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Dissemination plan

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Glossary of Terms

ECHORD++: European Coordination Hub for Open Robotics Development Plus Plus (E++ for short)

1 Introduction

In parallel to the technical work, the CLARC team has addressed several initiatives for disseminating the ideas and obtained results during all phases of the project. These activities were catalogued as mandatory and optional actions in the Dissemination plan proposed in November 2017. Moreover, they can be grouped in seven dissemination categories as listed in Table 1. In the table, we resume the main outcomes obtained in all listed categories. All mandatory actions were completed. The items on the table will be detailed in next Sections on this document. Apart from the specific activities described on the table, the CLARC project opened a website, http://www.clarc-echord.eu/, where we provide general information about the project and update significant news.

Table 1: Dissemination categories

Category	Significant outcomes
Associations	Residence SARquavitae (Seville) Les Arcades, Le Providence (Troyes) Phase III - Retirement homes and Care centres (Seville)
Trade fairs	Participation in the AUTOMATICA2018 fair Participation in the MEDICA2018 fair
Newspapers	L'Est Eclair – January 23, 2017
Radio, Television	Canal32.fr (FR, January 2017) France3-regions (FR, January 2017) Canal Sur (SP, November 2017 and September 2018) RTVE (SP, September 2018)
Conferences	Participation in WAF2016 Participation in ROMAN2017 Organization of a Special session in ROBOT'2017 Organizacion/participation in Workshop REACTS'2017 Participation in PlanRob2017 Participation in ROMAN2018 Organization/participation in WAF2018 Keynote presentation in 6th World Convention on Robots and Deep Learning 2018
Scientific journals	One published paper in Cognitive Systems Research (Elsevier) Two published papers in Pattern Recognition Letters (Elsevier)
Additional activities	Participation in IROS2018 Participation in II Conference about Ageing and Dependency

Although the dissemination activities were addressed from Phase I, Phase III has meant a great deal of effort. In June 2018, our team participated in the Automatica fair in Munich. For the end of September 2018, the CLARC solution was presented in the II Conference about Ageing and Dependency, held in Jaén (Spain). From there, our robot travelled to Madrid, to participate in the IROS 2018 conference. In November 2018, the robot was again packed to travel to Dusseldorf, to be presented in the Medica 2018 fair. Our proposal has been also visible in national and regional television news. Finally, three journal papers have been published this year in Cognitive Systems Research and Pattern Recognition Letters.

2 Associations

Our technical developments have been checked with end-users from associations in close contact with the elderlies. These contacts were located in the Andalusia (Spain) and Aube (France) regions.

The Andalusian community presents a diverse variety of day care centers and residences for the elderly partially funded by the Andalusian Government. Representing the Virgen del Rocio University Hospital (as a member of the Andalusian Public Health System (SAS) and belonging to the Regional Government of Andalusia), several day-care centers were contacted by email and / or telephone. For November 2017, a Co-operation agreement with the residence SARquavitae (Seville) was signed, and the CLARA robot was tested there in a short-scale pilot before the evaluation of Phase II. For the pilot of the platforms during Phase III, other agreements were formalized with the social centres of San Nicolás in Cantillana (Seville) and Mairena del Aljarafe (Seville), and with the Retirement homes in Mairena (Seville) and El Viso del Alcor (Seville), where the platforms are being tested. In addition, they are also being tested in the day-care centres of Bormujos (Seville) and Puebla de los Infantes (Seville).

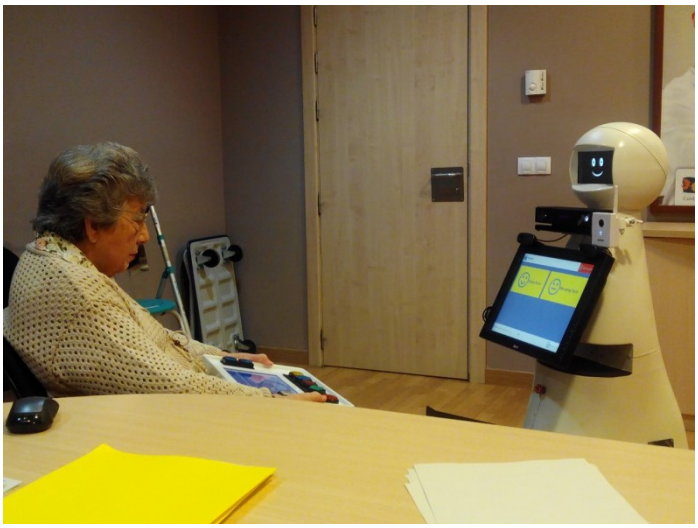

Figure 1: The CLARC project in the retirement home DomusVi Santa Justa (SARquavitae, Seville)

