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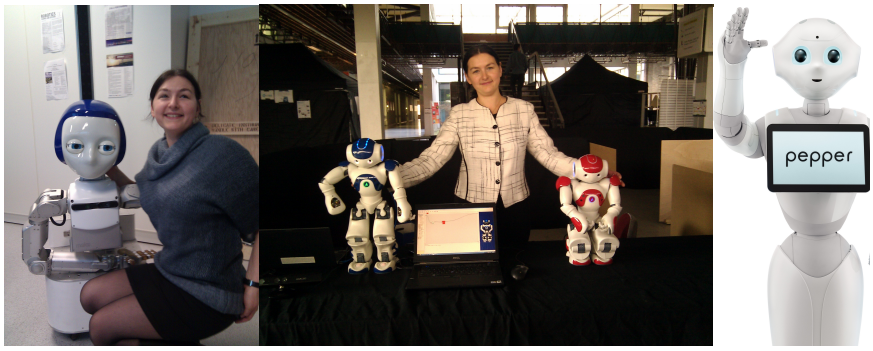

Full Prof. Adriana TAPUS
PhD coordination in "Computers and Information Technology"
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Research Profile:
My research aims to design a robotic system with social abilities that exhibits personality and emotions through the use of verbal, non-verbal (e.g., gestures) and para-verbal (e.g. pitch, volume) communication so as to help people with physical and cognitive impairments, living alone and suffering from depression or not. Thus, the goal of this project is to improve quality of life of the users; this is done through the use of a robotic agent that supervises, encourages, and engages the users as they perform tasks such as rehabilitation, physical therapy, and cognitive stimulation. This research, by its very nature, aims to impact the vulnerable populations. The research work proposed is innovative as it addresses the role of customized therapy that can allow for continuous monitoring of the user's physical/cognitive status and of providing structure, guidance, reminders, motivation, and training and beyond through the use of combined, noninvasive, and affordable sensing, tracking, and robotics technologies.

The long term research plan focuses and treats some of the following research questions:

- human-user modeling (e.g., gestures and postures classification and modeling);

- developing new algorithms for automatic and incremental learning of different concepts, such as space and situations, and tasks, such as navigation and human-robot cooperation;
- user physiological data modeling and interpretation;
- signal processing for verbal and para-verbal communication in human-robot interaction;
- developing learning algorithms and behavior control architectures that model, embody, and evolve with human user preferences, profile, and physical/cognitive disability level;
- understanding and modeling of social and cognitive sciences results so as to obtain more realistic, reliable, and robust solution for robotics.

PhD coordinator since 2011:

4 finalized PhD thesis
6 undergoing

Publications (Total: 139; h-index: 26):

15 Journals
13 Books/chapters
103 Conference Papers

Research Grant Proposals (last 10 years):

• EU Horizon2020 "ENRICHME: Enabling Robot and assisted living environment for Independent Care and Health Monitoring of the Elderly", PI: Roberto Rosso (TESAN), PI: A. Tapus (ENSTA-ParisTech), PI: N. Bellotto (UoL), PI: P. Baratinni (KONTOR), PI: V. Dupourque (Robosoft), PI: A. van Berlo (STICHTING SMART HOMES), PI: V. Gower (FONDAZIONE DON CARLO GNOCCHI ONLUS), PI: K. Wieczorowska-Tobis (PUMS), PI. D. Wieczorek (OPS), PI: P. Hobson (Lace Housing), PI: C. Prouskas (Aktios), total € 3 991 940.

• PSPC for "ROMEO 2", PI: D. Filliat (ENSTA-ParisTech), co-PI: A. Tapus, total € 509 309. Sept 2012 – Sept 2018.

• Region IdF Project HANDICAP " Proprioceptive, Kinematic, Socially and Individualized Human-Machine Interaction" (HEROES) PI: Prof. Adriana Tapus (ENSTA), Prof. Brice Isableu (LIMSI, Paris XI) and Prof. Jean-Claude Martin (LIMSI, Paris XI) total € 109 000

• ANR-Chaires d'Excellence (Excellent Researchers) for "HRIAA - Human-Robot Interaction for Assistive Applications", PI: A. Tapus (ENSTA-ParisTech), total € 484 200 €. Dec 2009 – Dec 2013.

• ANR-Carotte grant for "PACOM: Panoramic and Active Cameras for Semantic Object Mapping", PI: D. Filliat (ENSTA-ParisTech), co-PIs: A. Tapus (ENSTA-ParisTech), R, Benosman (UPMC), J.-C. Mammana (Gostai), total € 349 709. Sept 2009 – Sept 2012.

