



SRS

Multi-Role Shadow Robotic System for Independent Living

Small or medium scale focused research project (STREP)

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1 INTRODUCTORY SECTION: PURPOSE OF DOCUMENT AND CONTENTS

This report is enclosed under the Dissemination and Exploitation Workpackage of SRS project. The objectives of this WP are

- To disseminate widely information on the problems to be addressed, the existence of the project and its results and achievements, through effective multimedia dissemination material
- To raise awareness about the possibilities offered by SRS by direct contact with potential user groups, care organisations, and others
- To promote and exploit the project results.

This report on raising public participation summarises the SRS project main activities making the project and its outcomes public.

One of the activities carried out within WP7 is the participation in international robotics and assistant technology conferences to promote SRS results. At this deliverable the most important events where SRS project has been presented are explained.

2 SRS MAIN PUBLIC EVENTS

2.1 IJCAI 2011

The twenty second International Joint Conference on Artificial Intelligence, the main international gathering of researchers in AI. was held in Barcelona in July 2011 (1).

Robotnik which attended as an exhibitor had the chance to spread more than 1500 leaflets of SRS to the participants of the event. The banner of SRS project was also visible during the whole length of the exhibition, as shown in the next figure:



Figure 1. SRS presentation at IJCAI 2011

2.2 BULGARIAN NATIONAL PARLIAMENT

SRS was presented at the Bulgarian National Parliament in the frame of Exhibition of the Bulgarian Academy of Sciences (2).

The Exhibition took place in the big foyer and in the presence of majority of deputies. It was opened by the Head of the Parliament Mrs. Cecka Cacheva and the President of BAS Academician Nikola Sabotinov. Mrs. Cacheva mentioned the important role of BAS for the development of the national economy, science and culture, using European and National funds.



Figure 2: Presentation of SRS project at Bulgarian National Parliament

2.3 IROS 2011

The IEEE/RSJ International Conference on Intelligent Robots and Systems was held on September 2011 in San Francisco, California (3).

The SRS project took part in the “standard robot demonstration” and demonstrated first outcomes from the project. The idea of the standard robot demonstration was to have multiple groups showing their research on a single “standard” platform, which was in this case Care-O-bot (4). Care-O-bot was provided by Fraunhofer IPA at the conference exhibition area and was used by four groups demonstrating their current research.

The SRS demo was entitled: Semi-autonomous Tele-Operation Interface for Robotic Fetch and Carry Tasks.

The demonstration focused on remote user interface such as Apple IPAD to tele-operate robot semi-autonomously. It enabled non-expert users taking charge of the robot around the home.

The SRS consortium showed the usage of the UI_PRI on Care-O-bot where the robot could be sent to a new location using a graphical user interface on the iPad. Besides this live demonstration on the hardware a poster with the ideas and goals of the SRS project was presented to the visitors. There was quite a big interest by the audience, which were mainly scientific participants of the conference from the robotics community from all over the world.





Figure 3: SRS Demo at IROS 2011 using the COB3

2.4 EUROPEAN ROBOTICS WEEK

Partner ISER-BAS organized a special session devoted to the SRS project, as well as demonstration on the exhibition site of the UI_PRI and MRS controlling the Care-o-Bot 3 simulation at the National Conference of “Service Robotics 2011” organized in the frame of the European Robotics Week (5).

In the SRS session next was presented:

- Presentation “Multirole Shadow Robotic System for Independent living” by Dr. Nayden Chivarov, reporting what the project is, which are the participants, movie of the SRS demonstrator – Care-o-Bot 3 etc.
- Presentation “UI_PRI for the SRS project” by Phd. Student Daniel Radev, reporting the main features of the SRS UI in development by ISER-BAS
- Presentation “Mixed Reality Server for the SRS project”, by Phd. Student Vladimir Vladimirov, reporting the development of this component for the SRS project.

It is noteworthy that SRS project caused a lot of interest among the Bulgarian Robotics Specialist, University students and Hobbyists.



