FP6-001917

EURON

European Robotics Network

Network of Excellence
Information Society Technologies

DR.18.2
Proceedings from Annual Meeting

Due date of deliverable: 30/4/2006
Actual submission date: 20/6/2006
Start date of project: May 1st, 2004

Organisation name of lead contractor for this deliverable:
KTH

Revision: V.1.
Dissemination Level: PU

Duration: 48 months
EURON Annual Meeting 2006

Outline

- Welcome to the EURON annual meeting
- Report on Network & Key-Areas
- Group Activities
- Update on planned activities
Programme

- Annual Report (Christensen)
- Key-Area Activities
- EU 6th Call “Advanced Robotics”
- Parallel Sessions
  - Tech Trans Award, RoboEthics, Benchmarking, ...
- Announce winners PhD Award & Tech Transfer

Context

- EUROS-06
  - A premier Conference
- Update on EU
- New Platform
- New Call
- Activities

© Henrik I Christensen, KTH
EURON
Annual Report 2006

Henrik I Christensen, Coordinator
hic@kth.se

Outline

• Status of the Network
• Yr 2 highlights
• EUROS-08?
• Outlook on the network
Network Status

• At end of 2nd year of operation
• 2 more years to go 😊
  • Still significant funds for activities 😊
• 182 members of EURON (puuuhhh!)
  • 2-3 new members each month

EURON members
EURON members

Members Trends

- Most countries are now represented
- Increased presence of industry ~15%
- Good involvement of new member countries
- Representation across Europe is very solid
EURON Activities

- Ad-Hoc Research Projects
- Key-Area Activities
- Community efforts
  - Annual meeting
  - EURO-06

EURON Yr 1 review

- Review June 05
  - Overall a valuable effort
  - WWW site was heavily criticized
  - Need to develop a brand - EURON is not clear
  - Research projects to be reconsidered
  - More publicity of the effort
  - Gender issue is not considered explicitly
- Still not received payment / contract for yr 2
Review Followup

- WWW site under significant revision
- Brand - “promotion of excellence”
- EUROS - to promote science
- Gender: Childcare - Extra Travel Support
- Change in research project emphasis
- Push for more publicity about EURON

Ad-Hoc Projects

- 1 call decided summer 05
  - PRP, RA, TRS - 1 each
  - projects are well underway
  - Management is a bit of a hazzle
    - EU rules were not foreseen. Future contract will be simplified
- 3rd call for projects is open (DL: 15 April)
3rd Call Ad-hoc proj

- PRP
  - Directed at young researchers
- RA
  - Still topical studies related to roadmap ...
- SIGs
  - Sponsorship of sub-communities
- Revision of contract to simplify management

3rd Call

- Expect to fund a large number of projects
  - 3-4 PRP, 3-4 RA, 5+ SIGs
- Strong review process still a requirement
- Decision by June
- Launch by August 06
Activities

- Involvement of members is an issue
- EURON Questionnaire distributed for feedback
- 64 questionnaires returned ~33%
- Or 10% of the members of the mailing list

Questionnaire results

- Visit to web site every 2 weeks on average
- Few contribute to the web site
  - No time (not very convincing)
  - The web site is being revised (see later)
- Need information by e-mail to be effective
• Roadmapping
  • Few have visited the roadmap web-site
  • Everyone are unhappy with the process (100%)
  • The process is not seen as being transparent
  • The roadmap web site is too incomplete
  • People do not feel that they are being heard!
  • This is a very serious problem - must be solved now!

• Apparently < 5% have read the benchmarking survey
• Benchmarking is crucial and part of much research both in academia and industry
• (interesting that few were unhappy)!
Questionnaire results

• Education
  - Summer schools are good (not excellent)
  - Happy with course taught
  - Would like to see more applied topics
  - New topics are of interest
  - Contribution of material is difficult / time consuming

• WebBook is considered too empty
  - The process has not been a success
  - Too difficult to get people to contribute

• Web resources
  - Too many people were not aware of the resource
  - Limited time to contribute 😞
  - Without YOUR involvement how can it be a success?
Questionnaire results

- Industry links
  - People are happy with the current efforts
  - Few people use the available statistics
  - Limited #people have applied for the tech transfer award (~13 applications / year!)
  - No need for new activities towards industry

Questionnaire results

- Dissemination
  - Good information is provided
  - Few people have considered contributing
  - Few people have bought copies of STAR
    - Note present discount offer from Springer (thank you!)
  - Adequate mechanisms for news reporting in place
Questionnaire results

• People would like to see effort to setup a European Robot Society (after EURON)
  • Payment 300€ / lab or 50€ / researcher in fee
  • Lobbying effort in Brussels, Web site, Annual Meeting, summer schools
• Time to start thinking of beyond EURON

Questionnaire results

• Several felt that EURON primarily is for the “big” labs. Serious concern!
• Why not get involved?
• Open forum today after lunch!
  • Your opportunity to express your views!
• Few constructive ideas as to new activities
New EURON efforts

- PR Video @ Automatica-06 (May 2006)
  - 12 video clips received (~ 7% contributions)
- Presentation of our research
- A web map a la EURON WWW map
- A video stand at the Service Robotics Booth
- Poor timing (ICRA, ISR, ELROB, ... same week)

EURON Info

- EURON flyers
  - Information about EURON in general
  - Topic series of flyers
- Involvement of science journalists
  - 4+ journalists at this meeting
- Need for more dissemination to a general public
EURON Context

- Advanced Robotics is a major topic in FP7
- 6th Call of FP6 has an special “Advanced Robotics” topic. (more later)
- A European Technology Platform - ETP has been defined in cooperation with EURON
  - Official launch October 7 last year
- Launch of official EUnited Robotics & EURON collaboration incl tech transfer award

EURON - European Robotics Network

EUROP

- Industry Drive
  - SAGEM coord
  - Senior industry involvement
  - Roadmap for FP7
  - Important new coordination mechanism
  - Exact EUROP-EURON relation in preparation
• A joint meeting will be organised by April/May for roadmap coordination
• Important to get involved in this process.
• EUROP is divided into
  • Industry, Service and Security/Space robotics
• Check www.roboticsplatform.com

“Beyond Horizon”

• EU planning effort organized through ERCIM
• Basic proposal document at www.ercim.org
• Public hearing until 31 March 06
  • The document on “cognition & intelligence” might be of particular relevance to EURON audience
• Please make sure that you react to this public consultation
EUROS-06

- Our first EUROS
  - 50 paper submissions
  - 16 papers accepted
  - 2 invited talks
- Next EUROS?

