Thomas Janssoone

Ph.D. in affective computing for virtual agents, computer science engineer with experiences in machine learning, computer vision, human-computer interaction

Career summary and expectations

I started my career as a research and development engineer with several fields of application. I worked, among others, on medical image processing, software for computer-assisted medical interventions, or problem to improve human-computer interaction. I am currently finishing my Ph.D. that studies affect recognition and synthesis with virtual agents. I used several machine learning techniques to find information in social signals (facial expression, head movements, voice, . . .) relevant in the expression of friendliness or hostility. I used sequence-mining and deep-learning approaches to recognize emotional phenomena and to control the social signals of the agent to make it express efficiently these same phenomena .

To sum up, I am a researcher and an engineer with experiences with signal processing for machine learning with a large set of applications. I am currently looking for challenging projects where I could apply this knowledge while reinforcing it.

Employment history

October 2014 - January 2018

PhD. Student, *University Pierre et Marie Curie . ISIR . Interaction team*, Telecom Paristech . TSI . Greta team, Paris.

Description: Since October 2014, I am a Ph.D. Student at ISIR, UPMC, and Telecom ParisTech and I will defend on February 13th. My work deals with multimodal analysis and recognition of social signals for the expression of affective states. My goal is to improve the synthesis of virtual agents to make them express attitudes or interpersonal stances.

I designed frameworks able to find temporal patterns in visual features (facial expression and head movements) and audio features (turn-taking and prosodic) characterizing social stances, such as dominance or friendliness. I used several machine-learning approaches and, especially, adapted a sequence-mining algorithm to study the various timing and sequencing of the features coming from the different modalities. It then automatically proposes insights to animate an embodied conversational agent expressing the affective phenomena. I validated this model with the literature in humanities studies and through perceptive experimentations that I conducted. The synthesis process implied the use of Text-To-Speech systems, realistic voice morphing, and facial expressions animations. I achieved to get good results on the multi-modal analysis and synthesis of social signals for the expression of affective states and I am one of the first to look at this temporal dimension.[2, 4, 5, 6].

Through my participation to summer school as ISSAS, internship and research meetings, my Ph.D. gave me the opportunity to use and design artificial intelligence algorithms applied to the field of social signal processing, psychology, and affective computing and to propose novel and innovative solutions. I also did scientific mediation and explanation at La Cité des Sciences, a science museum in Paris.

Skills: C++, OpenCv, Sequence Mining, Qt, Cmake, Matlab, Intraface, TITARL, prosogram, Covarep, Speech Synthesis (open Mary, Cereproc), Speech Morphing (Praat, Promo)

July 2017 - September 2017

Research scholar as Ph.D. student, *University of South California, Institute of Creative Technologies*, Los Angeles.

Description: I worked with Pr. Stefan Scherer during a summer collaboration as part of my Ph.D. studies. Our ongoing work is to propose new models of emotionally coloured dyadic interactions. Based on domain separation networks, we investigate deep learning based models to describe the dynamics of an interaction. It separates what is specific to some affective phenomena and what is common to them. It is also able to consider dyadic information to improve its performance. We will publish this work soon applied to the problematic of interpersonal stance, emotions and flies interactions.

