Thomas Janssoone

Research scientist and engineer, with computer science Ph.D. and master,
experienced in machine-learning approaches for temporal data mining and synthesis
for virtual agents, HCI, affective computing, healthcare…

- Background
- Future Project

Background

- [2010]: Engineering School of Computer Science and Applied Mathematics ENSIMAG Grenoble with an Erasmus visit at TU/Eindhoven

- [2010:2014]: Multiples experiences in Start-ups (Imactis, Surgiqual Institute,…) and laboratories (TIMC, LIG,…) [MMVR 2011, AVI 2016]

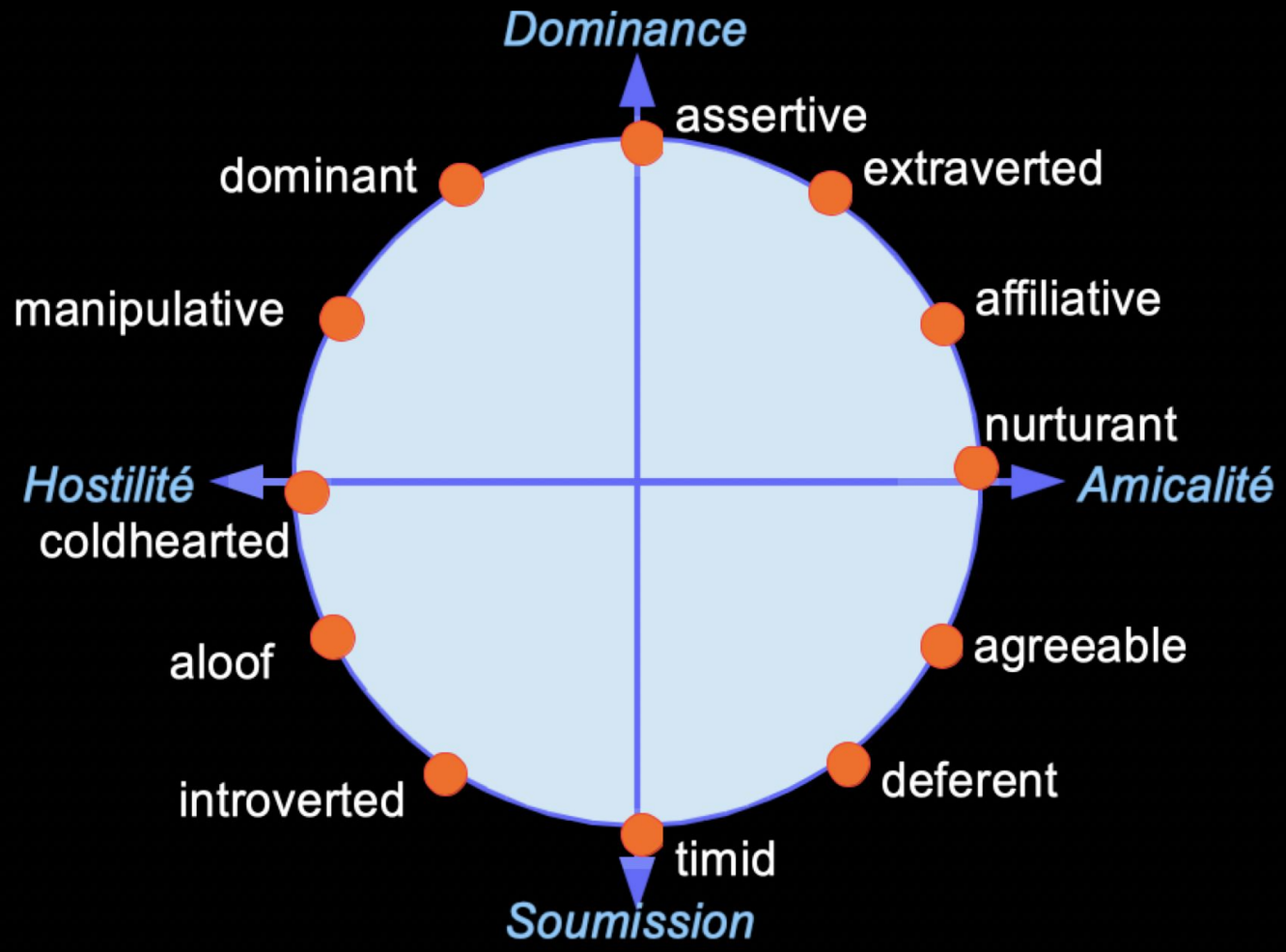
- [2014:2018]: PhD. Student at Sorbonne University (ISIR, Interaction team) and Telecom Paristech (TSI, Greta team): *Multimodal analysis and recognition of social signals: application to social stance generation in virtual agents*