EUROS-08?

- Proposal to have it every other year
- 2008 is the end of “Beyond Robotics”
- Start of “Advanced Robotics”?
- Proposal to have the meeting in Prague
EURON status

• Many activities across areas
  • Roadmap is emerging
  • 5 summer schools
  • 5 Ad-hoc projects active
  • WWW updated, Flyer, Popular science
  • STAR series
  • Industry ETP, Tech Transfer Award

EURON status

• Diverse activities across all areas
• More involvement of members would be good
• 5-6 new summer schools?
• Hopefully many new research projects
• Strong integration of the community
EURON changes

• Henrik Christensen is on the move
  • Moving to the US by January 2007
    • Distinguished Professor at Georgia Institute of Technology
  • A new coordinator by Jan 07
  • A committee has been appointed to address this
    • Dillmann, Casals, Siciliano & Hägele
  • KTH will continue as the Coordinator
  • New scientific coordinator to be recruited

Summary

• Strong community building effort
• Many activities see Key-Area reports
• Good activities in place across areas
• More involvement from members would be useful
  • Research projects, Summer Schools, ....
Summary

• A few people are doing most of the work
  • Acknowledgment of major efforts:
    • Jeanna Ayoubi (EURON administrator)
    • Bridget Hallam (WWW manager/editor)
    • Antonio Chella (EUROS local arrangements)
    • Key - Area coordinators
      • Dillmann, Pobil, Casals, Siegwart, Hägele, Prassler, Siciliano, Groen
  • Without their effort it would be impossible!

EURON
Your Network!
Help us make it an even bigger success
Robotics Research Roadmap

Speaker: R. Dillmann
Mar 18th, 2006, Palermo

Outline

- Introduction to the EURON Roadmap
- Comparison with other Roadmaps
- Results from Roadmapping Workshop in Karlsruhe
- Future work & activities
Objectives of WP 1 „Research Roadmap“

- Identification of key research challenges
- Identification of research strategies to address challenges
- Generate Roadmap Document
  - Documentation of State-of-the-Art
  - Identification of economic & societal driving forces
  - Recognize bottlenecks to progress
  - Describe major emerging trends
  - Identify relevant technological driving forces
  - Development of a research roadmap to accelerate progress

Structure of EURON Roadmap

- Application Areas
  - Advanced production systems
  - Adaptive robot servants in intelligent homes
  - Network robotics
  - Outdoor robotics
  - Health care and life quality
  - Similar areas like in WTEC report

- Assesement of status of robotics R&D in USA, Europe, Korea & Japan
- Comparison of efforts in terms of quality, scope & funding
- 6 Areas:
  - Robotic Vehicles
  - Space Robotics
  - Industrial, Service and Personal Robots
  - Humanoid Robots
  - Robotics in Biology & Medicine
  - Networked Robots

Objectives of the Roadmapping Workshop in Karlsruhe, Sept.2005

- Update and improvement of EURON roadmap I
- Collection of new key ideas and research fields
- Contribution to all 5 application areas, organized along roadmap structure
What is important for each Application Area?

- Economical & societal driving forces
  - Why is there a need for robotics research in this area?

- Objectives
  - Which goals should be attained and why?
  - Which solutions can be achieved in robotics to fulfill the specified needs?

- Bottlenecks to progress
  - Which obstacles block the required challenges in robotics in the specific areas?
  - Societal, economical, technological and ethical obstacles which have to be considered to accelerate and technological scientific challenges!

What is important for each Application Area?

- Technological driving forces
  - Which key technologies are expected and needed to accelerate the development in the individual area?

- Scientific Challenges
  - Which are the challenges we (as scientists) are facing?
  - Is there a potential industrial relevance and need?

- Future Research Activities
  - Which research activities need to be actively accelerated to enable innovative products?
  - A coarse time-frame research roadmap enabling development in the individual field
Results of the Workshop

- Working groups on
  - Advanced Production Systems
  - Outdoor Robotics
  - Adaptive Robot Servants and Intelligent Homes
  - Network Robotics
  - Health Care & Life Quality Systems

Advanced Production Systems - Societal & Economical Driving forces

- Anti-pollution, recycling, dismantling rules
- One-of-a-kind products
- Short product life cycles
- Yearly update of installations forecast of further growth
- 2007: ~325000 industrial robots in EU
- Approx. 1 Million Worldwide
- Prices decreased to 59% compared to 1990
- Taking into account quality improvements: 25%

Prices decreased to 59% compared to 1990

Taking into account quality improvements: 25%
Advanced Production Systems - Objectives

- Customization
  - Adaptability, user-in-the-loop, faster programming, sensing-intelligence, direct interaction
- New Processes
  - New materials & products (sticky, elastic, slippery)
  - New actuators and controls for increased flexibility of manipulation
- Extensive use of robots
  - Use of robots as interactive tools
  - Enhanced human-robot cooperation
- Lightweight manipulator systems

