-- Apologies for cross-postings –

Post-doctoral positions at Telecom-ParisTech on Deep learning approaches for social computing in human-agent interactions

Place of work Telecom ParisTech [TPT] 46 rue Barrault 75013 Paris – France Paris until september 2019, and then Palaiseau (Paris outskirt)

Starting date From now to September 2019

Salary according to background and from 2300 € /month

Duration 12 months renewable

Context
The post-doctoral fellowship will take part in the Telecom-ParisTech chair on **Data Science & Artificial Intelligence for Digitalized Industry & Services** held by Florence d'Alché-Buc, Full Professor at Télécom ParisTech in the fields of Computer Science and Applied Mathematics. [DSIAI]. Established for a five-year period, one of the main goals of the chair is to allow sustainable funding of research activities in AI and Data Science, on methodological topics crucial for applications.
The research activity of the postdoctoral fellowship will also contribute to the Social Computing topic [SocComp.] of the S2a team [SSA] at Telecom-ParisTech, in close collaboration with other researchers and PhD students of the team.

* **Candidate profile***
As a minimum requirement, the successful candidate should have:
• A PhD in one or more of the following areas: human-agent interaction, deep learning, computational linguistics, affective computing, reinforcement learning, natural language processing, speech processing
• Excellent programming skills (preferably in Python)
• Excellent command of English

How to apply
The application should be formatted as **a single pdf file** and should include:
• A complete and detailed curriculum vitae
• A letter of motivation
• The defense and Phd reports
• The contact of two referees
The pdf file should be sent to the two supervisors: Chloé Clavel [Clavel] and Giovanna Varni [Varni]: chloe.clavel@telecom-paristech.fr, giovanna.varni@telecom-paristech.fr

1/ First position: Multimodal attention models for predicting the user's socio-emotional behavior in human-machine interactions

Keywords human-machine interaction, attention models, recurrent neural networks, Social Computing, natural language processing, speech processing, multimodality

Supervision Chloé Clavel, Giovanna Varni,

Description Social robotics, and more broadly human-agent interaction, is a field of human-machine interaction for which the integration of socio-emotional behaviors (emotions, social attitudes, personality) is expected to have a great potential. For example, companion robots are designed to provide their users with both help (especially in the assistance and dependency market) and entertainment (in the entertainment market). For intelligent cars, the analysis of the driver's emotions through multimodal sensors can provide a better understanding of his driving [CARS]

This post-doctoral fellowship will focus on multimodal modeling for the prediction of the user's socio-emotional behaviors during interactions with a virtual agent.   In particular, the post-doctoral fellow will address the following points:

- the encoding of multimodal representations relevant for the modelling of socio-emotional behavior;

- the development and evaluation of models that take advantage of the complementarity of modalities in order to monitor the evolution of the user's socio-emotional behaviors during the interaction (e. g. taking into account the inherent sequentially of the interaction structure)

The models will be based on sequential neural approaches (recurrent networks) that integrate attention models as a continuation of the work done in [Hemamou] and [BenYoussef].

2/ Second Position: Reinforcement learning for the development of socially competent agents

Keywords human-machine dialogue, reinforcement learning, language generation model, Social Computing

Supervision Chloé Clavel

Description Conversational agents (e.g. Djingo, Orange, Alexa d'Amazon, Siri d'Apple, Cortana de Microsoft, etc.), chatbots and more broadly human-agent interaction and social robotics (see for example [CIMON]) are applications for which the integration of socio-emotional behaviour analysis in the interaction between humans and virtual agents has great potential. Recent developments in artificial intelligence in natural language processing have made it possible to set up functional chatbots: extraction of keywords, understanding of natural language, question and answer systems, dialogue trees. While virtual assistants are already on the market, taking into account the social component of interaction remains a crucial issue for the fluidity and naturalness of interaction. For example, the development of socio-emotional interaction strategies can compensate for the chatbot's lack of understanding of user requests, which results in expressions of frustration and irritation on the part of the user [Maslowski] and can lead to the user abandoning the conversation (also called an engagement breakdown [BenYoussef]), thus hindering the completion of the chatbot's intended task.

This post-doctoral fellowship will address this issue - the development of socially competent agents - by proposing methods of reinforcement and deep learning [Qureshi, Ritschel] for the selection and generation of natural language utterances based on their socio-emotional relevance.

Selected references of the team:

[Hemamou] L. Hemamou, G. Felhi, V. Vandenbussche, J.-C. Martin, C. Clavel, HireNet: a Hierarchical Attention Model for the Automatic Analysis of Asynchronous Video Job Interviews. in AAAI 2019, to appear

[Garcia] Alexandre Garcia, Chloé Clavel, Slim Essid , Florence d'Alche-Buc, Structured Output Learning with Abstention: Application to Accurate Opinion Prediction, ICML 2018

[Clavel&Callejas] Clavel, C.; Callejas, Z., Sentiment analysis: from opinion mining to human-agent interaction, Affective Computing, IEEE Transactions on, 7.1 (2016) 74-93.

[Langlet] C. Langlet and C. Clavel, Improving social relationships in face-to-face human-agent interactions: when the agent wants to know user's likes and dislikes , in ACL 2015

[Maslowski] Irina Maslowski, Delphine Lagarde, and Chloé Clavel. In-the-wild chatbot corpus: from opinion analysis to interaction problem detection, ICNLSSP 2017.

[Ben-Youssef] Atef Ben-Youssef, Chloé Clavel, Slim Essid, Miriam Bilac, Marine Chamoux, and Angelica Lim. Ue-hri: a new dataset for the study of user engagement in spontaneous human-robot interactions. In *Proceedings of the 19th ACM International Conference on Multimodal Interaction*, pages 464–472. ACM, 2017.

Other references:

[DSIAI] https://datascienceandai.wp.imt.fr/

[TPT] https://www.telecom-paristech.fr/eng/

[SocComp.] https://www.tsi.telecom-paristech.fr/recherche/themes-de-recherche/analyse-automatique-des-donnees-sociales-social-computing/

[SSA] http://www.tsi.telecom-paristech.fr/ssa/#

[Clavel] https://clavel.wp.imt.fr/publications/

[Varni] https://sites.google.com/site/gvarnisite/

[CARS] https://www.lesfurets.com/assurance-auto/actualites/voiture-intelligente-decrypter-emotions

[CIMON] http://blogs.esa.int/alexander-gerst/2018/11/16/alexander-welcomes-cimon/

[Qureshi] Ahmed Hussain Qureshi, Yutaka Nakamura, Yuichiro Yoshikawa, and Hiroshi Ishiguro. Robot gains Social Intelligence through Multimodal Deep Reinforcement Learning. Humanoid Robots (Humanoids), 2016 IEEE-RAS 16th International Conference on. IEEE, 2016.

[Ritschel] Ritschel, Hannes, and Elisabeth André. "Real-time robot personality adaptation based on reinforcement learning and social signals." Proceedings of the Companion of the 2017 ACM/IEEE International Conference on Human-Robot Interaction. ACM, 2017.