- [2018:2020]: Research scientist for Sêmeia, research studies and implementation of a ML library to design predictive model of adverse events in patient care path from French Health System Data records

- [2021:now] PostDoc at INRIA, Post-Doctoral Research Visit The role of rapport in human-conversational agent interaction: Modeling conversation to improve task performance in human-agent Interaction. The objective of this project is to build embodied conversational agents (also known as ECAs, or virtual humans, or chatbots, or multimodal dialogue systems) that have the ability to engage their users in both social and task talk, where the social talk serves to improve task performance. In order to achieve this objective, we model human-human conversation, and integrate the models into ECAs, and then evaluate their performance.

[2014:2018]: PhD. Student at Sorbonne University (ISIR, Interaction team) and Telecom Paristech (TSI, Greta team): *Multimodal analysis and recognition of social signals: application to social stance generation in virtual agents*

- Analysis of social stances



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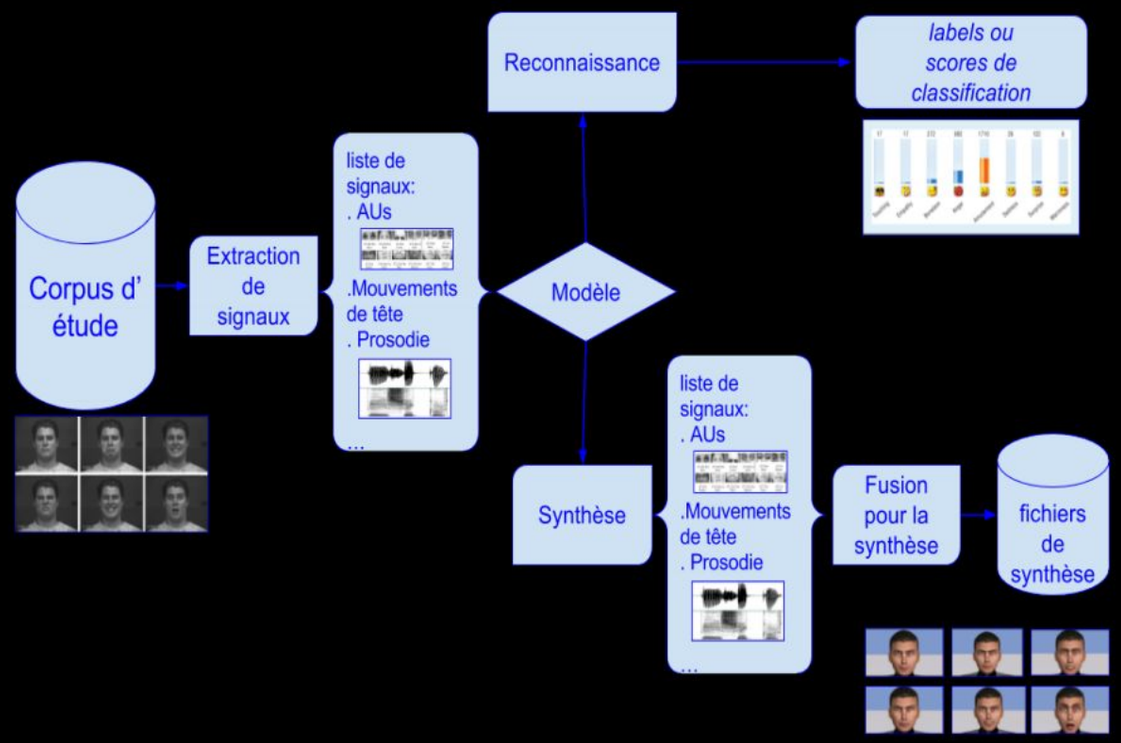
- The POTUS Corpus, a database of weekly addresses for the study of stance in politics and virtual agents. [LREC 2020]

[2014:2018]: PhD. Student at Sorbonne University (ISIR, Interaction team) and Telecom Paristech (TSI, Greta team): *Multimodal analysis and recognition of social signals: application to social stance generation in virtual agents*

- Design of a pipeline for the analysis and synthesis of social signals for virtual agent generation