Advanced Production Systems - Challenges

- Ease of Use
  - Extensive sensing and dynamic control as well as exploitation of redundant structures to enhance accuracy and performance
  - Combine interactive multimodality with automatic planning/programming methodologies
- Cooperation
  - Working and cooperation in commonly shared workspace
- Portability
  - Plug-and-manufacture (3 days!)
Advanced Production Systems - Approximate Timeline

Mostly Economy of scale
Low Variants …

2010 2015 2020

• Flexible+ LW Manipulator
• No Fence In LAB (cooperate)
• Automatic Process-Programming
• Standardisation

• No Fence In Factory (cooperate)
• Sensor-based Programming
• Interactive Programming / commanding (gesture,speech)
• Extreme Customisation

• Easy to Use
• Plug-and-Produce

Adaptive Robot Servants & Intelligent Homes - Objectives

• Time-saving in daily repetitive work
• Have a companion and a servant/assistant
  - Elderly care
  - Surveillance, security applications!
  - Communicating w/other devices:
    Robot in smart house
  - Emphasis on HMI
• Personal robots adapting to individuals
• Exercising robots
  - Personal entertainment
  - Fitness/rehabilitation/training
• Medical support
• Reach high acceptance by unexperienced users:
  - Emotional component
  - Robot as luxury
  - Improve robot acceptance
  - 24 hours service in household environments
• Robots in environments dangerous to humans
• Incremental development of robots
Adaptive Robot Servants - Societal and Economical Driving Forces

- Elderly people / Aging society
- Changing living patterns (single households...)
- Huge market potential 2005-2007
- Forecast: 4.1 Million units sold

Market size
- 2.7 Bn.$ (vacuuming, mowing, window-cleaning)
- 4 Bn.$ (entertainment & leisure)

Adaptive Robot Servants & Intelligent Homes - Scientific Challenges (1)

- Architecture and components
  - Plug and play systems
  - Modularity and compatibility
- Endeffectors (hands)
  - Two-handed manipulation
  - Zero-inertia manipulation
  - Control of mechanically flexible systems
- Head
  - Coordinated eyes and ears
  - Focus of attention and visual servoing
- Affective interfaces
  - Haptics for interaction as well as for manipulation
- Interface for teaching and advice
- Cognitive system capabilities
- Representations
  - Semantics + language
- Learning, generalization and action generation
  - Actions, skills and tasks
  - Situation assessment
  - Decision making
  - Planning
- Novel object manipulation and grasping
Adaptive Robot Servants & Intelligent Homes - Scientific Challenges (2)

- Autonomy
  - Minimal maintenance robots
  - Self evaluation, failure analysis, self optimization, self calibration
- Dynamic environment and multi (and rough) terrain mobility
- Reliability and energy efficiency (24h robot availability)
- Real-time control in high dimensional configuration- and task space
- Design methodologies
  - Building of efficient systems with functional building blocks which can be verified
  - Dynamic environments, open-ended systems, scalability
- Perception
  - Object and situation categorization + recognition
  - Handling of realtime dynamic constraints
- Human-robot, robot-robot and robot-environment cooperation
- Navigation in cluttered dynamic environments

Adaptive Robot Servants & Intelligent Homes - Approximate Timeline

- "Real" vacuum cleaner <400€
- Robot loading household devices
- Companion for elderly people
- 24h assistant
- Ironing robot
- Robot helping handicapped people
- Understand human activities
- Proactive robots
- Robot adapting to individual needs
- Window washer
- Gaming robots

Advances

2005 2010 2015 2020
Outdoor Robotics - Objectives

- Economical efficiency
  - Outdoor assistants, Public service systems
  - Optimized use of resources
- Disaster management
  - Wide range of operations, decision & planning,
  - Man-machine-cooperation,
  - Expanded mobility
- Exploration & Surveillance
  - Mission planning, generation of reliable representation, fast & reliable sensors
- Demographics
  - Increase outdoor mobility for elderly => better transportation systems

Outdoor Robotics - Scientific Challenges

- Cognition & Perception
  - Embodied cognition, real-time situation assessment,
  - Decision, adaption, learning in open environments, planning
  - Self-awareness
  - Cooperative perception
  - Large-scale sensor data fusion
  - Adaption to environmental conditions
  - Dynamics of environment
  - Robustness
  - Fault-tolerant control, fault and error recovery
- Representations of space, action & time
  - Human-duequate symbolic representations
- Multi-agent coordination and controls
  - with low bandwidth
- Manipulation and locomotion effecting the environment
  - Application specific
  - Realistic route planning considering dynamics
  - Scalability of representations
Autonomous Ground Transportation Systems - Approximate Timeline

- European „Grand Challenge“
- Autonomous Vehicles Driving in Cities
- Communication with sensor nets in environment
- Transportation Systems In Cities
- Autonomous Vehicles In unstructured domains
- Communication between Mobile Systems
- 2-3 Cars finishing Grand Challenge
- Autonomous Vehicles Driving on Highways
- Situation & Risk Assessment

2005 2010 2015 2020

Network Robotics - Objectives

- Create:
  - Robot-Teams
  - Robot-Humans-Teams
  - Robots networked with environment / infrastructure
- to improve:
  - Efficiency, effectiveness and reliability
- For:
  - Cooperative Transportation, Maintenance, Inspection, Exploration, Agriculture, (Homeland) Security,
Network Robotics - Driving Forces

- Automated multi-vehicle systems/highways
- Intelligent buildings
- Earth sciences and pollution monitoring
- Security and civil defense, disaster situations
- Military: „Network Centered Battlefield“

Network Robotics - Scientific Challenges

**Control**
- System with evolving structure
- What is the state of the system?
- What is the space of controls?
- How to incorporate mixed initiative interactions?
- What is a control strategy?
- Control under communication constraints