http://www.domusvi.es/articulo/proyecto-clark-en-domusvi-santa-justa/

The contacts with the associations in the Aube region were mainly focused on capturing the suggestions and comments from the elderlies and caregivers, and using them for driving our efforts in the user-centred design started at Phase II. These associations collaborate with the ActivAgeing Living Lab at Troyes (France). The Association Les Arcades is a geriatric centre specialized in prevention. Their senior members have been collaborating with the ActivAgeing Living Lab for several years. The director of the centre, a geriatrician, also participated in CLARC to give the clinician perspective that was taken into account in developing the CGAmed. The retirement home La Providence welcomes 67 residents. The director, coordinating nurse and elderly residents were participating in CLARC.

Finally, we also demonstrated our prototypes to the Ageing Lab association sited in Jaén (Spain). They organized in September 2018 the II Conference about Ageing and

Dependency, where the CLARC project was showed in an individual stand. The opportunity gave the project to be disseminated through radio and television channels, as it will be shown in next Sections along this document.

3 Presence on Trade fairs

Trade fairs are events which hold the unique opportunity to personally meet numerous potential clients and to generate valuable contacts in just several days. They are especially well suited for advertising the experiments, since they offer space for setting up small robotic shows. In addition, technology fairs bring together the state of the art, allowing us to directly talk to our tentative competitors. We participated in two large events: The Automatica fair, hold in Munich in June 2018, and the Medica one, hold in Dusseldorf in November 2018.

3.1 Automatica fair

The Automatica2018 is the largest trade fair for automation in industry. The CLARC project was presented in the stand that ECHORD++ managed within the fair. We participated on the fair from 19 to 22 June 2018. Figures 2 and 3 depict some snapshots.

Figure 2: The CLARC project in the ECHORD++ stand at Automatica2018

Figure 3: (Left) The ECHORD++ stand in the Automatica fair and (right) the CLARA robot

From Automatica fair we had some contacts that were interested on the design and application scenario or as a technology provider.

3.2 Medica fair

The Medica fair took place in Dusseldorf on November 12-15, 2018. The CLARC project was again presented within the ECHORD++ stand. Figure 4 shows some pictures. On November 12, Juan Pedro Bandera gave a talk about our experiments in the MEDICA TECH FORUM.

Patientenversorgung der Zukunft? Robotik, AI und Big Data auf der MEDICA 2018

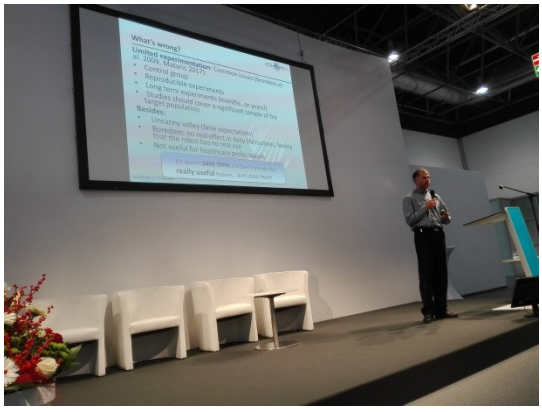

Figure 4: CLARC in the MEDICA fair: presence on the fair and promotional videos. (Right-down) Juan Pedro giving the talk in the MEDICA TECH Forum.

4 Newspapers

The first new on a newspaper was on January 2017, in the L'Est Éclair newspaper. Figure 5 shows the new in press.