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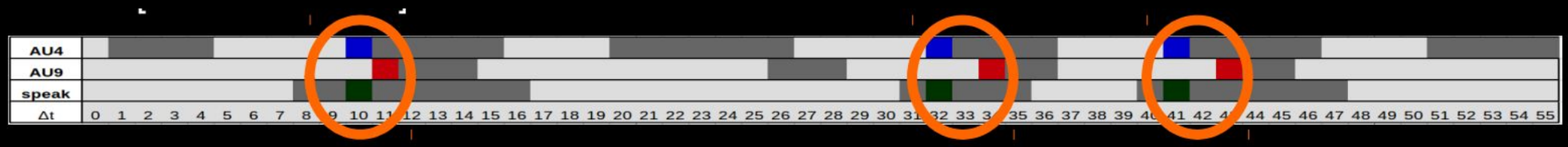
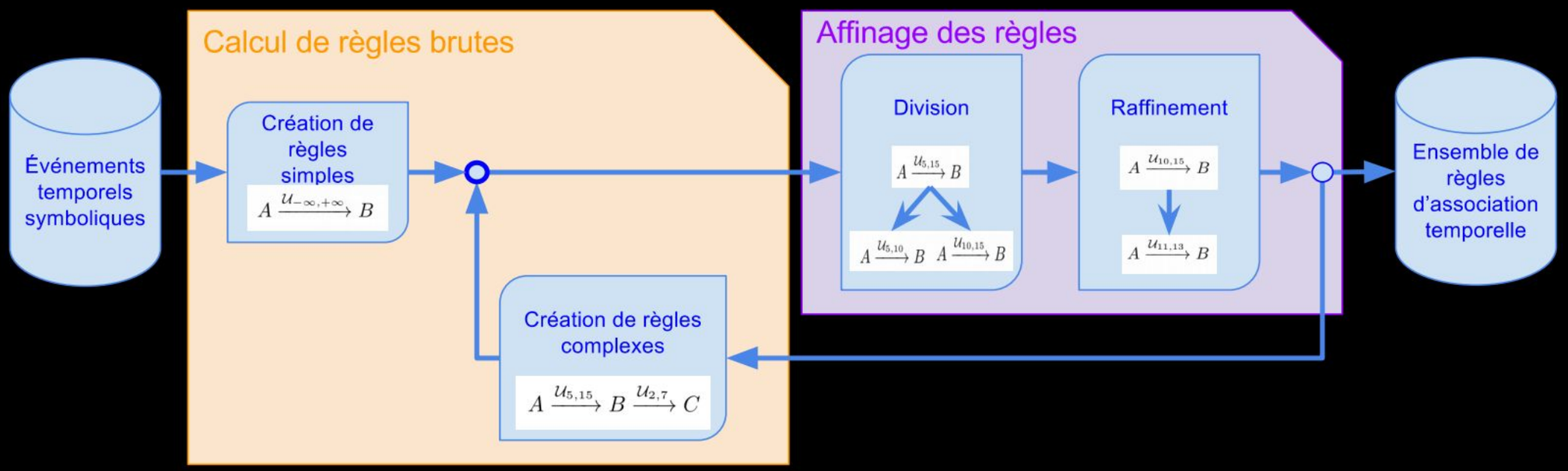
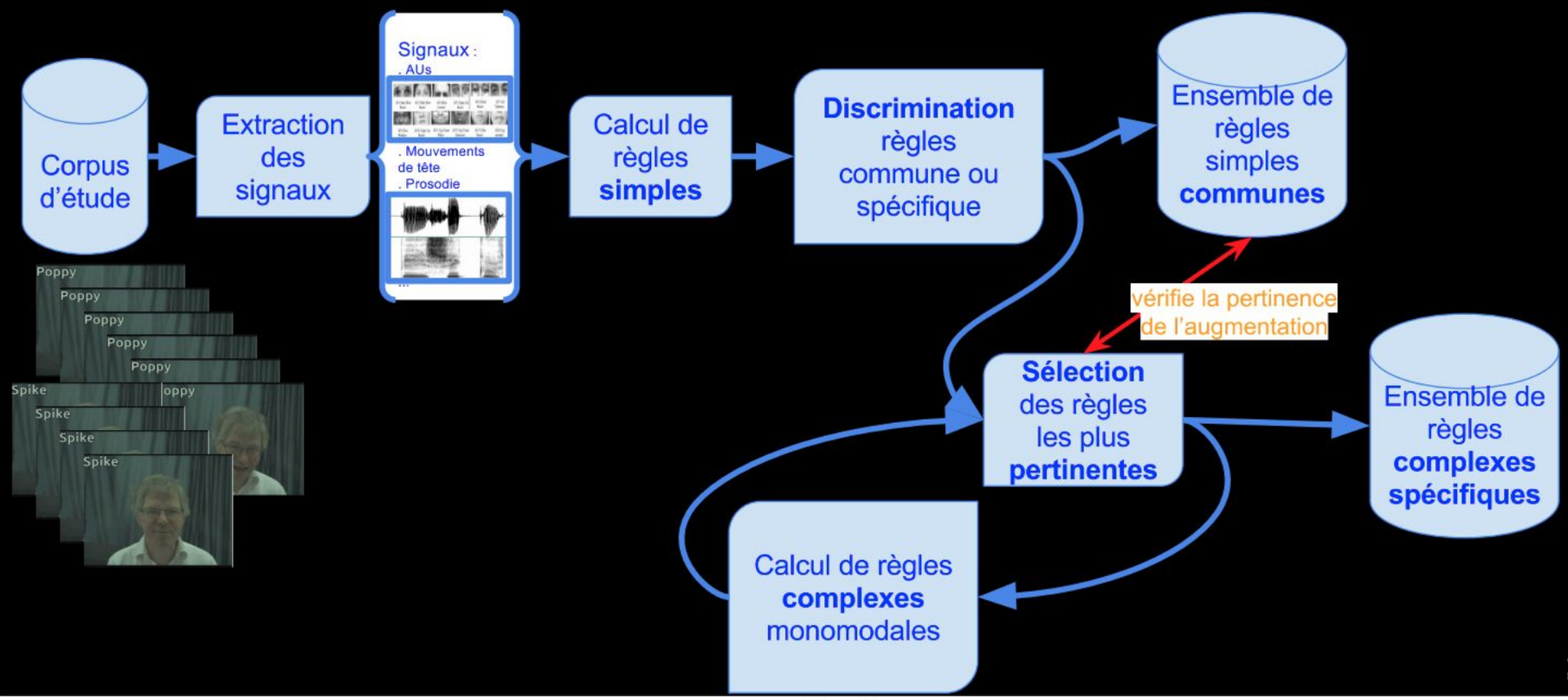