**Tools**
- Deployment of dynamic networks hybrid automata
- Interoperability and standards
- Real time code generation and distribution
Network Robotics - Approximate Timeline

Advances

- Robot teams cooperating with production manufacturing
- Large Team (~50) operating for simple task in structured environments
- Small Groups networked w. sensors in known Environment
- Robot teams assisting in disaster situations
- Autonomous cooperative transportation in semi-structured areas
- Surveillance/Security supported by robot teams
- Robot Team in planetary exploration

2005 2010 2015 2020

Health care & life quality

- Economical and societal driving forces:
  - Aging societies
  - Increased need for assistive technologies
  - Self-dependency of patients
- State of the art:
  - ROBODOC, CASPAR, AESOP, Da Vinci, ...
- Bottlenecks to progress:
  - Complex preoperative planning
  - Price/performance ratio
  - Safety, complexity
  - Limitation of multimodality and semantics
Health care & life quality

- Scientific challenges:
  - Transparency of robot actions
  - Sensors and medical imaging, in body sensors
  - Robot assisted 3D-endoscopy and haptics
  - Efficient and patient specific pre-operative and invivo planning
  - Risk evaluation and minimization, increase of safety

- Future research activities:
  - Optimization of robot sensors, fusion with intraoperative imaging (CT, MRT, sonar, molecular imaging, invasive sensors)
  - Universal surgical minimal invasive robots for various applications
  - Miniaturized medical robots (micro- / nano-scale)

For More Results...

- See EURON Roadmapping Homepage
  - http://wwwiaim.ira.uka.de/euron

- Support: pardow@ira.uka.de
Future Activities

1. Draft Version of Roadmap2 on homepage in May 2006
2. Final Version 2 to be published in October 2006
   a. Update of State-of-the-Art
   b. Evaluation of IPs and alignment with challenges & future research activities
   c. Tracking new emerging trends for robotic technologies (coop. with industry)
3. Cooperation of EURON research roadmapping group with EUROP (common meeting)

Thank You!
EDUCATION AND TRAINING

- Summer Schools
- Teaching Material Data Base
- Inventory of Robotics Education in Europe. Curricula
- Thesis Directory. Theseuron
- Georges Giralt Ph D Award
EDUCATION AND TRAINING

• Summer Schools

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Teaching Material Data Base

Wiki Platform: DB

- Robotic Platforms
- Simulators
- Videos
- Summer Schools / Videos
- Lectures / Robotic Courses

WEBook

Manel Frigola
Josep Fernández
Martín Mellado
Pedro Sanz

Herman Bruyninckx
Jorge Dias
John Hallam
M. Isabel Ribeiro

THE ROBOTICS WEBOOK
The online textbook project

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**Teaching Material Data Base**

### Educational resources

This educational web site provides a platform for collecting and sharing information about robots in education. This web site has been produced as part of the EURON Education and Training effort (www.euron.org).

#### Educational Platforms:

Robots offer an excellent tool for innovative teaching of a number of different engineering subjects. Find examples in the Educational Robots Platforms section.

#### Videos:

We hope that these Robotics Videos are both useful and enjoyable.

#### Summer Schools:

If you are interested in organising a Summer School see this link: Summer Schools.

#### Simulators:

The Robotics Simulators page contains descriptions of some robotics simulators used in education and training.

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### Robotics simulators

"Simulation is a graphical software tool but also, and probably more importantly, is an engineering method" (Quote: Scott Baldwin, General Manager CIS Robotics).

#### Aim and Scope

This website intends to supply information about the most common and significant robotics simulators with their main features for educational purposes, including links to more detailed information about the software.

#### Submission

Submissions describing robotics simulators can be done sending a message to the coordinator Martin Mellado (martin@isa.upv.es).

The subject of the message must be: EURON simulator submission. The message should include all information that can be relevant for the description of the simulator. This could be (but is not limited to) the following points: simulator name; brief general simulator description; a specific description; h/w-s/w requirements; main capabilities of the simulator; price when applicable; educational application and target group; references to known institutions using the simulator; application examples including images and videos; link to the official simulator web page.

You can submit descriptions of new simulators as well as additions to existing descriptions with your own point of view.
Teaching Material Data Base

Webots

Author of description: Olivier Michel

Introduction

Webots is a fast prototyping and simulation software for mobile robotics, a kind of robot CAD.

With Webots you can build a model of a mobile robot in 3D, equip it with customizable sensors and actuators, set physics properties, like mass distribution and friction parameters, program the controller of the robot and simulate it!

Webots allows students to get started with mobile robots very easily. No hardware is needed to model or program a robot, but transfer to real robots is possible.

Screenshots

Teaching Webots was originally used mostly for research. However, it is now widely used for education as well. Webots licenses were sold to over 100 universities worldwide for research and education.

Aim and Scope

Robots offer an excellent tool for innovative teaching of a number of different engineering subjects. To apply robots in such a variety of subjects and different scenarios, the employed platforms have to meet a number of technical as well as educational requirements such as flexibility, modularity, scalability and ease of use. To enable teachers to judge on different platforms, the platform overview on this website is intended to provide relevant information, examples in educational use and links to other sources of information.

Submission

Submissions describing educational platforms (commercially available as well as custom-made) can be done sending a message to the coordinator

Uwe Gerecke: gerecke(at)learninglab.de

The subject of the message must be: Euron platform submission. The message should include all information you feel relevant for the description of the platform. This could be (but is not limited to) the following points:

- Robot system information
Teaching Material Data Base

Lego

The Lego Mindstorms mobile robot kit is well established in education, widely used and supported by a large user community. Its modular composition and kit approach are perfectly suited for educational applications.

