

SPEAKY for Robots

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SPEAKY for Robots

Robot, present
SPEAKY for Robots

That was not
what I expected...



SPEAKY for Robots
is cool!!!

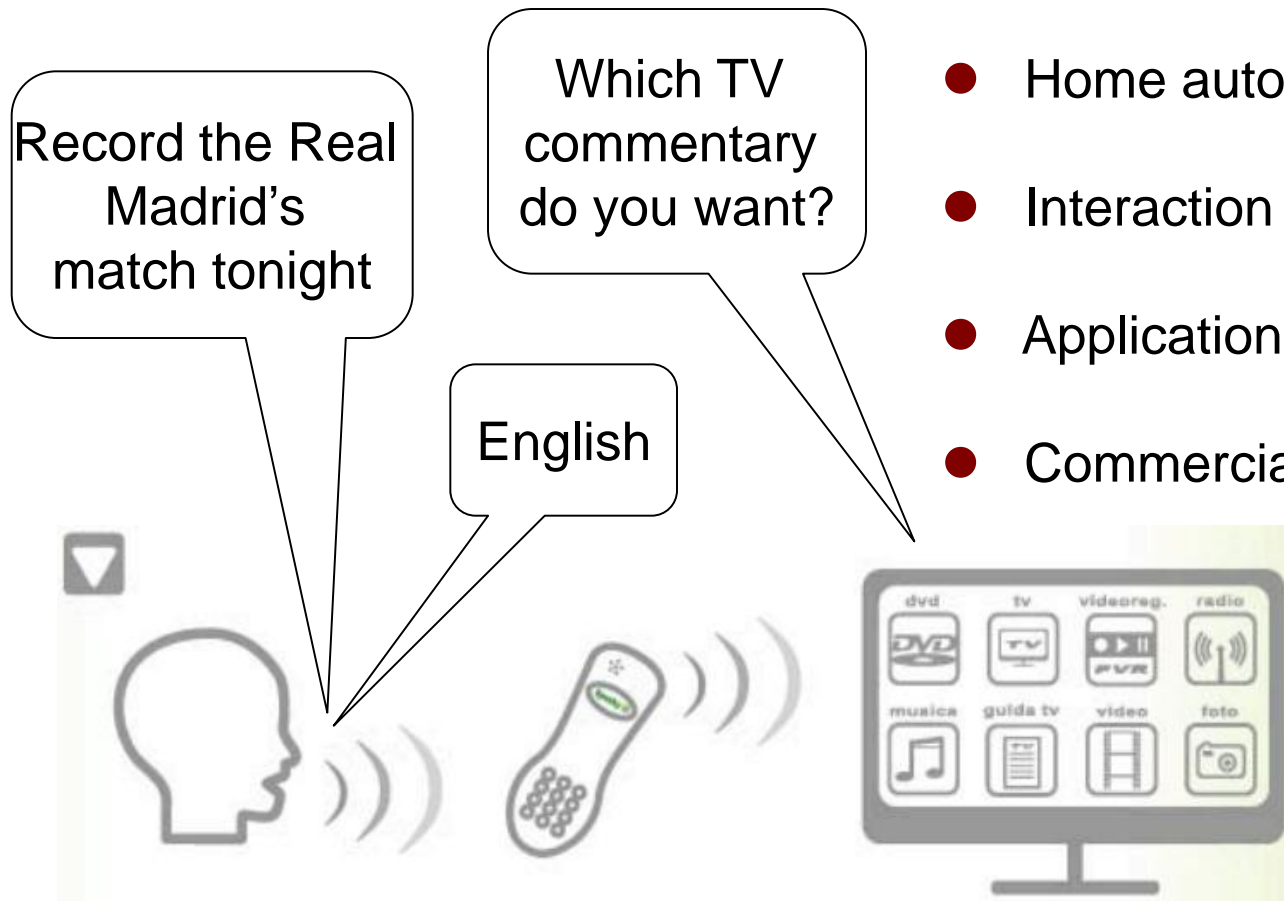
Would you prefer
"message not recognized"?