$$AU4_{activation}^{Speaking} \xrightarrow{\mathcal{U}_{\Delta t,3\Delta t}} AU9_{activation}$$



[2014:2018]: PhD. Student at Sorbonne University (ISIR, Interaction team) and Telecom Paristech (TSI, Greta team): *Multimodal analysis and recognition of social signals: application to social stance generation in virtual agents*

- Design of a pipeline for the analysis and synthesis of social signals for virtual agent generation [ICMI 2015, IVA 2016, WACAI 2016, RIA 2017]



	rule ($body \xrightarrow{\Delta t_{min};\Delta t_{max}} head$)	score
faible amicalité	début parole $\xrightarrow{49\%;52\%} f_0(-20\%) \xrightarrow{2\%;8\%} f_0(-20\%) \xrightarrow{2\%;11\%} f_0(-20\%) \xrightarrow{2\%;5\%} f_0(-20\%) \xrightarrow{0\%;6\%} f_0(-20\%) \xrightarrow{3\%;12\%} f_0(-30\%) \xrightarrow{21\%;30\%}$ fin parole	$6,2.10^{-12}$
faible amicalité	début parole $\xrightarrow{15\%;18\%} f_0(+0\%) \xrightarrow{1\%;10\%} f_0(+0\%) \xrightarrow{28\%;31\%} f_0(-10\%) \xrightarrow{0\%;7\%} f_0(+0\%) \xrightarrow{8\%;17\%} f_0(+0\%) \xrightarrow{0\%;9\%} AU4_{0\text{ to }1} \xrightarrow{21\%;30\%}$ fin parole	$1,0.10^{-12}$
faible amicalité	début parole $\xrightarrow{15\%;18\%} f_0(+0\%) \xrightarrow{1\%;10\%} f_0(+0\%) \xrightarrow{28\%;31\%} f_0(-10\%) \xrightarrow{0\%;7\%} f_0(+0\%) \xrightarrow{8\%;17\%} f_0(+0\%) \xrightarrow{2\%;6\%} rot(\text{tête})_{Y:10\text{ to }20} \xrightarrow{23\%;31\%}$ fin parole	$3,8.10^{-13}$
forte amicalité	début parole $\xrightarrow{0\%;5\%} AU4_{1\text{ to }0} \xrightarrow{12\%;21\%} f_0(+0\%) \xrightarrow{1\%;8\%} f_0(+0\%) \xrightarrow{26\%;35\%} f_0(-10\%) \xrightarrow{1\%;4\%} f_0(-10\%) \xrightarrow{0\%;9\%} f_0(-10\%) \xrightarrow{41\%;47\%}$ fin parole	$1.2.10^{-12}$
forte amicalité	début parole $\xrightarrow{0\%;5\%} AU1_{0\text{ to }1} \xrightarrow{0\%;7\%} AU1_{1\text{ to }2} \xrightarrow{25\%;33\%} f_0(-10\%) \xrightarrow{37\%;46\%} f_0(-10\%) \xrightarrow{1\%;10\%} f_0(-10\%) \xrightarrow{1\%;10\%} f_0(-20\%) \xrightarrow{13\%;17\%}$ fin parole	$5,0.10^{-13}$
forte amicalité	début parole $\xrightarrow{0\%;5\%} AU4_{1\text{ to }0} \xrightarrow{12\%;21\%} f_0(+0\%) \xrightarrow{1\%;8\%} f_0(+0\%) \xrightarrow{7\%;15\%} f_0(-10\%) \xrightarrow{16\%;25\%} f_0(-10\%) \xrightarrow{0\%;8\%} AU12_{0\text{ to }1} \xrightarrow{39\%;47\%}$ fin parole	$4,7.10^{-13}$