Image: Fire-fighting robot built at the University of Hannover (compare robotics videos section)

Hardware:
Lego bricks, RCX controller, variety of sensors (light sensors, bumpers, etc.) and actuators/motors. Besides the many Lego parts, construction guidelines for custom-made parts are available.

Software:

Robotics videos

Click on the desired video subsection (left side menu)...

This video data base is intended to provide useful video demonstrations to the robotics educational community. In order to not limit the contributions, all digital video formats are welcome. With the aim to facilitate the contribution videos with audio tracks or titles in any language will be accepted, even though English is recommended so that everybody can better understand their contents. The video data base is addressed to the whole robotics community, not only to EURON members. We encourage contributors to generate original material not only in EURON, but everywhere.

Copyright remarks:
If the submitted material is not original, contributors will provide the necessary permission notices from the copyright owners where required. In all cases, submitters will be responsible of copyright issues since EURON can not control the original sources.

Obviously, as it is the intention of the database, the submitted materials will be further used for presentations in universities or other training centres. The only request for future users is that they reference the source (that is EURON database) and the name of the authors and their affiliation in their presentations.

Submissions

Video submission (download video) can be done creating a
Manipulation and grasping

Vision-Based Computation of Three-Finger Grasps on Unknown Planar Objects

Video author(s): A. Morales
Robotic system author(s): A. Morales, P.J. Sanz, and A.P. del Pobil
Institution: Jaume-I University (Spain)
Date: 2002

Abstract:
This work presents an implemented vision-based strategy for computing three-finger stable grasps on unknown planar objects.

More info: (Morales et al., IROS 2002)

Key Images

Video files
Future actions

• Lectures / Multimedia material

• New Sections ?
  Proposals from members
  Volunteers to steer

• Not only volunteers … someone to push!

  *Ricardo continues with the follow up, reminding.*

  *Claudia and Edgar help the responsible of each section*
Robotic curricula

Main Goals

• This initiative is basically addressed to help the mobility of students and professors.
• It could be a source for inspiration of new subjects’ contents.
• It will facilitate interchange of educational materials between the teachers.
• It will help the administration in the recognition of foreign courses’ ECTS.

Responsible: Joan Aranda
Euron Robotics Education and Training

Robotics curricula

Course Title: Robotics
Course URL: http://www.fib.upc.es/en/Erasmus/total.html#ROB
Contact person & email: Josep Fernandez josep.fernandez@upc.edu
Keywords/Topics

Degree: Computer Science
Level: Undergraduated
Organization: Technical University of Catalonia
Country: Spain
City: Barcelona
Course language: Catalan
Website language: English
Credits ECTS: 6
Electronic materials available? YES

http://euron.upc.es/rcdb/

Robotics curricula

http://euron.upc.es/rcdb/
Contributions by country

EDUCATION AND TRAINING

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Theseuron

Theseuron is the Euron directory of robotics
Theses developed in Europe.
The project started in January 2005

Responsible: Ricardo Téllez
Euron Robotics Education and Training
Thesis directory

Educational Resources

Education and dissemination of information generally were seen as major feats of the original EURON. This resulted in four main systems of information:

1. This web site, for up-to-date information about what is going on, especially in Europe.
2. An encyclopedia for EURON Robotics, to give definitions and descriptions of both historical robotics and current state-of-the-art.
3. A database of teaching materials that can be used freely for educational purposes. So far, a number of links exist to, for example, robotics simulation, educational robotics platforms, and robotics videos.
4. EURON Schools, aimed at PhD student level. Two Winter Schools were approved for 2005/06: The Rescue Robotics Camp, in Italy which is already finished, and TeleSurgery, a winter school which will take place from March 26-31, 2006 in Benidorm, Spain.

These four initiatives are still active; contributions are welcome to all of them.

EURON aims to encourage excellence in young researchers by giving an award for the best recent PhD in Europe.

A database directory for robotics PhD theses developed in EURON member Research Centers and Universities has been started to provide readers with the most up-to-date research in various areas of robotics.

Theseus directory

Latest theses to be validated by the administrator

by Christian Geyh
Subject: Control Architectures
Country: Germany
Language: German
Available at

Abstract:

The thesis introduces a software technical and algorithmic framework for the realization of today's rehabilitation robots. Thus, systems with the ability of semi-autonomous task execution. The framework comprises a control architecture, a planning module, and the user. The basic structure of the control architecture originates from the area of fully autonomous robotic systems and is adapted to the requirements of semi-autonomy. For the realization of task execution, the architecture possesses a center module, which automatically generates and executes sequences of actions after the receipt of a high level command. In order to obtain real-time suitable as well as error-tolerant execution behavior, the generation of action sequences is performed by means of so-called process structures. A process structure subsumes all possible situations that might appear during the execution of a task, forming a hierarchical decomposition of the application or system programs, respectively. For the representation data structures, which are used within the area of assembly planning, have been enhanced with elements from the field of artificial intelligence. Beyond the already mentioned subroutines, the usage of process structures not only enables a controlled movement of the user during the execution, but also enables task level programming. An application programmer with no knowledge about the technical details of the system can process new tasks to be processed on a high level of abstraction. For a system programmer process structures support the incremental enhancement of the systems autonomy without the necessity to perform changes within the overall structure. The latter aspect is a mandatory prerequisite for the evolutionary development of rehability robotic systems.

Validation:

Send validation

For comments or questions about this website, please email the Ascensor.
Updated on: 2006-07-01 10:00 - 10:00
Thesis directory

Welcome!

This is the directory for robotics Ph.D. theses developed in Research Centers and Universities of Europe belonging to the European Robotics Research Network (EURON).

All theses information can be browsed using the classification links below. Theses are classified by Subject, Country, Language and Year of publication.

If you want your thesis to be included here, please contact us or click on the Submit a thesis link above.

