The workshop on **Natural Interaction with Social Robots** proposed for the **European Robotics Forum (ERF) 2015** (Vienna) was fused together with two other workshops proposed for ERF 2015, listed below under the names of (1) *On Robot's Social Intelligence* and (2) *Natural Interaction Capabilities with End User Development (for Social Robots).*

The final format of the workshop consisted three sub-sessions, 30 minutes each, followed by a general discussion of 30 minutes. The workshop was scheduled for the 11th of March 2015, 16:15-18:15. The sub-sessions included presenters from the three proposed workshops that were run according to the order reported below:

The first session was dedicated to workshop on *Social Intelligence* proposed by **Amit Kumar PANDEY** and **Rachid ALAMI**

The second session was dedicated to workshop on Natural Interaction with Social Robots proposed by **Kerstin DAUTENHAHN** who was substituted by **Agnieszka WYKOWSKA,** and **Anna ESPOSITO**

The third session was dedicated to workshop on *End User Development* proposed by **Emilia I. BARAKOVA**, **Bruce A. MACDONALD, and James P. DIPROSE**

Details of the workshop, timing and presenters are available on the website:
   http://SocialRobotsERF.SciencesConf.org

The organizers of the workshop meet in the morning of the 11th of March in order to set the presentations and the timing given that the time assigned was very short.

The workshop started in time at 16:15 on March 11th 2015 and the presentations ended at 18:25. There were about 50 participants of the workshop, including the presenters and the organizers.

The workshop started with a presentation of **Amit Kumar PANDEY (Aldebaran Robotics, France**) who introduced the topic in general and explained the timing (5-7 minutes for each speaker) and the plan of the workshop.

The first session had the following speakers:
1. **Michaela Pfadenhauer, University of Vienna, Austria,** whose talk was "On the sociality of Social Robotics". The focus was on "objectivation" as a key to understand sociology in technology
2. **Rachid Alami, LAAS-CNRS, France,** whose talk was devoted to mind reading in artificial systems. The talk suggested theories to estimate mental states and managing divergent beliefs
3. **Lorenzo Natale, IIT, Italy,** was speaking on iCub technology: Social Robots must be autonomous, friendly, interactive in order to allow untrained humans to communicate with them.
4. **Amit Kumar Pandey, Aldebaran Robotics, France,** who presented the scopes and the aims of the Topic Group on ***Social Intelligence*** (which included a very large set of topics)

The second session ("***Natural Interactions with social robots***") had the following speakers:
1. ***Agnieszka Wykowska*, LMU/TUM Munich, Germany, and *Anna Esposito*, Seconda Università di Napoli, Italy** (presenter *Agnieszka Wykowska)* who presented the scopes, aims and future

directions for the Topic Group on **Natural Interaction with Social Robots,** highlighting that social robotics is a field with broad applications in society as well as potential for innovative solutions.

2. **Astrid Weiss, TU Wien, Austria,** whose talk titled "User involvement as key to success for natural HRI with social robots?" covered the topic of user involvement, underlying the need to develop user-centered robots that are able to understand context. The speaker suggested an iterative report of an exemplary success story**:** HOBBIT exploitation team wining the "Commercial Viability Award" at the i2c innovation event (www.informatik.tuwien.ac.at/i2c/start-academy)

3. **Andrea Bonarini, Politecnico di Milano, Italy,** presented a talk "Non-verbal affective expression and intrinsic adaptation as keys for successful interaction with low-cost robots" devoted tot he topic of robot acceptance and emotional interaction discussing the basic of emotional expressions given that a given emotion can be expressed with different types of robots. The talk was also focused on low-cost solutions that could be accessible by various user groups.

4. **Filippo Cavallo, Scuola Superiore Sant'Anna, Italy,** whose talk was titled "Experience of evaluating social service robotics in assisted living" and reported experiences in evaluating service robots in assisted living, underlying the need to develop robot creativity in this context

5. **Laurence Devillers, University of Paris Sorbonne IV, France**, presented a talk "Affective and social dimensions in spoken interactions with humanoid robots - humor in HRI " which covered the topics of affective and social dimensions in spoken interactions with humanoid robots and the role of humor. The question of whether different robot strategies result in different degrees of appreciation was discussed

6. **Alberto Sanfeliu Cortes, Institut de Robòtica i Informàtica Industrial, Spain,** presented a talk "Robot social-aware navigation to accompany, guide, look for or find people" on joint cooperative human-robot tasks allowing human-aware navigation, guiding, as well as finding-and-following strategies.

The third session involved the following speakers:

1. **Emilia Barakova, Eindhoven University of Technology, The Netherlands,** who underlined the following concepts in robotics: (1) Robot assistants for physical therapy; (2) The leading role of therapy; (3) End user development for robots; (4) Affordance for natural interaction.

2. **Milan Gnjatović, Belgrade University and University of Novi Sad, Serbia,** who presented a robotic application devoted to assist children with developmental disorders underlying the need of robust end user designs for robotic dialogue behaviors.

3. **Katsu Yamane, Disney Research,** presented some applications of intuitive interfaces for creating robot and character animations (more on characters than robots).

The last part of the workshop was devoted to a general discussion, involving the audience. The following issues/questions were raised:

- types of robot facial expressions;
- importance of long-term interactions in social robotics;
- means to asses quality of interactions (objective vs. subjective measures);
- criteria for assessing interaction as "social enough";
- measuring the quality of interaction with physiology measures, e.g., EEG, Skin conductance, heart rate – versus other methods
- algorithms to put obtained knowledge regarding the human responses inside the robot-behavioral analysis

- social rules underpinning interactions
- objective measures vs. natural interactions
- ethical issues regarding the robot's resemblance in behavior and/or appearance to humans

Time did not allow for discussing further issues which had been prepared by the speakers and organisers of the "Natural Interaction" session. These issues are listed here:

- Autonomous robots as open, eclectic interaction devices: is this possible? (Andrea Bonarini)
- What could be the ethical implications of an autonomous interaction (Tamagochi effect)? What are the implications of using these robots with persons with special needs (Andrea Bonarini)
- How to overcome the present limitations of social robots? More knowledge? Better sensors? Learning? Why most robots have such unnatural interaction? (Andrea Bonarini)
- Is a natural interaction a reasonable/desirable goal? Should a robot be perceived as a robot, with all its limits, or should we give it more and more abilities so to make it behaving as a human being? Is it better a robot failing to have a rich interaction or a reliable robot we have to learn to interact with? (Andrea Bonarini)
- Could a strict framework for interaction (keywords, defined gestures, ...) be acceptable by real, long-term users, or should we go towards more natural interaction? Why? (Andrea Bonarini)
- What are relevant use cases that benefit from natural interaction? (Astrid Weiss)
- Should natural interaction be a universal paradigm or are user specific paradigms (elderly, children) needed? (Astrid Weiss)
- Which target groups could benefit the most from natural interaction with social robots? (Astrid Weiss)
- Natural interaction implies being also culturally attuned – is there at present sufficient emphasis on intercultural studies in social robotics (Agnieszka Wykowska)

The discussion involved many participants from the audience and took more than the time assigned to the entire workshop (the workshop ended around 19:00). Thus, such a lengthy and engaging debate showed that the social robotics topics are timely, interesting and important.