2006)
- **Duration:** until Dec 2007 (**2 years**)
- **Partners:** 2 industrial partners
 - **Profactor** Produktionsforschungs GmbH, Steyr, Austria
 - **Atensor** Engineering and Technology Systems GmbH & CoKG
- **Underlying Technologies:**
 - Ontologies, Ontology Reasoning
 - Multi-Agent Infrastructure
 - Triplespace
 - Semantic Facades (semantic views on resources in legacy systems)

- **Ontology & Reasoner Development**

- Design of an Upper-level Ontology enabling
 - interoperation between agents and
 - integration of information within the environment
- Design & Implementation of an Reasoning system that
 - leverages formal ontologies
 - can help answer the type of questions defined in the use case
 - can deal with large amounts of data

• Multi-Agent System Development

- System Design
 - Agents need to interact and communicate (over time & space)
 - Leverages both communication paradigms:
 - Message-oriented for focused interaction with well-defined participants
 - Publication/Space-based for (space/time-) decoupled communication
- Implementation of communication infrastructure based on the Triple Space paradigm
- Implementation of an Engineering Rationale Framework

• Semantic Facades

- What are Semantic Facades ?
 - provide a semantic perspective on all kinds of information in legacy systems and allow tools to interoperate on a knowledge level rather than on a data-format level
 - provide uniform access to various kinds of resources
 - hide complexity of legacy system from the SEnSE platform and allow to dynamically integrate new sources
- In general not only uni-directional (from sources) but also bi-directional (to the sources)
- Tasks
 - Semantic Facade Design
 - Implementation of a Semantic Facade Infrastructure
 - Implementation of Use Case Facades