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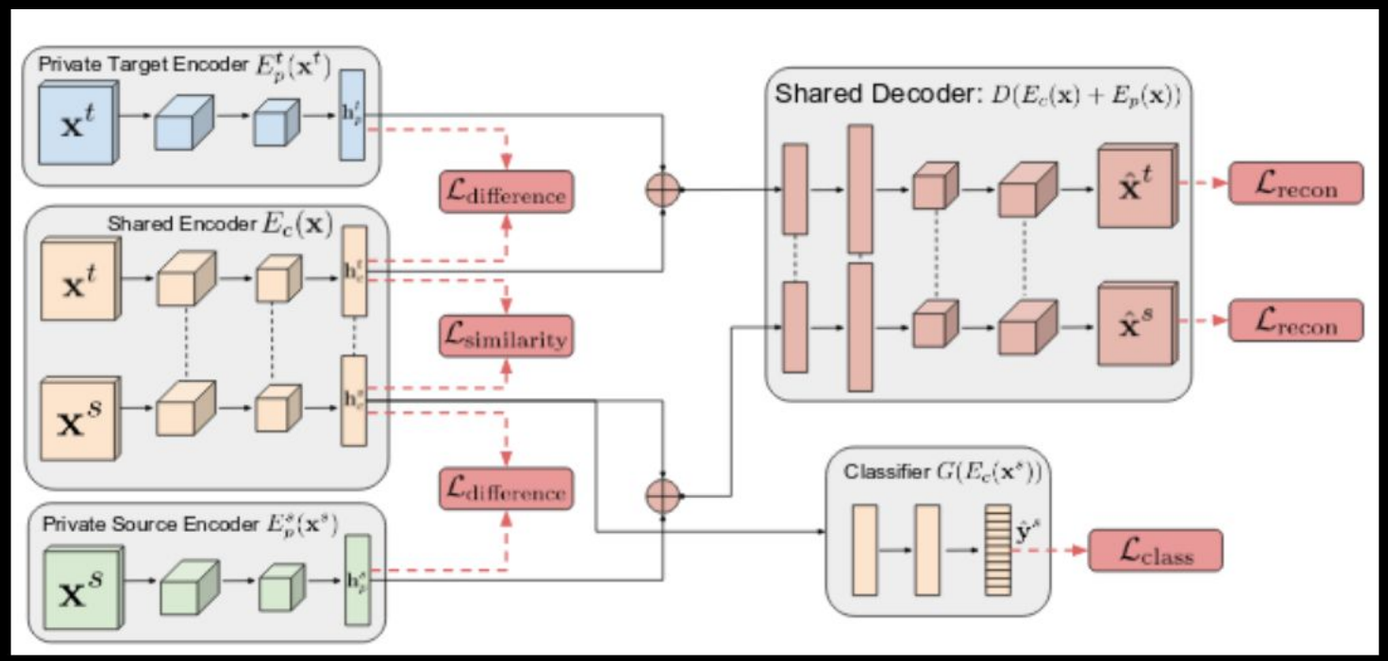
- ICT internship: from Domain Separation Network



