The goal of this thesis is to develop a gesture model for a credible communicative robot behavior during speech. The generation of gestures will be studied when the robot is a speaker and when it is a listener. In the context of this thesis, the robot will be replaced by an embodied virtual agent. This allows applying of the outcome of this work in both virtual and real world. It is possible to test the results of this work on a real robot by transferring the virtual agent behavior to the robot, when possible, but it is not an end in itself.

In this thesis, two main topics will be addressed: (1) the prediction of communication-related gesture realization and timing from speech, and (2) the generation of the appropriate gestures during speech synthesis. When the virtual agent is listening to a human interlocutor, the head movement is an important communicative gesture that may give the impression that the virtual agent understands what is said to it and that may make the interaction with the agent more effective. In fact, gestures help in conveying information which speech alone cannot provide and need to be completed, as in referential, spatial or iconic communication. Moreover, providing multiple modalities helps to dissolve ambiguity typical of unimodal communication and, as a consequence, to increase robustness of communication. In multimodal communication, gestures can make interaction with robots more effective. In fact, gestures and speech interact. They are linked in language production and perception, with their interaction contributing to an effective communication [WHK14]. In oral-based communication, human listeners have been shown to be well attentive to information conveyed via such non-verbal behaviors to better understand the acoustic message [GM99].

This topic can be addressed in the field of robotics where few approaches incorporate both speech and gesture analysis and synthesis [GBK08, SL03], but also in the field of developing virtual conversational agents (talking avatars), where the challenge of generating speech and co-verbal gesture has already been tackled in various ways [NBND09, KW04, KBW05].

For virtual agents, most existing systems simplify the gesture-augmented communication by using lexicons of words and present the non-verbal behaviors in the form of pre-produced gestures [NBND09]. For humanoid robots the existing models of gesture synthesis mainly focus on the technical aspects of generating robotic motion that fulfills some communicative function, but they do not combine generated gestures with speech or just pre-recorded gestures that are not generated on-line but simply replayed during human-robot interaction.

Mission confiée

Context

One of the main objectives of social robotics research is to design and develop robots that can engage in social environments in a way that is appealing and familiar to humans. However, interaction is often difficult because users do not understand the robots internal states, intentions, actions, and expectations. Thus, to facilitate successful interaction, social robots should provide communicative functionality that is both natural and intuitive. Given the design of humanoid robots, they are typically expected to exhibit human-like communicative behaviors, using speech and non-verbal expressions just as humans do. Gestures help in conveying information which speech alone cannot provide and need to be completed, as in referential, spatial or iconic information [HAB11]. Moreover, providing multiple modalities helps to dissolve ambiguity typical of unimodal communication and, as a consequence, to increase robustness of communication. In multimodal communication, gestures can make interaction with robots more effective. In fact, gestures and speech interact. They are linked in language production and perception, with their interaction contributing to an effective communication [WHK14]. In oral-based communication, human listeners have been shown to be well attentive to information conveyed via such non-verbal behaviors to better understand the acoustic message [GM99].

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Informations générales

- Ville : Villers-lès-Nancy
- Centre Inria : CRI Nancy - Grand Est
- Date de prise de fonction souhaitée : 2019-10-01
- Durée de contrat : 3 ans
- Date limite pour postuler : 2019-05-01

Contacts

- Equipe Inria : MULTISPEECH
- Directeur de thèse : Duni Slim / slim.ouni@loria.fr

A propos d'Inria

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- Your degree certificates and transcripts for Bachelor and Master (or the last 5 years).
- Master thesis (or equivalent) if it is already completed and publications if any (it is not expected that you have any). Only the web links to these documents are preferable, if possible.

In addition, one recommendation letter from the person who supervised your Master thesis (or research project or internship) should be sent directly by his/her author to slim.ouni@inria.fr.

Consignes pour postuler

Sécurité défense : Ce poste est susceptible d'être affecté dans une
model that can predict the generation of gestures in the contexts of speaking and listening.

References


Compétences

Required qualifications

Master of computer science. Good background in modeling, data analysis and machine learning. First experience in speech recognition or in using a deep learning technique will be appreciated.

Language

French or English.

Avantages

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking (after 6 months of employment) and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Rémunération


Monthly salary after taxes : around 1596,05€ for 1st and 2nd year. 1678,99€ for 3rd year. (medical insurance included).