



eu
Robotics
coordination action

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“European Efforts in Strengthening Academia-Industry Collaboration”
Workshop at IROS 2011, San Francisco, 30/09/2011

Introduction of this session

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- Goal of this session: Exchange experiences on how to strengthen academia-industry collaboration
- Step 1: Brief summary of what has been discussed today
 - Potential benefits of collaboration
 - Approaches from Europe and elsewhere
 - Lessons learned
- Step 2: Moderated discussion on various related topics
 - What can be done to improve academia-industry collaboration?
 - Discussion of approaches discussed and others you know about
 - How can funding support this process?
 - What is best practice?
 - At which Technology Readiness Level (TRL) should TT happen?

Potential benefits of close collaboration

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- Better understanding of
 - The needs of industry
 - The offerings of academia
- This can result in
 - Research more industrially relevant
 - Technology transfer from academia to industry
 - More money for research
 - More advanced products
 - Imp. aspects: “how to manage the knowledge transfer” & “people transfer”
 - Less duplication of work
 - More Spin-offs / start-ups

Summary of European approach

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- Steps taken in euRobotics
 - Identify gaps of understanding & initiate measures to overcome them
 - Maintain and implement Strategic Research Agenda
 - Training for industry
 - Fostering entrepreneurship
- ECHORD
 - Small scale projects (→experiments) involving industry & academia
- FP7 / National funding
 - Calls partially based on roadmaps from industry and academia
 - Frequent consultations of representatives from both communities
 - Encouragement of industrial participation often with end user

Lessons learned in Australia

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- Technology addressing an unmet business need
- Making it work robustly in the real world is hard!
- Start up in niche/new markets, license if established markets (non-exclusive licenses where possible)
- Key points/requirements:
 - Smart money & realistic market valuation with a good business plan
 - It's all about the people and building the best teams
 - Focused science and technology → unencumbered & mature IP
 - Collaboration with partners in innovation, industry & standardisation
 - Know your global competitive advantage and how to maintain it
 - Brilliant execution of great plans is mandatory
 - Embrace risk and a “whatever it takes” attitude

Lessons learned with the LWR

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- Intensive and exclusive collaboration
- Need to transfer people
- Strong patents
- Spin-out of required technologies not in the focus of industrial partner
- Continuing interest of academic partner
- Building the market / integration into product line

Lessons learned in the US

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- Communicate in the language of those you want to address → show that you can address a important problem
 - In the US: money, jobs or security
 - Products that people care about
- Try to find a model which suits stakeholders
- Constraints of market are relevant to research (e.g. \$12 for HW)
- Make technology accessible to people (some uneducated)
- National Robotics Week great for society support
- New robotics network: Robotics-VO
- Robotics business competition
- Set up pipeline so that the right people talk to each other

Lessons learned in ECHORD

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- Consider the market and potential products
- Consider the timeline and industrial requirements
- Geographical closeness is an advantage
- Keep the company involved at all times
- Reduce HW dependence → use HW specified by industry
- Make technology accessible to industry e.g. SW tool
- Set up strategic partnerships
- Industry may not see all benefits that robotics offers
- Overcome barrier between company and academic R&D
- Help those in the industry to think outside the box

Lessons from the EFFIROB Study

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- Need to carefully evaluate market and development costs
- EFFIROB tool/methodology can be used by:
 - Academia to convince industry → speak money
 - Industry to calculate cost of Service Robots
 - Consortia to evaluate the commercialisation potential for research
 - Funding agencies to evaluate where to set long term focus
- “Economy of scale” has less leverage often quoted
- Sometimes robotics needs new business models

Lessons learned at BOSCH

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- Go from “it worked a few times” to “works reliably in many different circumstances”
- ROS / BOSCH's participation in PR2 program
 - Academia and industry at one table
 - Implementations of algorithms available (formerly “only” in)
 - Interaction between sites
 - Exchange of code
 - Re-useability of results
- What's missing
 - Quality (software metrics)
 - Reliability

Lessons learned at Willow Garage

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- Industry hat: transfer technology to academia by:
 - Build hardware with industrial methods & to industrial standards
 - Mentor interns and host visiting scholars (e.g. value of unit testing...)
- 1/2 - 1/2 hat: transfer technology to both communities:
 - Develop, distribute, and support open source software platforms
 - Create a community for academic and industry partners alike
- Academia hat: transfer technology to industry:
 - Develop and distribute robust implementations of important algorithms → use in commercial products (even stuff from textbooks)
 - Commercialise technology through spin-offs (keep competitive advantage through first entry and choosing what to keep secret)
- Create an environment for people to work with (like Android)

Discussion...