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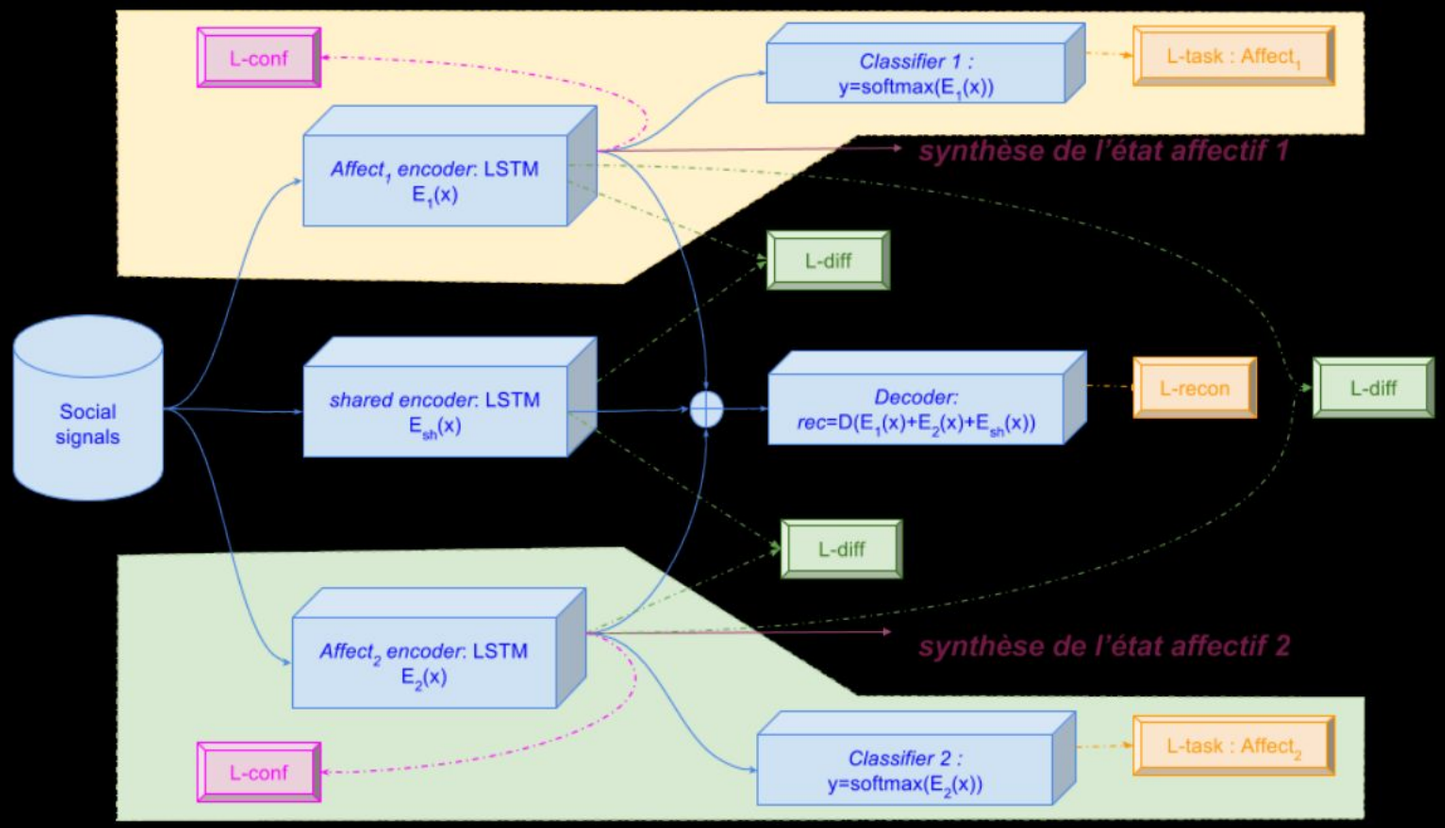
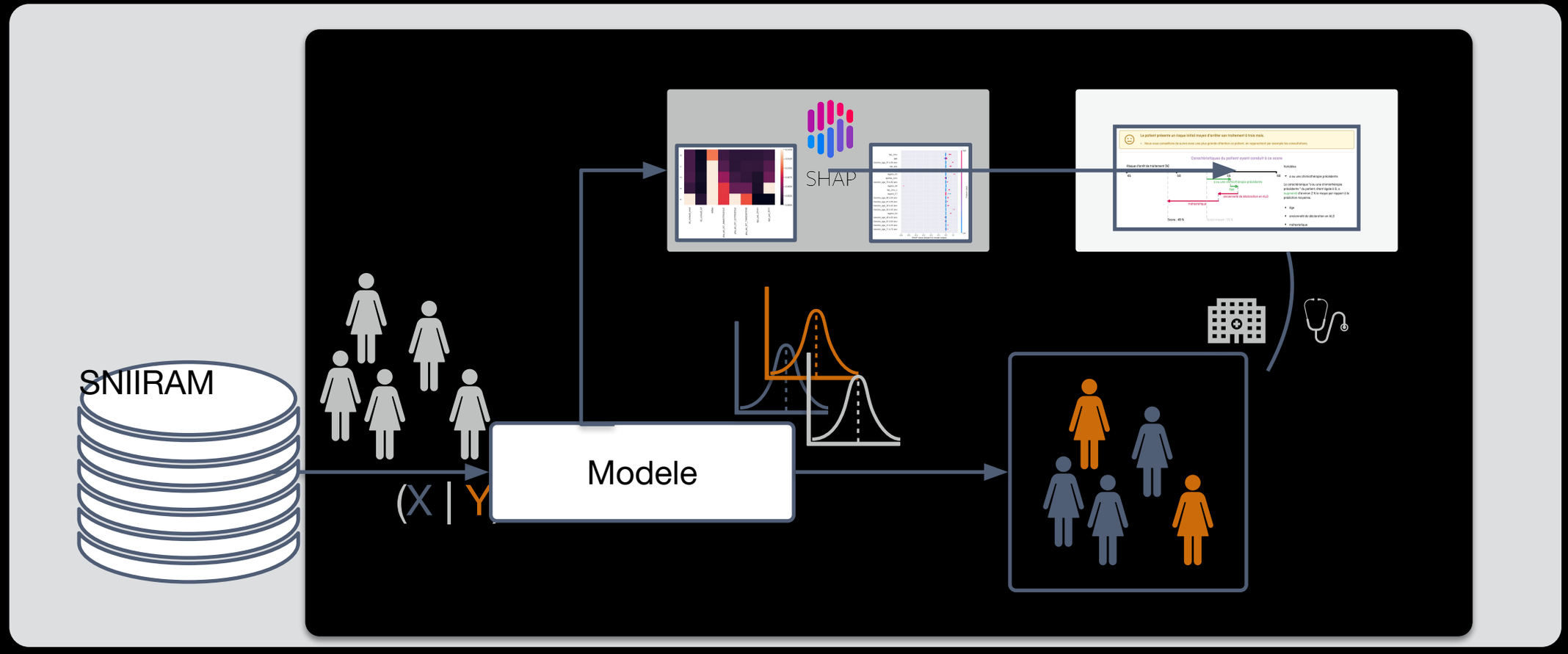
- ICT internship: to Social Separation Network