Vision

- **Knowledge transfer** of commercial speech technologies into robotics
- **Framework** development for the semi-automatic and agile definition, generation and deployment of voice user interfaces (VUIs) for robotic applications
- Joint speech and robotic technologies transferred back to the market

Industrial Products: SPEAKY



- Natural language
- Home automation
- Interaction with consumer devices
- Application independent
- Commercial-off-the-shelf

Industrial Products: SPEAKY

- ASR based on Hidden Markov Chains
- No training
- Interaction modeled through dictionaries and grammars
- Handheld controller



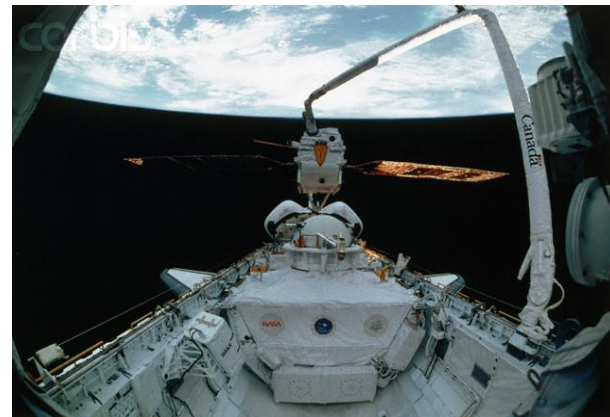
Academy Research: Human-Robot Co-Worker

Massive robot deployment in **everyday activities...**



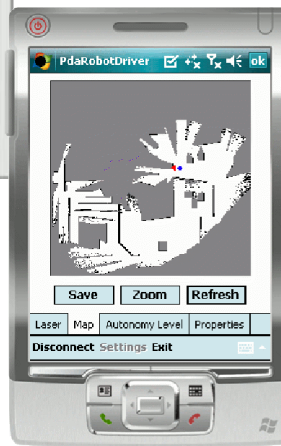
Academy Research: Human-Robot Co-Worker

... and in challenging applications where the **human role is fundamental**



Academy Research: Human-Robot Co-Worker

“We investigate how to enable natural human-robot interaction by transferring innovative interaction means into robotics”



SPEAKY for Robots

<http://s4r.dis.uniroma1.it>

Making commercial speech technologies easily available in robotics...