UNIVERSITÉ DE TECHNOLOGIE DE TROYES

Robotique : « Bonjour, je m'appelle Clara »

Un robot destiné à assister les médecins en gériatrie est actuellement en test à l'UTT. Pour le « Living Lab ActivAgeing », le laboratoire de l'UTT, c'est une « fierté ».

Bonjour, je m'appelle Clara et je vais vous aider à effectuer le test du lever de chaise », explique le robot Clara. En face de lui, dans le « *Living Lab ActivAgeing* » de l'UTT, se trouve une personne âgée.

C'est l'une des amies de ce laboratoire qui, reproduisant à l'identique un appartement privé, s'est spécialisé dans l'évaluation des technologies à destination des personnes âgées. Ici, il s'agit de tester un robot gériatrique. La dame se lève et retourne s'asseoir. Le robot la remercie. Il a tout mesuré, tout enregistré.

DEUX ROBOTS

« *C'est un robot qui est destiné à soulager les médecins des tests répétitifs qu'ils doivent mener pour évaluer une personne* », explique Dimitri Voilmy, responsable du laboratoire. Le robot Clara, appelé aussi Clarc, est l'un des deux prototypes en lice pour répondre à une commande de l'agence européenne Echord. Construit en Allemagne par l'entreprise Metralab, il fait partie d'un programme de recherche impliquant l'université de Malaga, Carlos III à Madrid et donc l'UTT de Troyes. Ici, pas question de le programmer, mais il s'agit de l'évaluer dans un environnement réaliste et avec de « vraies » personnes âgées, les « amis » du « Living Lab » qui se prêtent régulièrement aux expériences proposées par le laboratoire.

Le robot Clara, encore au stade de prototype, doit non seulement recueillir des données fiables mais aussi ne pas agacer la personne âgée qu'il évalue.

TROIS SEMAINES DE TEST À L'UTT

« *Il devait rester quelques jours, il restera finalement trois semaines,* se réjouit Dimitri Voilmy. *Devant les premiers résultats, particulièrement intéressants, ils ont décidé de prolonger les tests.* » Depuis son agrandissement, l'UTT dispose d'une salle d'analyses du mouvement. Le robot Clara, dont l'un des objectifs est justement d'analyser les mouvements, peut ainsi comparer ses données à celles, très performantes, de l'UTT.

Le robot Clara est en concurrence avec un autre projet. Après ces tests à l'UTT, il partira travailler en condition réelle à l'hôpital de Séville, le plus grand d'Espagne. S'il convainc l'agence européenne, il pourrait alors débuter une phase de préindustrialisation. « *L'idée, ce n'est pas de remplacer le médecin, c'est de lui donner plus de temps pour ce qui est vraiment utile, c'est-à-dire l'échange avec les patients tout en bénéficiant des résultats de tous les tests opérés par le robot* », souligne Dimitri Voilmy. Un test gériatrique, effectué par le robot, devrait permettre de gagner une heure par patient. ■

BRUNO DUMORTIER

Figure 5: The CLARA robot in the L'Est Éclair newspaper

http://www.lest-eclair.fr/archive/recup/10607/article/2017-01-23/clara-un-robot-qui-vous-veut-du-bien

More recently, a new about the CLARC project was presented in the Sevilla Actualidad digital newspaper (Figure 6).

Figure 6: The old and new versions of the CLARA robot in Sevilla Actualidad

http://www.sevillaactualidad.com/sevilla/116773-proyecto-clarc-un-robot-para-evaluar-pacientes-en-el-virgen-del-rocio/

5 Radio, Television

The meeting at Troyes in January 2017 allowed CLARC to appear in several media (see Figure 5). The project was in a redesign stage under the supervision of the UTT team, and our prototype appear in France 3 (regional TV) and on the local TV Canal 32 (Figure 7).

Figure 7: CLARC project in Canal 32

After updating the robot's appearance, a brief new in November 2017 covered the CLARC project in CanalSur, the regional TV on Andalusia (Spain).

Figure 8: CLARC project in CanalSur (November 2017)

The next presence on Radio/TV was in September 2018, when the CLARC project participated on the II Conference about Ageing and Dependency, held in Jaén (Spain). CLARC had a specific small stand and it was covered by several media (Figure 9 – CanalSur, September 28 and 29, and Figure 10 – RTVE, September 29).