[2018:2021]: Research scientist for Sêmeia, research studies and implementation of an ML library to design predictive model of adverse events in patient care path from French Health System Data records

- Using data from SNIIRAM, records of reimbursement from the French Health System to design algorithms predicting adverse events (medication non-adherence, kidney rejection, …) [ML4H & AI4SG NeurIPS workshop 2018, CNIA 2019, IA&Santé 2020]



[2021:Now]: PostDoc at INRIA, Post-Doctoral Research Visit The role of rapport in human-conversational agent interaction:

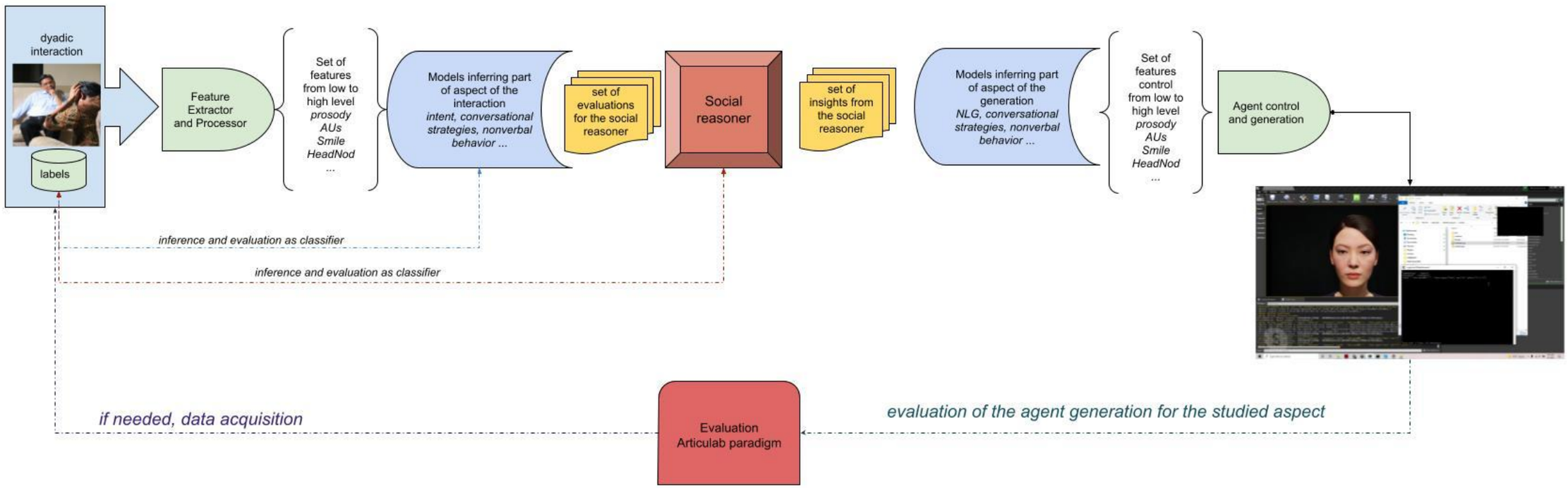
- Modeling conversation to improve task performance in human-agent Interaction: use fine-tuning of pre-trained Bert like models to classify conversational strategies (detection of *question eliciting* or *violations of social norm* in the discourse).