Statistics:

Subject with most contributions: Vision
Most active country: Spain
Most active year: 2003
Most popular language: English

Total number of theses: 10

Latest Theses Added:

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Latest Theses Added:
PhD Georges Giralt PhD Award

- Summer Schools
- Teaching Material Data Base
- Inventory of Robotics Education in Europe. Curricula
- Thesis Directory. Theseuron
- Georges Giralt Ph D Award

People involved:  Alícia Casals  
Manel Frigola  
and the Jury!

October 05:  Submissions, 12 accepted
November 05:  Starting of the review process
February 06:  Decision on Nominees
March 06:  Award presentation

Alićia Casals  
Henrik Christensen  
Raja Chatila  
Paolo Dario  
Rüdiger Dillmann  
Bruno Siciliano  
Hendrick Van Brussel
PhD Georges Giralt PhD Award

Submission of Theses presented in 2004: 12

3 Nominees to be presented at the end of the meeting

... and the WINNER!

Conclusions

• Many activities started (and open to new…)
• Problem of follow up and motivation of volunteers
• Promotion of activities through the Web
• A leaflet available
EDUCATION AND TRAINING

- Summer Schools
- Teaching Material Data Base
- Inventory of Robotics Education in Europe. Curricula
- Thesis Directory. Theseuron
- Georges Giralt Ph D Award
EURON II Summer Schools

1. Report Summer Schools 2005
2. Update on Winter Schools 2005/06
3. Announcement of Summer Schools 2006
4. Update on Funding Policy and Ideas for the Future

Report EURON Annual Meeting 3.2006, R. Siegwart, EPFL

Four Summer Schools 2005

1. 2nd EURON GeoPlex Summer School
   Modeling and Control of Complex Dynamical Systems  39 participants
   - 17-23 July 2005, Residential Center of the University of Bologna
   - http://www-lar.deis.unibo.it/euron-geoplex-sumsch
   - Claudio Melchiorri, Stefano Stramigioli

2. Perception and Sensor Fusion in Mobile Robotics  43 participants
   - September 1-7, 2005, Ancona, Italy
   - http://psfmr.univpm.it
   - Primo Zingaretti

3. IURS-2005 Robotics and Neuroscience  51 participants
   - September 5-9, 2005, Benicassiml, Spain
   - http://www.robot.uji.es/research/events/iurs05
   - Angel P. del Pobil, Yiannis Demiris, Jose M. Carmina

4. Surgical Robotics  37 participants
   - September 7-14, 2005, Montpellier, France
   - http://www.lirmm.fr/UEE05
   - Etienne Dombre, France

Thank you to all organizers, lecturers and participants
Number of participants from new member countries are increasing.
Summer Schools 2004

Major/Level of education of Participants

<table>
<thead>
<tr>
<th>Major of Participants (%) 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical engineering</td>
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<tr>
<td>Mechanical engineering</td>
</tr>
<tr>
<td>Computer science</td>
</tr>
<tr>
<td>Others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Education of Participants (%) 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master</td>
</tr>
<tr>
<td>Doctoral Student (first half)</td>
</tr>
<tr>
<td>Doctoral Student (second half)</td>
</tr>
<tr>
<td>Postdoc</td>
</tr>
</tbody>
</table>

Major of Participants (%) 2004

<table>
<thead>
<tr>
<th>How to get mechanical engineers involved?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical engineering</td>
</tr>
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<td>Computer science</td>
</tr>
<tr>
<td>Others</td>
</tr>
</tbody>
</table>

Level of Education of Participants (%) 2004

| Master | 10% |
| Doctoral Student (first half) | 60% |
| Doctoral Student (second half) | 30% |
| Postdoc | 5% |

Summer Schools 2005

Quality of Program, Lectures, Exercises and Rhythm,

- Problem with exercises still remain
- % of very good decreased
Summer Schools 2005

Quality of Side Elements

- In general a little better

Summer Schools 2004

Quality of Side Elements
1. Summer Schools 2004
Costs / Future Editions

Do you like to participate on future editions of EURON Summer Schools?

- Yes absolutely 60% (71% in 2004)
- Probably 38% (29% in 2004)
- No 2% (0% in 2004)

2. Winter Schools 2005/06

- Camp on Rescue Robotics
  - October 29 - November 2, 2005, ROMA, Italy
  - http://sied.dis.uniroma1.it/camp
  - Daniele Nardi

- IURWS-2006 (1st International UMH Robotics Winter School)
  - Telesurgery
  - March 26-31, 2006, Flamingo Oasis Hotel, Benidorm, Spain
  - José María Azorín

Thank you to all organizers, lecturers and participants
**Summer Schools 2006 (first announcement)**

- **2nd Summer School on Perception and Sensor Fusion in Mobile Robotics**
  - September 11 - 16, 2006, Fermo, Italy
  - [http://psfmr06.univpm.it](http://psfmr06.univpm.it)
  - Primo Zingaretti <zinga@diiga.univpm.it>

- **3rd Summer School in Simultaneous Localisation and Mapping**
  - August 27-31 2006, University of Oxford, UK
  - [www.robots.ox.ac.uk/~SSS06](http://www.robots.ox.ac.uk/~SSS06)
  - Paul Newman <pnewman@robots.ox.ac.uk>

- **IURS-2006 (6th International UJI Robotics School)**
  - September, 18-22, 2006 Hotel Bonaire Benicàssim, Spain
  - [http://www.robot.uji.es/lab/plone/iurs06/](http://www.robot.uji.es/lab/plone/iurs06/)
  - Angel P. del Pobil pobil@icc.uji.es

- A 4th Proposal will be invited for a second evaluation

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**Update on Funding Policy**

**Basic Conditions:**

- Sponsoring only possible if you have at least 15 registrations from at least 10 different EURON member institutions.