Figure 4: SRS at Bulgarian European Robotics week

2.5 IZA CENTER

As a way to start promoting SRS outcomes at care-giving institutions, the 2nd year project review meeting was held at Ricardo Bermingham Hospital in San Sebastian, Spain. Next to it there is the IZA Center which is a caregiver center for severe unpaired people.

SRS project was introduced to the persons in charge of the hospital and the IZA center, and the SRS consortium members were showed the main facilities in where the outcomes from the project might be applied in the future



Figure 6: SRS at Ricardo Bermingham Hospital and IZA centre

Previous to the SRS project review meeting, the IZA centre was the location of the first SRS outcomes trials with real users. Two scenarios were tested:

- SRS Manipulation test scenario: A robotic arm simulating the COB3 arm grasps and object in the nearby of and elderly:



Figure 7: SRS manipulation trial workbench

- SRS visualization test scenario: professional operators used the UI_PRO for robot visualization and performed a grasping task:

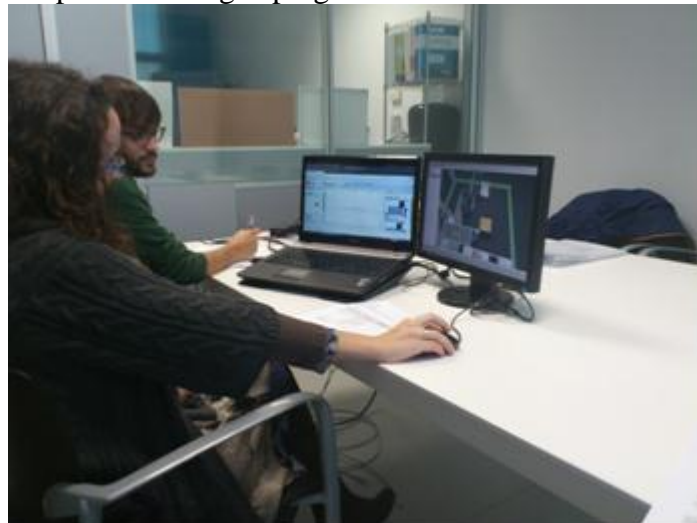


Figure 8: SRS visualization trial

2.6 SRS ETHNOGRAPHIC RESEARCH

In this research, 5 interviews conducted by FDGCO and 10 interviews conducted by Ingema were reported, including home visit descriptions to frail elderly people's houses, tasks about daily living activities and picture taking procedures. Results showed that frail elderly people living alone have age-related sensorial and osteoarticular problems limiting mobility, and also chronic health conditions. Houses are usually furnished with ornaments and carpets making difficult for the robot to circulate; some of the houses have also narrow corridors or rooms. The performance in the Activities of Daily Living is limited by those problems. They require assistance and different activities; in this sense, gender is a relevant variable, with woman better coping with housekeeping tasks. Management of risk situations is one of the better accepted functionalities proposed, especially regarding feelings of fear about falling



Figure 9: some pictures from the Ethnographic research

2.7 SRS INTERFACE TEST

Some tests were done over the SRS interfaces UI_LOC and UI_PRI in order to determine the initial “feelings” of both the elderly people and the family member when using the corresponding SRS interface. Next pictures show some of these tests:



Figure 10: Robot got milk for the elderly based on the request sent from the smart phone (UI_LOC)



Figure 11: SRS remote user interface on an iPad (UI_PRI)

2.8 SRS ROBOT TEST IN A REAL FLAT

The main objectives of this test were to identify technical problems when operating the robot in a real home environment and to get feedback from potential elderly users on their perception of the robot in their home.

The test was carried out in two apartments of the same house located near Stuttgart, Germany. Two elderly people (1 female, age 80; 1 male, age 81) live on the ground floor where the robot was deployed. For UI_PRI operation, a remote operator (grandchild, female, age 30) controlled the robot from another apartment upstairs in the same house.