- Designed a pipeline to extract relevant features (Facial expressions, gazes, prosody, ...) and link them to correct clean labels (obtained by crowdfunding). To ease this step, I developed with an intern a feature analysis tool that can perform this task over a bunch of video data. I took part of the model implementation based on deep learning (LSTM, GRU, Attention models) to evaluate the rapport level during an interaction, using SHAP to be able to explain the model decision to use these insights to generate a virtual agent able to create and maintain rapport during an interaction.

- Handle the design of a python library dedicated to build embodied conversational agents (also known as ECAs, or virtual humans, or chatbots, or multimodal dialogue systems) able to engage their users in both social and task talk, where the social talk serves to improve task performance. In order to achieve this objective, we model human-human conversation, and integrate the models into ECAs, and then evaluate and interpret their performance.

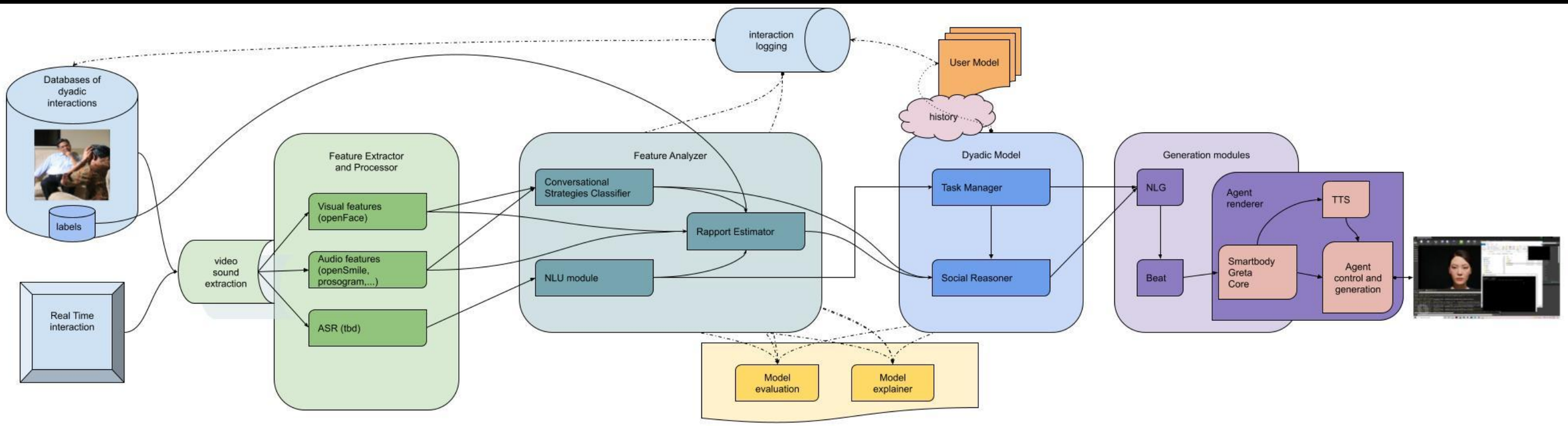
[2021:Now]: PostDoc at INRIA, Post-Doctoral Research Visit The role of rapport in human-conversational agent interaction:

Overall design of the system with the different control loops applied to guarantee the quality of the system



[2021:Now]: PostDoc at INRIA, Post-Doctoral Research Visit The role of rapport in human-conversational agent interaction:

Overview of the system design as a python library with a modular architecture



- Background
- Future Projects

As future steps of my career, I would like to apply my previous knowledge on issues such as augmenting data for multimodal model and interpretability

- Focus on multimodal data fusion: Handling multi modalities issue on how to combine multiple sources of data like verbal, nonverbal and para-verbal features. Test of fusion solutions such as Block or Pythia like ones.

- Model improvements: use of SHAP or MixMatch principles for explanation of decision but also to use the variable influence to make the model « dream » with GAN like principles to generate other samples [see What is My data Worth ? Jia 2019]

- Use these approaches to improve model decision interpretability with better insights on overall model mechanism separated between embedding computation and representation learnings.

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