**Budget Allocation:**

- A maximum of 3 k€ for supporting travel and accommodation of lecturers
- A maximum of 1 k€ for administration and other elements
- A maximum of 200 € per participating student from EURON member institution.
- Maximum: 10 k€ (if 30 and more students)
Ideas for the Future

- Conservation of course material of the summer school
  - Collect it on one Web server
  - Simple structures to access the material
  - Rating based on summer school questionnaire
- Summer school for high-/primary-school teachers
  - Goal: To attract more female students for studies in science and technology
  - Collection of interesting material (mainly videos)
- EURON distinguished lecturer program for high-/primary-schools

Propositions of Students for Future Schools

The key list

- Navigation and Trajectory Planning
- Control and Estimation
- Perception and Sensor Fusion
- Robot design
- Humanoids and Legged Robots
Other Propositions of Students for Future Schools

- Active sensing
- Advanced issues in manipulation
- Applications of Service Robots
- Artificial skins
- Autonomous systems
- Medical, biomedical robotics
- Bionic, Biologically-inspired robotics
- Cognition, knowledge models
- Computer vision
- Developmental Robotics
- Different (fast) learning principles
- Emotions
- Grasping
- HRI Evaluation
- Impact of Software frameworks
- Learning and Evolution
- Mixed Imitative interaction
- Modelling 3D of the environment
- More Affective Computing
- Motion control
- Motion detection and Tracking
- Neuroscience and Robotics
- Object recognition
- Primitives of outdoor recognition
- Qualitative approaches, planning, reasoning
- Robot Architecture (design and implementation)
- Robotic Application to human
- Robotics and AI
- Robotics and Ethics
- Sociable Robots
- Tactile Sensors
- Team Work / Collaboration
- User models
**Dissemination**

**Key Area Co-Chairs**

Bruno SICILIANO  
siciliano@unina.it  
Frans GROEN  
groen@science.uva.nl

With support from

K. KYRIAKOPOULOS  
kkyria@mail.ntua.gr  

J. HALLAM  
john@mip.sdu.dk  

B. HALLAM  
bridget@lions.ukshells.co.uk

Committee Members

W. Burgard, P. Lima, A. Moshaiov, M. Vincze

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**Status & Outlook**

- WP-9 Book series
  - Consolidation of STAR series
  - New handbook project
- WP-10 Web facility
  - Web portal
  - Professional layout and appearance
- WP-11 Information about EURON and *Beyond Robotics*
  - Regular IEEE-RAM column
  - Media and press
- WP-19 European Robotics Symposium – EUROS
  - First edition in Palermo (March 2006)
WP-9 Goal

- Continue and possibly expand success of Springer Tracts on Advanced Robotics (STAR) series (started under EURON-I)
- Publication of best PhD theses (including finalists of annual EURON G. Giralt PhD Thesis Award), monographs and proceedings (including summer schools) into single collection on robotics
- Launch of new project: Springer Handbook of Robotics

Book Series

http://www.springeronline.com/series/5208

- Editors
  - Bruno Siciliano, Frans Groen, Oussama Khatib
- Editorial Advisory Board
  - H. Bruyninckx, R. Chatila, H. Christensen, P. Dario, R. Dillmann (Europe)
  - K. Goldberg, J. Hollerbach, L. Kavraki, T. Salcudean, S. Thrun (America)
  - P. Corke, M. Kaneko, S. Lee, Y. Xu, S. Yuta (Asia/Oceania)
Record

- 22 volumes printed
  - 10 monographs and 12 edited collections
- 15 volumes formally accepted upon peer reviews
  - 12 monographs and 3 edited collections
- 22 proposals rejected
- 6 proposals recommended for revision
- 2 proposals under review
- 13 contacts with potential authors/editors

- 2 annual Editorial Advisory Board Meetings (ICRA + IROS)
- EURON brand now visible both on website and book colophon

Outlook

- Recruitment of new authors
  - High quality PhD theses, workshop organisers and selected themes of interest to research and education
- Aim at publishing 10 new volumes per year
  - Seek for more authors outside Europe
  - Publication of proceedings from summer schools
Editors
- B. Siciliano, O. Khatib

Editorial Board
- D. Orin, F. Park, H. Christensen,
  M. Kaneko, R. Chatila
  A. Zelinsky, D. Rus

Official presentation to community
- San Francisco (ISRR '05)

Organization

7 Part Editors
- Robotics Foundations (D. Orin)
- Robot Structures (F. Park)
- Sensing and Perception (H. Christensen)
- Manipulation and Interfaces (M. Kaneko)
- Mobile and Distributed Robotics (R. Chatila)
- Field, Service and Intervention Robotics (A. Zelinsky)
- Human-Centered and Life-Like Robotics (D. Rus)

65 Chapters
150 Authors
1800 Pages
WP-10 Status & Outlook

- See Bridget Hallam’s presentation
  - …
- How to enrich the website? … ask for content for quarterly newsletter
  - New summer schools
  - PhD defenses in the last 3 months
  - National events
  - New projects started
  - New books
  - PR: interviews in journals, TV, radio
  - Everything you think is important!