The test duration was 1 ½ days including setup and removal of robot and equipment. There were two test trials with elderly people, one involving a remote operator. Two interviewers were attending to the participants, corresponding to two usage scenarios:

- Scenario 1: An elderly person was sitting on the couch and used a handheld interaction device to make the robot fetch a book from a locker in the dining room. However, the robot failed at executing the task (this failure was planned / simulated) because a stool hindered appropriate path planning for delivering the object to the user. Therefore, a remote operator (located in another apartment) was called and remotely navigated the robot to deliver the book.
- Scenario 2: An elderly person was in bed and the robot fetched a medicine box from the window sill in the kitchen.

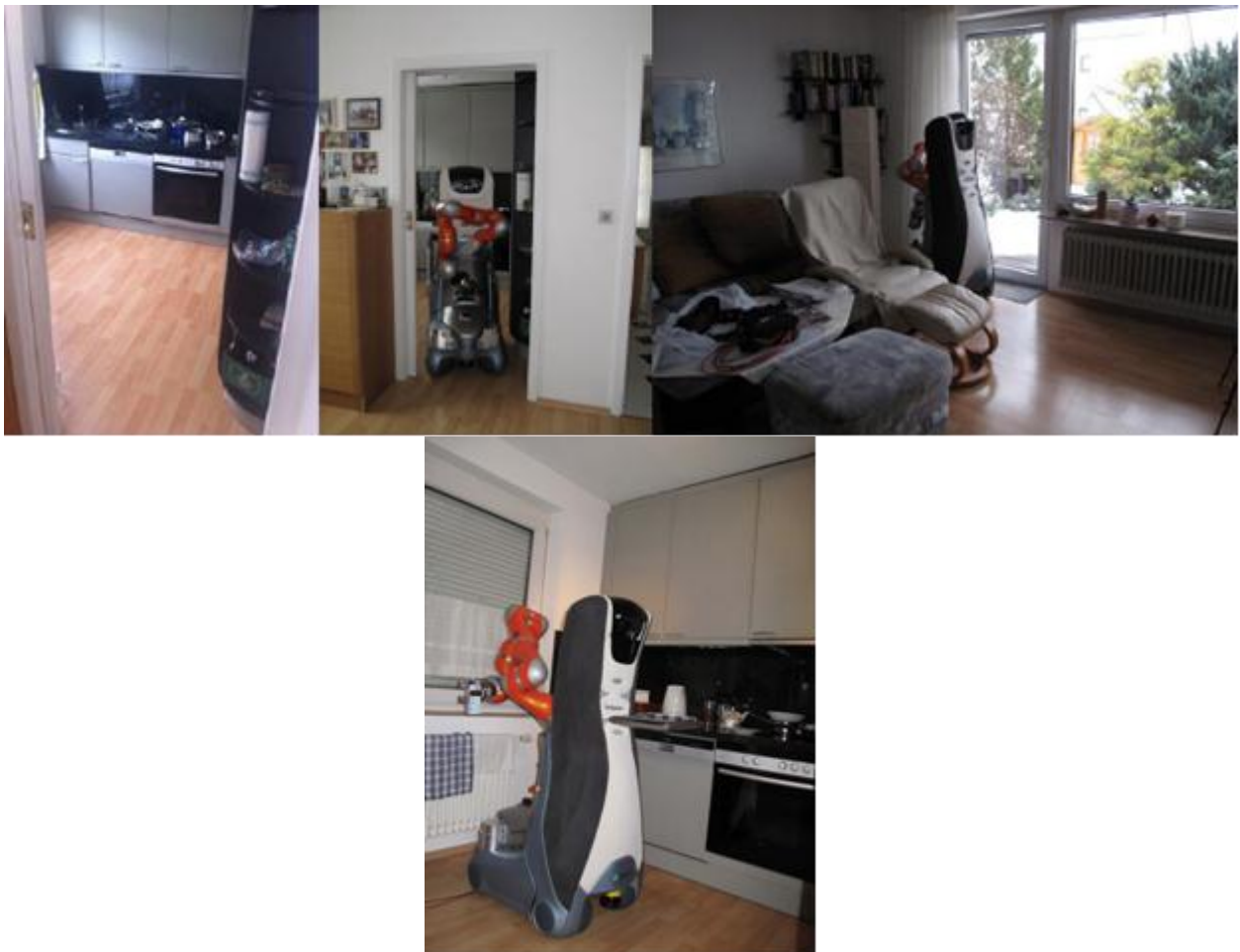


Figure 12: Robot working on a real flat

2.9 DAY OF RESEARCH AT STUTTGART MEDIA UNIVERSITY

Stuttgart Media University's annual "Day of Research" - an event to showcase ongoing research - took place on June 22, 2011. The purpose of this event is for the public, for other researchers, and for students to gain insight into the activity fields, to foster collaboration and inspiration. Prof. Michael Burmester from Stuttgart Media University's User Experience Research Group gave a speech on human-robot interaction in the SRS project. In a separate demonstration room, the SRS challenges associated with designing appropriate human-robot interaction for elderly people and caregivers were showcased by Marcus Mast. Visitors experienced hands-on demos of point cloud-based 3D remote interaction and the problems associated with remote robot navigation and telepresence.



Figure 13: HdM's Day of Research

3 OTHER EVENTS

The SRS project has been presented in many different meetings and conferences as:

- Antony Soroka (CU), Semi-autonomous Robot for Elderly Care FP7 consultation meeting on Service and Social Robotics for the Ageing Population
- Prof. Carsten Maple (BED), Assistive Technologies for the Elderly and Infirm first International Conference on Integrated Intelligent Computing (ICIIC2010), August 05-07, 2010, Bangalore, India (<http://www.dline.info/iciic2010/keynote.php>)