Skills: Python, Keras, Tensorflow, Numpy, Pandas, Linux

February 2013 - July 2014	**Research and Development Engineer**, *Laboratory of Informatics of Grenoble . Human-Computer Interaction group*, Grenoble. *Description:* I collaborated with a Ph.D. student in his researches on interactions with ambient intelligence. As part of a FUI project, it involved meeting with industrial and research partners. I handled the design and implementation of new ways to interact with lights in several contexts (restaurant, hotel room,. . .).The main goal was the evaluation of an application that dynamically guides 3D gestures to teach the user how to control the lights. Several guidance displays were used (screen, augmented reality on the user's hand or the user reflect in a mirror,. . .). The tracking was done with the Kinect technology. Real-time realistic visualizations were implemented with the 3D engine Ogre3D.[1] *Skills:* C++, Kinect SDK, OpenNi 2, Nite2, Ogre3D, GRT gesture recognition toolkit, Cmake, Imovie.
July 2011 - April 2012	**Research and Development Engineer**, *TIMC Laboratory . CAMI Team*, Surgiqual Institute Company, Grenoble. *Description:* I designed a demonstrator of SurgiQual Institute's products and development of software components for computer-assisted surgery and medical navigation solutions for the hospital of Grenoble. *Skills:* C++, Open Gl, Itk, Dicom, Voluson.
January 2011 - June 2011	**Hospital Engineer**, *TIMC Laboratory . CAMI Team*, Imactis Company, Grenoble. *Description:* I set up a prototype for navigation with CT-Scan images with strong expectations. I handled specifications, risk analysis and software development, especially evaluation of the impact of breathing on internal organs movements. *Skills:* C++, VTK, Itk, Dicom.

Educational qualifications

September 2006 - July 2010	**Ensimag diploma**, French Superior National School of Applied Mathematics and Computer Science, Grenoble, Three years of studies leading to a master degree with a specialization *Image and Virtual Reality. Exchange Student* at Technische Universiteit Eindhoven between September 2009 and January 2010 for a specialization in Expert Systems and Medical Image Processing. *Final internship* at CAMI team : Realization of a biopsies simulator at the GMCAO lab. Design of an efficient User-Interface for the application and set up of a learning environment of ultra sounded guided biopsies of prostate with evaluations and recommendations.[3].

Technical Skill

Programming	C/C++, Java, Ada, Tcl/tk, SQL/Oracle, MATLAB, R, script shell/bash/. . .
Library	ITK, VTK, Qt, Open Gl, stl, numpy, scikit-learn, pandas, Tensorflow, Keras
Languages	*English:* fluent, *French:* native, *German:* basic knowledge
Publication	LaTeX, LibreOffice, Microsoft Office, google drive, scribus, iMovie, photoshop, gimp

Hobbies

Photography, Travel (bucket list: visit five continents within a year), Music

Conclusion

As an engineer, the Ensimag formation gave me the ability to quickly understand and use any computer science language or library. My experience in several start-up and laboratories allowed me to work as a team member. I handled challenging and innovative projects with positive results, concrete applications and improvements to former state-of-the-art solutions. I can also confidently speak in public and know how to adapt my explanation to my audience thanks to the conference I did and my experience in a museum.

Publications

[1] W. Delamare, T. Janssoone, C. Coutrix, and L. Nigay. Designing 3d gesture guidance: Visual feedback and feedforward design options. In *Proceedings of the International Working Conference on Advanced Visual Interfaces*, 2016.

[2] T. Janssoone. Temporal association rules for modelling multimodal social signals. In *Proceedings of the 2015 ACM on International Conference on Multimodal Interaction*, 2015.

[3] T. Janssoone, G. Chevreau, L. Vadcard, P. Mozer, and J. Troccaz. Biopsym: a learning environment for trans-rectal ultrasound guided prostate biopsies. In *MMVR*, 2011.

[4] T. Janssoone, C. Clavel, K. Bailly, and G. Richard. Des signaux sociaux aux attitudes : de l´utilisation des règles d´association temporelle. In *WACAI 2016, Workshop . Affect . Compagnon Artificiel . Interaction*, 2016.

[5] T. Janssoone, C. Clavel, K. Bailly, and G. Richard. Using temporal association rules for the synthesis of embodied conversational agents with a specific stance. In *International Conference on Intelligent Virtual Agents*, 2016.

[6] T. Janssoone, C. Clavel, K. Bailly, and G. Richard. Smart : Régles d′associations temporelles de signaux sociaux pour la synthése d′un agent conversationnel animé avec une attitude spécifique. *Revue d'Intelligence Artificielle*, July 2017.