

Research Topic for CSC PhD Program

***Field (cf. List of fields below):** Information and Communication Sciences and Technologies

Subfield: (Applied Physics, Chemistry, Mathematics, Mech. Eng. etc...) Robotics

Title: Machine Learning for Natural Social Robot Behaviors

ParisTech School: ENSTA ParisTech, France

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Short description of possible research topics for a PhD: (10-15 lines in English + optional figure)

Social robots are more and more present in our daily life. Robots need to understand the context and human user's behaviors in order to be able to exhibit a natural behavior and to adapt their behavior to the human users they are interacting with. Several modalities are used to express robot's behavior such as verbal, non-verbal (i.e., gestures, postures) and para-verbal (i.e., tone of voice, speed, pitch, etc.). The goal of this thesis is to understand and learn how a robot can use deep learning to observe video recordings of people interacting with each other, and extract and understand which behaviors are appropriate under which circumstances. The learned model will also be implemented on a real robot (Tiago robot, Pepper robot, or Meka robot) and tested in real-time in real social interactions.

Required background of the student: (Which should be the main field of study of the applicant before applying): Information and Communication Sciences and Technologies/ Robotics.

A list of 5(max.) representative publications of the group: (Related to the research topic)

1. Cruz, A and **Tapus, A.** (2017) " Learning Users' and Personality-Gender Preferences in Close Human-Robot Interaction", In Proceedings of RO-MAN 2017, Lisbon, Portugal, August 2017
2. Ferland, F., and **Tapus, A.** (2017) "Crowd Sourcing Approach Behavior Control", In Proceedings of RO-MAN 2017, Lisbon, Portugal, August 2017
3. Agrigoroaie, R., Cruz-Maya, A., and **Tapus, A.** (2018) "Oh! I am so sorry!": Understanding User Physiological Variation while Spoiling a Game Task", In Proceedings of the 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018), Madrid, Spain, October 2018