How to improve understanding between academia and industry (1/3)

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- Industry may not be so willing to put their topics onto the academics agenda as they would reveal their strategy
- Develop realistic expectations for technology transfers and collaborations (probably on both sides)
- Industry needs to participate in research to a certain extend to understand academia (and vice versa)

How to improve understanding between academia and industry (2/3)

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- „Yellow pages of robotics“ → find the experts on both sides
 - How to build yellow pages
 - From conference proceedings; understanding needed to evaluate quality
 - Hard to capture all relevant topics and people
 - Give the experts a platform to provide information about them and their technologies / content
 - Problems with yellow pages:
 - May help industry to find a set of experts → but how to identify the most suitable one(s)?
 - Even with Yellow Pages you need the network

How to improve understanding between academia and industry (3/3)

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- Discuss to understand the positions in the context of a technology or problem (@ workshops)
- Improve understanding of each others problems via media
- Communicate from industry towards academia
 - Communicate (product) visions and the related needs
 - Challenges set by industry (e.g. navigate in environment X)
 - Establish repository of industrially relevant datasets
- Communicate from academia towards industry
 - Industrial training → acad. teaches industry how to use results
 - Tell industry what you have to offer

How to get industry and academia to work together

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- US project offices compiled a list of gaps for academia
- Academic results in a context industry understands?
- Common projects (e.g. ECHORD, funded research...)
 - Arguments in the context of “length of project”:
 - Short: validate technology quicker; good if proposal is less work; not long enough to really create value (e.g. new technology...)
 - Long: team might change too much
 - One approach: start with a short project (e.g. intern) with a focus and then build a longer project on that (maybe 10% turn into long projects)
 - Getting academia to do something short-term if you have money is easy.
 - Dating agency –increase success rate and decrease overhead
 - If academia offers to write the proposal then industry is often willing
- How to stimulate joint projects (independent of funding)

How to help start ups

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- Help for start-ups focused on robotics
- Find the person on the technical team who has or is happy to develop the business sense
- Ensure start up is user focused (internal & external users)
- Build tool box “to pick things up from” if you have an idea
- VC with focus on robotics (e.g. from within “mother ship”)
- Get VC to give talks to those most likely to start companies
- Facilitate “buying the bits you need” (e.g. “the navigation”) → need for standardisation

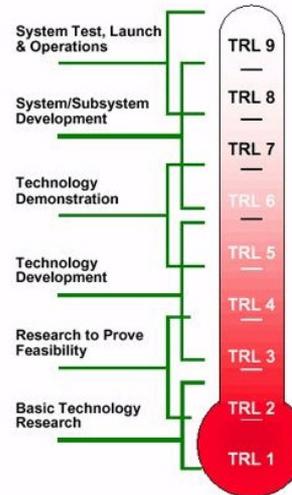
How can funding support this process?

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- Design calls
 - To stimulate cooperation & communication
 - Aim for mixed projects (industry and academia collaborate)
 - Content industrially relevant
 - Involve end users / consider exploitation strategy
- ECHORD style experiments
- Try to close the gap between academic research (TRL X) and industrial development (TRL Y).

At which Technology Readiness Level (TRL) should TT happen?

- To which TRL should academia develop?
- From which TRL can industries development departments pick up the baton?



European Robotics Week

- 28 November – 04 December 2011
- www.robotics-week.eu
- Your idea! Anything (robotic related) goes...
 - E.g.: open houses, lab tours, exhibitions, workshops / public talks / discussions, targeted educational reachout-activities (at schools, universities), challenges / competitions, media events...
- Locally organised (by a scientist, lab, teacher, school, robotics engineer, robot maker etc.)
- Centrally marketed by euRobotics (locally also by you)
- Deadline for submission of events passed, so be quick!

The European Robotics Week is supported by euRobotics European Robotics Coordination Action, funded by the European Commission (FP7-ICT-244852; 01/2010 – 12/2013)

Thank you!

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■ 30/09/2011 ■ IROS WS industry-academia collaboration

European
ROBOTICS
Research
Network
EUROPE

■ european
robotics
technology
platform