- Juan Bosca (ROB), IEEE International Workshop on Safety, Security and Rescue Robotics in Bremen, at Jacobs University
- Roberto Guzman (ROB), Presentation of Robotnik projects at National Conference of Robotics, University of Malaga
- Roberto Guzman (ROB), Presentation of Robotnik projects at XI Workshop of Physical Agents 2010, Politecnic Univ. Valencia
- Juan Bosca (ROB), Presentation of Robotnik products and projects 2010 Robotics: Science and Systems Conference, University of Zaragoza
- Miguel Moreno (ROB), Presentation of Robotnik products and projects, Dec-2010 IRI (Robotic and Informatic Institute)
- Renxi Qiu presented SRS project in European Robotics Forum at the workshop of "Assistance robots for the elderly" in Västerås, Sweden
- Lucia Pigni (FDGCO), AAATE 2011, 31 Ago-2 sept, Maastricht, "Tele-operated robots in elderly care at home: a survey on needs and perception of elderly people and caregivers". The SRS paper was selected as one of the 10 best paper of the conference.

SRS at Media and other publication:

- 1st March 2010, HdM Michael Burmester SRS Press Release on HdM website including an interview of Prof. Michael Burmester
- 2nd March 2010, PROF Andreas Pichler OÖ Nachrichten - Rollstuhl mit integriertem Autopilot soll Benutzer sicher ans Ziel bringen - SRS project is also mentioned in this article
- 1st March 2010, Stuttgart Media University Michael Burmester Michael Burmester, course on scenario-based design with SRS as the design subject

- January 2010, Linköping University Marcus Mast SRS Project concept and innovations guest lecture (2x) at Linköping University
- 12th April 2010, Stuttgart Media University Marcus Mast & Michael Burmester Research colloquium speech by Marcus Mast and Michael Burmester on SRS Robotic concept and focus group

4 REFERENCES

- (1) <http://ijcai-11.iiia.csic.es/>
- (2) <http://www.bas.bg/cgi-bin/e-cms/vis/vis.pl?s=001&p=0361&n=17&g>
- (3) <http://www.iros2011.org/>
- (4) <http://www.care-o-bot.de/english/>
- (5) <http://www.eurobotics-project.eu/eurobotics-week/index.html>