ICRA2011 Workshop on Software Development and Integration in Robotics (SDIR VI - 2011)

May 9, 2011, Shanghai, China

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Announcements

- IEEE RAS Technical Committee on Software Engineering for Robotics and Automation
  http://robotics.unibg.it/tcsoft/
- JOSER : Journal of Software Engineering for Robotics
  http://www.joser.org/, ISSN 2035-3928
The 6\textsuperscript{th} edition of SDIR reflects an increased awareness within the robotics community for the importance of adopting best practice software engineering techniques and approaches in the development of robotic systems.

Nowadays, implementing complete robotic systems is still more of an art than a systematic engineering process. Essential parameters and non-functional properties are mostly hidden in the software structures and are not explicates. Thus, they are neither accessible during system development nor at run-time.

\textbf{As for every engineering endeavour, one should rely on the power of models. In software-intensive domains like robotics, systematic engineering requires the step from code-driven to model-driven software development.}

Software models can represent relevant properties of robotic resources, their usage constraints, and their mutual dependencies and enable the development of tools that support the systematic engineering process. Software models are computational, that is they can be executed, simulate the system evolution and even represent the system evolution at run-time.

They also allow to separate robotics knowledge from short-cycled implementation technologies. Since recently, tools like Eclipse are matured enough to be applied in and tailored to robotics. Design patterns, best practices, sophisticated and optimized software structures and approved solutions can be made available to experts in robotics within highly optimized code generators such that even novices can immediately take advantage from a coded immense experience.
The current situation in software for robotics can be compared with the early times of the World Wide Web where one had to be a computer engineer to setup web pages. The World Wide Web turned into a universal medium only since the availability of tools which make it accessible and allow domain experts (like journalists) to provide content without bothering with technical details.

In robotics, a model-driven software development approach can make the shift from programming to composing that is making robotics technology accessible to domain experts (like experts for cleaning machines) without requiring them to become a robotics expert. Model-driven software development can provide the design abstraction to compose robotic systems out of off-the-shelf robotic software components and boost the wide-spread use of robotics technology.
Component Shelf

base
laser
mapper
planner
speech

IEEE ICRA2011 - 6° SDIR Workshop - Shanghai, May 9th, 2011
Overall Schedule SDIR VI

09:00 – 09:15  Welcome and Introduction  
Christian Schlegel

Part I / Tutorial on Model-Driven Engineering

09:15 – 10:00  Model-Driven Software Development for Robotics: An Overview  
Jan Broenink, Maarten Bezemer

Part II / Paper Presentations (20 + 10 min each)

10:00 – 10:30  Model-Driven Software Development in Robotics:  
Composability of Software Components, Robot Behaviors and Reuse of Action Plots  
Dennis Stampfer, Andreas Steck, Christian Schlegel

10:30 – 11:00  Morning Coffee Break

11:00 – 11:30  Way of Working for Embedded Control Software Using Model-Driven  
Development Techniques  
Maarten Bezemer, Marcel Groothuis, Jan Broenink

11:30 – 12:00  Towards a DDS-based Platform Specific Model for Robotics  
Juan Bandera, Adrian Romero-Garces, Jesus Martinez

12:00 – 14:00  Lunch Break
Overall Schedule SDIR VI

14:00 – 14:30  
**An Overview of Xrobots: A Hierarchical State Machine Based Language**  
Steve Tousignant, Eric Van Wyk, Maria Gini

14:30 – 15:00  
**A Robotics Task Coordination Case Study**  
Davide Brugali, Luca Gherardi, Patrizia Scandurra

15:00 – 15:30  
**Case studies for model-driven engineering in mobile robotics**  
Bruce MacDonald, Partha Roop, Tanveer Abbas, Chandimal Jayawardena, Chandan Datta, Jamie Diprose, John Hosking, Zeeshan Bhatti

15:30 – 16:00  
**Afternoon Coffee Break**

Part III / Discussion and Dialogue

16:00 – 16:45  
**Future Perspective, Upcoming Topics, Identify Research Opportunities**

17:00 -  
**Opening Ceremony ICRA 2011**
SDIR VI – Part III
Future Perspective, Upcoming Topics, Identify Research Opportunities

The tangible results of the workshop will be

- a practical program of research and public relations focused on the way that software development techniques are actually practiced in robotics and
- a roadmap that indicates the strategic directions to pursue the synergy between Robotics and Software Engineering.

SDIR V: Idea of Small Challenges and Requests for Solution Examples

- excellent idea, but still not a single challenge published ...
  - how to start?
  - what might be a good first challenge?
Integration: clear allocation of roles in industrial robotics / automation

Component Supplier

Component Supplier

Service Provider / Consultant

System Integrator

Customer

Components

System

Application

Integration: unclear allocation of roles in service / advanced robotics

Component Supplier

Component Supplier

Service Provider / Consultant

System Integrator

Customer

System Integrator

Service Robotics

Consulting