GEMBENCH 09

Standards for Service Robots
Why, How, When

Gurvinder S. VIRK
Clawar Ltd, UK
School of Engineering and Advanced technology, Massy University, Wellington, New Zealand

Seungbin MOON
Department of Computer Engineering Sejong University, Korea

Rodolphe GELIN
Aldebaran Robotics
Why Standards for Service Robots?

- **Some current standards on robots are obsolete**
  - Meant for industrial robots
  - Technology has changed

- **Industry needs standards**
  - There will be an industry of service robots
  - Standardisation of components
  - Benchmarking
  - Safety issues

- **But**
  - Standards could be a constraint for development
  - Industrial feedback does not exist yet
  - It could be too early
What is a Service Robots?
What is a Service Robot?

- **Robot that provides service outside industrial automation applications**

- **Industrial robot**
  - Multipurpose robot, programmable in three or more axes, for use in industrial automation applications
How do you do a Standard?

- You ask ISO if someone works on the subject
  - ISO TC184 / SC 2: www.isotc184sc2.org
  - Technical Committee 184: Industrial Automation System and Integration
  - Sub Committee 2: Robots and robotic devices

- You propose ISO to change the current standard
  - ISO asks an Advisory Group (AG1) to think about it
  - Advisory Group says to create Project teams on important subjects
    - PT2: Safety Standards for Service robots in Personal Care
    - PT3: Vocabulary on robots and robotic devices
  - Project teams produce a Committee Draft to propose a Work Item to ISO
  - Based on this CD, ISO proposes a Draft International Standard (DIS)
  - After discussion of the DIS, publication of the new International Standard (IS)

- How to write a Committee Draft?
  - Read everything has been written in the world on the subject
  - Select what you prefer
  - Suppress what you don’t like
  - Write what is missing
What has been done?

**Meetings**
- 8 for AG1 (Seungbin Moon)
- 7 for PT2 (Gurvinder Virk)
- 5 for PT3 (Rodolphe Gelin)
- People from Korea, Japan, UK, Germany, France, USA, Sweden, Italy
- All over the world
- Connection with existing PT1: Industrial robot – 10218

**Reorganisation**
- WG1 replaces PT3: Vocabulary
- WG3 replaces PT1: Industrial Safety
- WG7 replaces PT2: Personal Care Safety
- WG8 replaces AG: Service Robots
Advisory Group (now WG8)

- **Creation of two project teams**
  - PT2 : Safety for Personal Care Robots (now WG7)
  - PT3 : Vocabulary on Robots and Robotic devices (now WG1)

- **Other subjects to be considered**
  - Roadmap for standardization for service robots
  - Ethical issues
  - Farm animal handling
  - Performance of service robots
  - Robot modularity
Working Group 1: Vocabulary

- Identification of existing documents
  - ISO8373, Korea, Japan, ANSI
  - Rosta, Euron, CARE

- Merging, organizing, cleaning, selecting, rephrasing, changing...
  - General Terms (France)
  - Classification (Korea)
  - Mechanical Structures (Germany)
  - Geometry and Kinematics (UK)
  - Mobility (Japan)
  - Manipulation (Japan)
  - Programming and Control (UK)
  - Perception and sensing (France)
  - Autonomy and Learning (Sweden)
  - Safety (Korea)
  - Performances (Germany)
Some examples

- **Robot**
  - 1. automatically controlled, reprogrammable manipulator or mobile mechanism, with a degree of autonomy, programmable in more than one axis, to perform an intended task.
  - 2. automatically controlled, reprogrammable manipulator or mobile mechanism, programmable in more than one axis, to perform an intended task.
  - 3. automatically controlled, reprogrammable manipulator or mobile mechanism, to perform an intended task.

- **Mobile Robot**
  - Robot able to control the motion of its base in the world coordinate system.
  - Instead of “which carries all of the means needed for its monitoring and movement”

- **New definitions**
  - Holonomic, non-holonomic
  - Body center

- **Deleted definitions**
  - Playback robot: playback is a function not a characteristic
  - Fixed sequence manipulator: it is not a robot anymore
Working Group 7: Safety for Personal Care Robots

- Non-invasive robots
  - Medical robots
  - Mobile servant robots
  - Physical assistance supplementation robots
  - Physical assistance augmentation robots
  - Personal care robotic devices

Table of Contents of Committee Draft Document
- Section 3 - Terms and definitions (all)
- Section 4 - Hazard Identification and Risk Assessment (Japan)
- Section 5 - Safety Requirement (UK)
- Section 6 - Protective Measures (Korea)
- Section 7 - Verification and Validation (Korea)
- Section 8 - Information for Use (UK)
- Annex A: List of Significant Hazards (Japan)
Working Group 7: Vocabulary for Service Robots

- **Personal service robot** is a service robot for personal use, ie, a robot used in non-commercial situations
- **Professional service robot** is a service robot for professional use, ie service robot used in commercial situations
- **Domestic robot** is a service robot used in a domestic environment
- **Personal care robot** is a service robot with the purpose of either aiding actions or performing actions that contribute directly towards the improvement of the quality of life of individual.
- **Physical assistant robot** is a personal care robot which assists a person physically, to perform required tasks, by providing the capabilities needed
- **People carrier robot** is a personal care robot for the purpose of transporting people
- **Mobile robot** is a robot able to control the motion of its base in the world (or absolute) co-ordinate system. Note: mobile robot can be with, or without, a manipulator.
Agenda

**WG1: Vocabulary**
- Committee draft: June 2009
- Draft International Standard: March 2010
- International Standard publication: beginning of 2011

**WG7: Personal Care Safety**
- Committee Draft: November 2009
- Draft International Standard: May 2010
- International Standard publication: summer of 2011
Conclusion

- A lot of work has been done and still has to be done

- Industry usually carries out standardisation work
  - But industry is too young
  - And work has to progress

- Research community has to commit in this task