WP-11 Goal

- Dissemination of activities and achievements outside European research domain in order to promote further networking
- Continue tri-monthly column in IEEE Robotics and Automation Magazine (RAM) started under EURON-1
- Raising public awareness about EURON and Beyond Robotics
IEEE-RAM Column

- The Institute of Electrical and Electronic Engineers (IEEE) is the largest worldwide professional organization
- Contact with management of IEEE-RAM, an official publication of IEEE Robotics and Automation Society (RAS) read by large international audience of researchers and practitioners (10,000 copies) and having high impact ratio
- Adoption of scheme of publishing 400-500 words column on EURON activities and European robotics research area, edited by K. Kyriakopoulos (NTUA) and B. Siciliano (UNINA) for each RAM issue

Record

- Eight columns
  - [Sep 04] EURON/ERF Technology Transfer Award
  - [Dec 04] Integrated Projects (IP) COGNIRON, I-SWARM, NEUROBOTICS funded under Beyond Robotics
  - [Mar 05] New robotics related initiatives for FP6 Research and Technological Development
  - [Jun 05] Report on annual meeting in Warsaw, including Technology Transfer Award and PhD Thesis Award
  - [Sep 05] Funded Prospective Research Projects (PRP), Research Ateliers (RA), and Topical Research Studies (TRS)
  - [Dec 05] EUROPE Technology Platform
  - [Mar 06] EUROS + EURON Call 3 + IST Call 6 Advanced Robotics
  - [Jun 06] Summer Schools
Outlook

- Continue publication of regular columns
  - Update on IP’s
  - Newly funded PRP+RA+TRS's
  - EUROS ’06
  - …

Media & Press

- Make general public and community at large aware of various initiatives
  - Prepare Information Package
  - Issue periodic press releases, reporting e.g. PhD Award, Technology Transfer Award, IP results
  - Articles and press appearances in general media and popular science publications
Record

- Information Flyer
  - Distributed around at conferences and meetings
- Press Release for Technology Transfer Award 2005
  - Delivered by M. Hägele through DPA channel
- Leaflets
  - One for general public
  - One for scientists
- Media promotion
  - Articles in magazines
  - TV programs
- Science journalists @ EUROS '06
  - 4 Italian + 1 British

Information Leaflet

- Conceived for general public
  - Text by Duncan Graham-Rowe & John Hallam
  - Printed in few thousand copies
Media Promotion

- Articles in Italian press
  - “The invasion of thinking robots” in Tuttoscienze (R. Miceli)
  - “Palermo capital of European robotics” in La Repubblica (R. Miceli)
  - “Robotics in Italy and Europe” by ANSA (E. Battifoglia)
  - “Robots and society” in Il Denaro (B. Siciliano)

- Article in German press
  - “Trends in European robotics” in Handling (E. Heinzelmann)

- TV program on RAI Educational
  - “Talk Show on Robotics” (A. Bonarini, E. Guglielmelli, S. Panzieri, B. Siciliano)
  - “Explora Web” (www.euron.org)

Outlook

- Dissemination to public
  - Keep promoting EURON brand
  - Further press coverage on EUROS '06 and EURON
  - Promotion of robotics science and technology @ open events, e.g. RoboCup, Eurobot, European Science Week, Automatica Fair (PR video in preparation)
  - Summer schools for high-school teachers (?)
  - Post high-school projects on EURON website (?)

- Dissemination to scientists
  - Preparation of technical leaflet
Launch of European Robotics Symposium – EUROS

- Every second year
- Single-track quality event
- Open to international submissions
- First edition in Palermo
  - STAR volume prepared in record time

Ongoing Discussion

- Launch of EURON magazine to reach broader audience (proposal from Atlantis Press)
  - EU and funding agencies to show what is going on in Europe
  - Companies from small to large in the robotics field
  - Act as an initiation for articles by journalist
  - Available in both print and website
  - Professional central editor with local editors
  - Intended to exist after EURON-II … European Robotics Council (?)

- ERCIM has got something similar
Summary

- Status
  - STAR continued with sound publication record
  - Web portal being restructured
  - Enhanced visibility in IEEE RAS and research community
  - Information leaflet
  - EUROS launched

- Outlook
  - Promote Handbook of Robotics
  - Technical leaflet
  - Consolidate press club
The Third EURON/EUnited Robotics Tech-Transfer Award

Palermo, 18 March 2006

Purpose
To enhance excellence in applied research and to raise the profile of technology transfer between research and industry.

Mission
Outstanding innovations in robot technology and automation that result from cooperative efforts between research and industry will be honored. A total of €6,000 will be awarded as well as signed certificates.

Subject Areas
• Robot applications
• Robot developments
• Development of robot components
Industrial Sponsors

1. Stefan Sagert (EUnited Robotics, EU)
2. Henrik Christensen (KTH, EURON, S)
3. Uwe Zimmermann (KUKA-Roboter, D)
4. Martin Hägele (IPA, EURON „Industrial Links”, D)
5. Gisbert Lawitzky (Siemens, D)
6. Roland Siegwart (EPFL, CH)

Deadline: Feb. 6th, 2006
Response: 12 applications, 11 formally o.k.
4 applications selected as “finalists”

Media Coverage: English press-release
### Session:
- 4 * 10 min presentation plus questions
- Criteria
  1. Benefit to industry
  2. Extent and value of the technology transfer
  3. Creativity
  4. Soundness and clarity of the approach
  5. Quality of the overall presentation
- Ceremony 17.45
- Next opportunity for your research:

### The Third EURON/EUUnited Robotics Tech-Transfer Award

<table>
<thead>
<tr>
<th>Presenter</th>
<th>Affiliation</th>
<th>Application-Short-Title</th>
</tr>
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<tbody>
<tr>
<td>Paulo Alvito</td>
<td>Idmind (Portugal)</td>
<td>RAPOSA: A Semi-Autonomous Robot for Rescue Operations</td>
</tr>
<tr>
<td>Etienne Dombre</td>
<td>LIRMM (F)</td>
<td>Autonomous Underwater Vehicle: TAIPAN-H160</td>
</tr>
<tr>
<td>Daniel Lecking</td>
<td>University of Hannover (D)</td>
<td>The RTS-STILL Robotic Fork Lift</td>
</tr>
<tr>
<td>Michael Gauss</td>
<td>University of Karlsruhe (D)</td>
<td>ARIKT</td>
</tr>
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