Thomas Janssoone

Research scientist, Ph.D. in computer science and applied mathematics, experienced in machine-learning approaches for multimodal temporal data applied to study, explain and mimic cognition, virtual agents, affective phenomena, healthcare. I am looking for a new challenge to handle research projects in machine learning with a strong focus on the interpretability of decisions, ethics, to build an AI able to assist humans on a daily basis

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Employment history

April 2021, Now — **PostDoc**, *INRIA - Justine Cassel Team*, Paris

Description: As a post-doc in Justine's team, I planned and executed the refactoring of the Virtual Agent system, as well as assisted Ph.D. students and interns in their daily tasks. Justine's researches are focused on Rapport, which can be seen as the degree of collusion during a dyadic interaction and can help achieve a goal (during tutoring, for example, a good rapport will lead to better results in the learning process). Our goal was to design a system able to extract social information to infer the degree of rapport and generate the appropriate behavior of a virtual agent to reach as well a rapport level and a task goal. I designed a python library able to:

- extract from audio-video stream facial expressions, gazes, prosody, …
- detect voice and apply Speech-to-Text method to get the semantic content
- design, train and test a Conversational Strategy classifier from pre-trained Bert models to detect specific patterns such as Question Eliciting or Violation of Social Norms
- design, train and test a Rapport Classification model from previous features with a model's decisions interpretation mechanism based on SHAP
- design the generative process to control the Virtual Agent : use a RL-GAN based BlenderBot to generate text with the desired Conversational Strategy, explore Unreal's Metahumans solution for graphical rendering.

On top of that, I coordinated the design of tools to extract features and delivered an AI-assisted annotation tool. I also reviewed papers for international conferences, winning the Best Reviewer Award for ICMI 2021

April 2018, January 2021 — **Research Scientist**, *Sêmeia*, Paris

Description: As the most senior data researcher of the team, I conducted research and developments for Sêmeia company which provides solutions for patient support. We used SNIIRAM database, one of the largest structured databases of health data in the world, with records of 66 million persons. It contains track records of diagnostics, hospitalizations, drug purchases, or contextual patient information (age, government supports, geographic information,…). My work consisted in:

- improved existing solutions with PoCs applying several data-mining methods, from statistical analysis to deep-learning networks or temporal sequence mining algorithms
- provided technical insights for the creation of a secured server to store and access to these data, as well as meeting with committees such as the Health Data Hub and proposal writing for administrative support.
- orchestrated the development of a python library to handle these data and provide a set of models, from survival analysis to deep learning ones, to predict the risk of an illegitimate drug drop-out from a patient for example. A key point was also to provide explanations of the model decision to the medical staff (using methods such as Shap or Lime for "black-box" models).
- strategized and planned researches for Sêmeia by 1- defining research questions and implementing prototypes to investigate them, 2- providing a scientific watch to state-of-the-art existing solutions (Transformers, BERT, SHAP, Lime, BLOCK, MixMatch…), 3- publishing results in scientific publications[11, 3, 4, 10]

July 2017, September 2017 — **Research scholar as Ph.D. student**, *University of South California, Institute of Creative Technologies*, Los Angeles

Description: working with Pr. Stefan Scherer during a summer collaboration as part of my Ph.D. studies. Our work was to propose new models of emotionally coloured dyadic interactions. Based on domain separation networks, we investigated 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, forcing the latent representations to be orthogonal. It is also able to consider dyadic information to improve its performance.

February 2013, July 2014 — **Research and Development Engineer**, *Laboratory of Informatics of Grenoble . Human-Computer Interaction group*, Grenoble

Description: collaborating 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]

July 2011, April 2012 **Research and Development Engineer**, *TIMC Laboratory . CAMI Team*, Surgiqual Institute Company, Grenoble
Description: 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.

January 2011, June 2011 **Researcher**, *TIMC Laboratory . CAMI Team*, Imactis Company, Grenoble
Description: 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.

Educational qualifications

October 2014, January 2018 **PhD. Student**, *Sorbonne University (ISIR . Interaction team, and Telecom Paristech . TSI . Greta team)*, Paris
Description: study of machine learning approaches to find temporal information in social interaction with both recognition and synthesis goals. My work focused on the multimodal analysis and recognition of social signals for the expression of affective states. 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 provided a sequence-mining algorithm that infers stance-specific temporal association rules from the different features. It automatically proposes insights to animate an embodied conversational agent expressing the desired affective phenomena. My approach was validated by the literature in humanities studies and through perceptive studies 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.[Details][2, 6, 7, 8, 9].
Through my participation in 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.

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.[5]

Technical Skill

Programming Python, C/C++, Java, Ada, Tcl/tk, SQL/Oracle, MATLAB, R, script shell/bash/...

Library Tensorflow, Keras, Numpy, Scikit-Learn, Pandas, dask pytorch, pytorch-lightning, optuna, transformers, nilearn,Shap, lime Qt, Open Gl, stl, ITK, VTK, ROS, unity

Languages *English:* fluent, *French:* native, *German:* basic knowledge

Publication LaTeX, LibreOffice, Microsoft Office, google drive, google colab, scribus, iMovie, photoshop, gimp

Hobbies

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

Start-up founder Since June 2018, I founded and participated in the development of Smart Farming System that designs systems of vertical, ergonomic and autonomous urban farms, assisted by artificial intelligence modules. The company has developed a vertical cultivation system integrated with small growth blocks and controlled by artificial intelligence; Its first product, pop-farm, intended for large and medium-sized supermarkets, makes it possible to grow and harvest quality herbs and fruits in the very heart of stores, without pesticides, without transport and full of vitamins.

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, C. Bic, D. Kanoun, P. Hornus, and P. Rinder. Ai for patient support: Predictive model of medication non-adherence. *AI for Social Good Workshop at NeurIPS 2018*, 2018.

[4] T. Janssoone, C. Bic, D. Kanoun, P. Hornus, and P. Rinder. Machine learning on electronic health records: Models and features usages to predict medication non-adherence. *arXiv preprint arXiv:1811.12234n part of Machine Learning for Health (ML4H) Workshop at NeurIPS 2018*, 2018.

[5] 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.

[6] 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.

[7] 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.

[8] 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.

[9] T. Janssoone, C. Clavel, K. Bailly, and G. Richard. The potus corpus, a database of weekly addresses for the study of stance in politics and virtual agents. 2020.

[10] t. janssoone, P. Rinder, C. Bic, D. Kanoun, and P. Hornus. Modèles d'apprentissage automatique de la persistance aux médicaments : application au cancer du sein. In *Conférence Nationale en Intelligence Artificielle*, Toulouse, France, July 2019.

[11] T. Janssoone, P. Rinder, H. Pierre, and D. Kanoun. Predictive patient care: Survival model to prevent medication non-adherence. In *Proceedings of the First International Workshop on PRedictive Intelligence in MEdicine, PRIME 2018, held in conjunction with MICCAI*, 2018.