SPEAKY

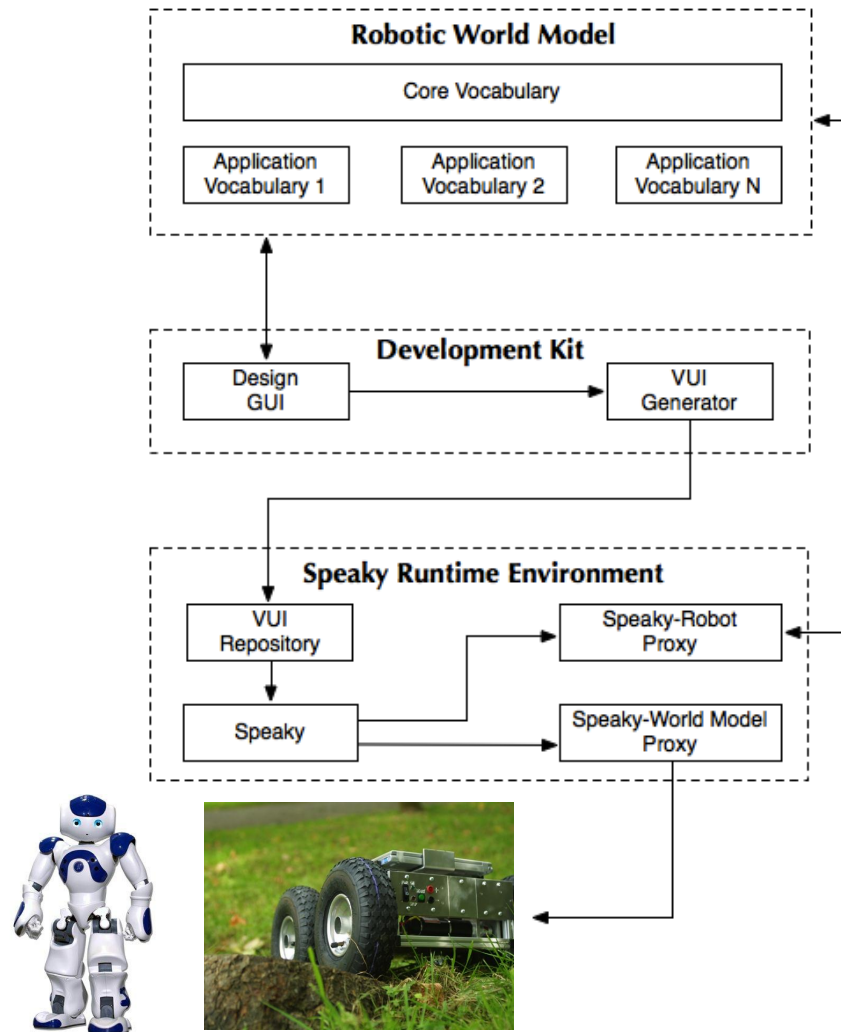


Joint Enabling Technology

...and promoting the *joint development* of robotic technologies ready for consumer market and manufacturing

- **Not** yet another implementation
- Robotic Voice Development Kit
- **Rapid** semi-automatic voice user interface generation
- **Configurable** for different robotic domains
- **Support** for non expert users

System Architecture



Challenges and Solutions

“Speech systems in robotics are ad-hoc implementations”

S4R does not aim at developing any specific implementation, rather provides a ***development framework*** to ease VUI design and generation

“Robotic domains are challenging with respect to other applications”

S4R provides both core and application-specific robotic knowledge, hence ***lowering modeling effort*** of end users, and enabling the use of speech interfaces for robot control

Challenges and Solutions

“Human-robot interaction requires extensive and expressive natural language fragments”

S4R encompasses different techniques for the world model: ***vocabularies, lexical databases*** (e.g. FrameNet), ***advanced grammatical structures***, pragmatics.

“Today voice user interfaces are manually designed and require complex knowledge”

- graphical design environment for easy VUI modeling
- graphical widgets and wizards for step-by-step design
- automatic grammar generation for Speaky

Work Plan

	FTE Months			Partner	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18
	MV	UR1	TOTAL																			
Task 1		6	8	UR1	1.5	1.5	1.5	1.5														
	2			MV	0.5	0.5	0.5	0.5														
Task 2		3	11	UR1		1	0.5	0.5	0.5	0.5												
	8			MV		2	1.5	1.5	1.5	1.5												
Task 3		3	17	UR1						0.5	0.5	0.5	0.5	0.5	0.5	0.5						
	14			MV						2	2	2	2	2	2	2						
Task 4		9	12	UR1								0.5	0.5				1.0	1.0	1.5	1.5	1.5	1.5
	3			MV													0.5	0.5	0.5	0.5	0.5	0.5
	27	21	48																			

Legend:

- Leader Participant
- Mid-term Milestone
- Final Milestone

- 18 months
- 4 Tasks
- Two milestones
- User-centered validation
- Continuous experimental evaluation
- 2 demonstrators: *home services* (Nao), *outdoor robotic surveillance* (VolksBot RT6)

Thanks!
Questions?

Partners

Sapienza University of Rome

<http://labrococo.dis.uniroma1.it>



RoCoCo Laboratory (Cognitive Robotic Teams) research aims at the development of autonomous and cognitive robotic systems

Domains:

- Search and Rescue Activities
- RoboCup
- Large-scale Monitoring and Assessment
- Service Robotics

Topics:

- Cognitive Robotics
- Multi Robot Systems
- Software Development
- Human-Robot Interaction

Partners

Mediavoice

<http://www.mediavoice.it>



Innovation to live!

Mediavoice Mission is to reduce the digital divide, enabling users to interact with the digital world towards the development of new speech enabled solutions. Mediavoice has developed an extensive experience in research and innovation in the field of speech technology.