Figure 9: CLARC project in CanalSur (September 2018)

Figure 10: CLARC project in RTVE (September 2018)

6 Conferences

The CLARC framework has been presented in academic forums. The first contribution was in June 2016, when the idea was presented in the WAF2016. After that event, the CLARC scenario has been presented in several international conferences and workshops, the last ones being the RO-MAN and WAF in August and November 2018, respectively. In September 2018, CLARC was presented in a keynote presentation at the 6th World Convention on Robots and Deep Learning, held in Singapore. Table 2 summarizes our presence in academic forums.

7 Scientific journals

Although submitted during 2017, three papers have been recently published. The software cognitive architecture CORTEX, running within the CLARA robot, is described in the paper titled 'The CORTEX cognitive robotics architecture: Use cases', published in Cognitive Systems Research journal in June 2019. In this paper, the CLARC project is one of the scenarios where CORTEX is evaluated and tested.

The other two papers were published in Pattern Recognition Letters. The paper entitled 'Perceiving the person and their interactions with the others for social robotics – A review' (Adriana Tapus, Antonio Bandera, Ricardo Vázquez-Martín, Luis V. Calderita), provides a resume of recent approaches for recognizing human activities, but also for perceiving social signals emanated from a person or a group of people during an interaction. Significant experiences described in the paper were captured on the deep work on human-robot interaction addressed in the CLARC project. The algorithms developed for the automatic scoring of the GetUp&Go test within the project were published in the paper 'A new paradigm for autonomous human motion description and evaluation: Application to the Get Up & Go test use case' (J.P. Bandera, R. Marfil, A. Romero-Garcés, D. Voilmy). Table 3 resumes the data of these contributions.

Table 2: Contributions citing CLARC project in international conferences and workshops

Conferences	Title of the contribution and authors
WAF2016	**CLARC: a Robotic Architecture for Comprehensive Geriatric Assessment** A. Bandera, J.P. Bandera, P. Bustos, L.V. Calderita, Á. Dueñas, F. Fernández, R. Fuentetaja, Á. García-Olaya, F.J. García-Polo, J.C. González, A. Iglesias, L.J. Manso, R. Marfil, J.C. Pulido, C. Reuther, A. Romero-Garcés, C. Suarez **Percepts symbols or Action symbols? Generalizing how all modules interactwithin a software architecture for cognitive robotics** R. Marfil, L.J. Manso, J.P. Bandera, A. Romero-Garces, A. Bandera, P.Bustos, L.V. Calderita, J.C. Gonzalez, A. Garcia-Olaya, R. Fuentetaja, F. Fernandez
RO-MAN2017	**Integrating the Users in the Design of a Robot for Making Comprehensive Geriatric Assessments (CGA) to Elderly People in Care Centers** K. Lan Hing Ting , D. Voilmy , A. Iglesias , J.C. Pulido , J. García, A. Romero-Garcés, J.P. Bandera, R. Marfil, A. Dueñas
ROBOT2017	**CLARC: A Cognitive Robot for Helping Geriatric Doctors in Real Scenarios**

	D. Voilmy, C. Suarez, A. Romero-Garces, C. Reuther, J.C. Pulido, R. Marfil, L.J. Manso, K. Lan Hing Ting, A. Iglesias, J.C. Gonzalez, J. Garcia, A. Garcia-Olaya, R. Fuentetaja, F. Fernandez, A. Dueñas, L.V. Calderita, P. Bustos, T. Barile, J.P. Bandera, A. Bandera
RE-ACTS2017	**Towards autonomous gait analysis in the Get Up and Go test** J.P. Bandera, A. Romero-Garces, A. Duenas, R. Marfil, K. Lan Hing Ting, D. Voilmy, F.J. Garcıa-Polo
PlanRob2017	**On the Application of Classical Planning to Real Social Robotic Tasks** J.C. González, F. Fernández, A.García-Olaya, R. Fuentetaja
RO-MAN2018	**Towards a Robust Robotic Assistant for Comprehensive Geriatric Assessment Procedures: Updating the CLARC System** J. Martínez, A. Romero-Garces, C. Suárez, R. Marfil, K. Lan Hing Ting, A. Iglesias, J. Garcia, F. Fernandez, A. Dueñas, L.V. Calderita, A. Bandera, J.P Bandera
WAF2018	**Challenges on the Application of Automated Planning for Comprehensive Geriatric Assessment using an Autonomous Social Robot** A. García-Olaya, R. Fuentetaja, J. García-Polo, J.C. González, F. Fernández
WCRDL2018	**Why socially assistive robots?** J.P. Bandera Keynote presentation in 6th World Convention on Robots and Deep Learning 2018