• UPMC grant for "Intelligent Systems for Multi-perceptual Stimulation for Children with Developmental Disorders – MULTI-STIM", PI: M. Chetouani (UPMC), co-PIs: A. Tapus (ENSTA-ParisTech), D. Cohen (UPMC), J. Xavier (GH Pitié-Salpêtrière), M. Plaza (GH Pitié-Salpêtrière), L. Chaby (Pierre Descartes University), total € 150,000. Mar 2010 – Mar 2011.

• ANR-TecSan (Program for Technology for Health and Autonomy) grant for "ROBADOM: Impact of a robot "butler" at home on psychological and cognitive state of the elderly with mid cognitive impairment", PI: Anne-Sophie RIGAUD (BROCA Hospital), co-PIs: A. Tapus (ENSTA-ParisTech), M. Chatouani (UPMC), D. Duhaut (Université de Bretagne Sud), V. Dupourque (Robosoft), total € 736,316. Sept 2009 – Sept 2011.

• NIH Aging and Disability Resource Center grant for "Assessing Socially Assistive Robotics as Social and Cognitive Aides for the Elderly", PI: M. J. Matarić, A. Tapus, total $80,000, Jun 2007- Jun 2008.

• NSF Human-Robot Interaction Program grant for "Personalized Assistive Human-Robot Interaction: Validation in Socially-Assisted Post Stroke Rehabilitation", PI: M. J. Matarić, co-PI: C. Winstein, A. Tapus, total $450,000, Sept 2007- Aug 2010.

Research Positions/Editorships (more in CV, only for 2017-2018):

• Vice Provost for INTERFACE Graduate School at University Paris Saclay (UPSaY), France
• Associate Editor – IEEE Transactions on Cognitive and Developmental Systems (TCDS) - starting January 2016.
• Associate Editor - International Journal of Social Robotics (IJSR) – starting 2012
• Program Chair, Human-Robot Interaction Conference (HRI) 2018
• Program Committee, Human-Robot Interaction Conference (HRI) 2017
• Session Chair "Creating Expressive Robots", Human-Robot Interaction Conference (HRI) 2017
• Program Committee, HRI Pioneers Workshop 2017
• Program Committee, IEEE International Conference on Robotic Computing (ICRC) 2017
• Program Committee, International Workshop on Agent Technology for Ambient Intelligence (AgTAmI) 2017
• Program Committee, Workshop on Behavior Adaptation, Interaction and Learning for Assistive Robotics (BAILAR) 2017
• Associate Editor, IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN) 2017
• Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2017

Proposed subjects:

1. **Learn how to produce robot gestures and body postures for social communication**
   Robots need to communicate with their human peers and be able to use their hands, arms and body to do that in a natural manner. This thesis will develop and implement several models for non-verbal behaviors with several humanoids robots (Meka robot and Pepper robot) so as to determine how well they can convey information and if they are sufficently and richly informative in a social context.
2. **Human-Robot Trust: Develop a computational model for trust**

Robots are more and more part of our environments and society. Autonomous cars and robots are taking over. How much can be trust autonomous systems and how can we predict trust and build a computational model. What features and behaviors can have a positive or negative influence on trust. This work will analyze the context, the situation, the various partners involved in the interaction, their behaviors and will try to build a probabilistic model that will allow to predict the trust level and orientation.

3. **Sensory Preferences of Children with ASD with a Robot**
   It was shown in the literature that children suffering of Autistic Syndrome Disorder have affinities with machines and robots in particular. The main idea is to see how can we provide a personalized interaction for xhildren with ASD as a function of their profile and sensory preferences.
4. **Driving a Car: Impact of Driver"s Profile on Cognitive Load and Performance**
5. **Shared decision-making in Human-Robot Cooperation**
   Adjustable autonomy means dynamically adjusting the level of autonomy of an agent depending on the situation. For real-world teaming between humans and autonomous agents/robots, the desired or optimal level of control may vary over time. The thesis will try to tackle hard issues such as: monitoring and situation awareness; anytime behavior adaptation and modification of agents over time; maximizing effective collaboration between humans and agents; validation and verification of agents having adjustable autonomy; mission criticality; modeling and predicting behavior; reasoning about communication; prioritized tasking; and overlapping competence.
6. **Develop a real-time behavior control architecture that leasure the cognitive level in an interaction with a car**
   Interacting with a vehicle for the purpose of accomplishing a task is now more and more difficult. There are many driver models in the literature. Drivers must change and adapt their driving style as a function of the changes in the environment. These characteristics lead to a certain physical and mental level that influence the conduct of the driver. Therefore, driving intelligent vehicles is a cognitive complex task. In order to quantify and control, for example, the cognitive burden, the mechanisms that lead to attention deficits need to be quantifies so as to limit the effects on driving and reduce their impact on road safety. This thesis will try to ficus on these challenges aspects.