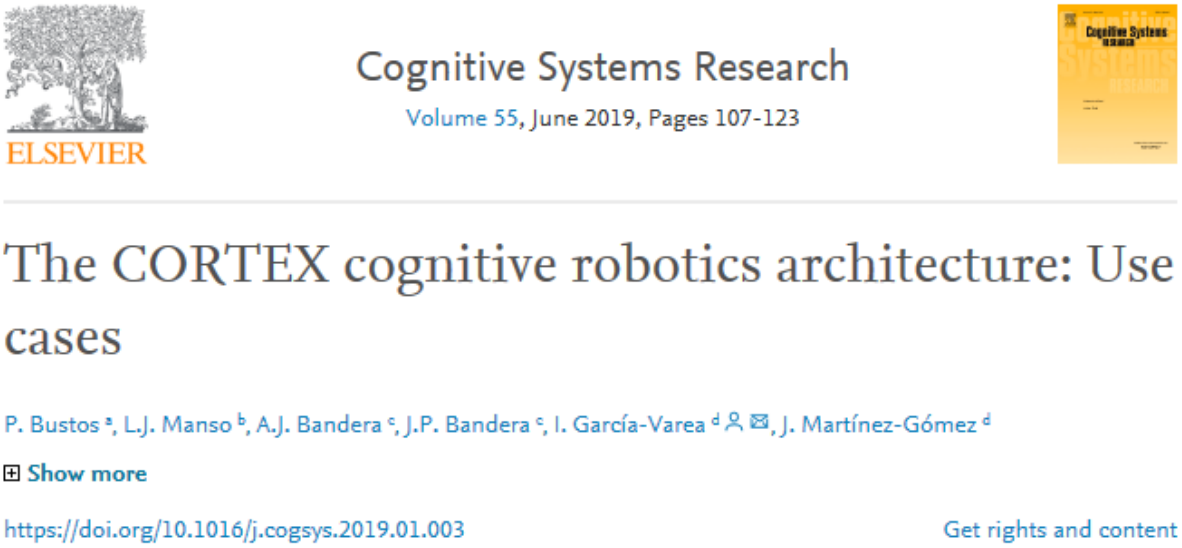

Figure 11: The paper published in Cognitive Systems Research

Table 3: Published international journals

Contribution and authors	Journal
The CORTEX cognitive robotics architecture: Use cases P. Bustos, L.J. Manso, A. Bandera, J.P. Bandera, I. García-Varea, J. Martínez-Gómez	**Cognitive Systems Research** Volume 55, June 2019, pages 107-123
Perceiving the person and their interactions with the others for social robotics – A review Adriana Tapus, Antonio Bandera, Ricardo Vázquez-Martín, Luis V. Calderita	**Pattern Recognition Letters** Volume 118, 1 February 2019, pages 3-13
A new paradigm for autonomous human motion description and evaluation: Appli-cation to the Get Up & Go test use case J.P. Bandera, R. Marfil, A. Romero-Garcés, D. Voilmy	Pattern Recognition Letters Volume 118, 1 February 2019, pages 51-60

8 Additional activities

The CLARC proposal was shown in the forum Tecnologies for evaluation and rehabilitation of neuro-cognitive damages organized by Tecnalia and IBIS at Seville (Hospital Virgen del Rocío)[1]. In November 2018, our robot travelled to Madrid to participate in the IROS 2018 conference.

[1]https://www.tecnalia.com/es/salud/eventos/tecnologias-para-la-evaluacion-y-rehabilitacion-del-dano-neurocognitivo-de-las-necesidades-clinicas-al-desarrollo-e-industrializacion-de-soluciones.htm