

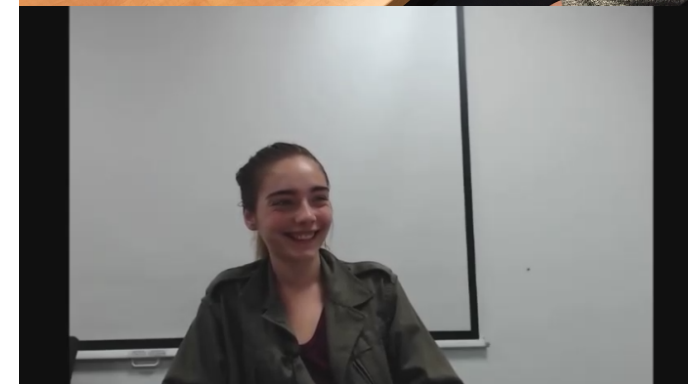
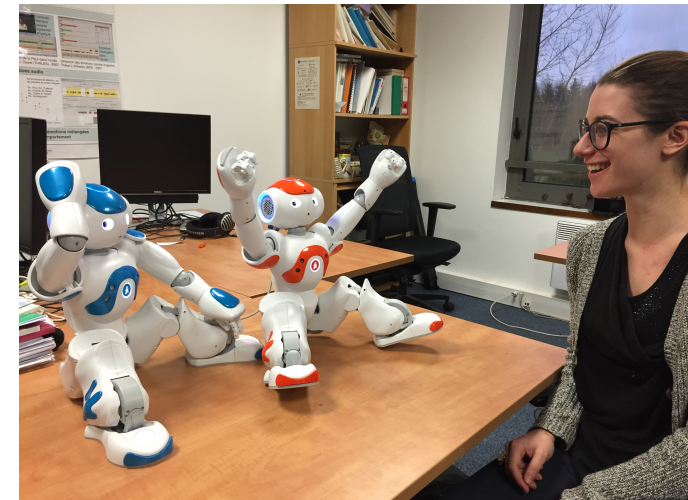
Affective and social dimensions in spoken interactions with humanoid robots - humor in HRI

- ◆ **Potential for humor in human-interaction**
 - Establishing social relationships (Nijholt, 2007)
 - Enhancing interaction (Knight, 2011)
 - Increasing cooperation (Kulms & al, 2014)

- ◆ **Several kind of humor (Neuendorf, 2011)**
 - Superiority & Excessive jokes, Incongruous & social jokes, self-derision, general knowledge

- ◆ **Humor strategies: studying 3 aspects of human-robot interaction**
 - Effect of jokes (social or excessive)
 - Effect of subjects (serious or funny)
 - Effect of answers and comments of the robot (positive or negative)

- ◆ **Machine learning (Learning Classifier System (LCS) (Holland 1976): genetic algorithm – reinforcement learning) - ExSTraCS (Urbanowicz & al, 2009)**



Experiments

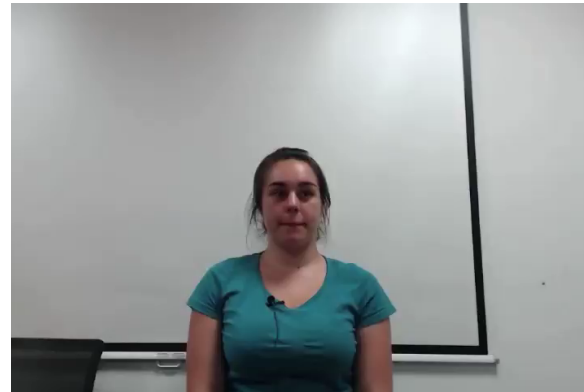
- Goal: Validate the robot humor strategies, and their impact on the interaction quality
- Different set of rules :
 - after **riddles** (4 types) and **comments** (pos/neg)
 - Parameters : dimensions of **liking**, **trust** and **dominance** computed from **questionnaires**, **age**, **sex**, a **sense of humor scale** of participants
 - 18 subjects

Using four kind of riddles

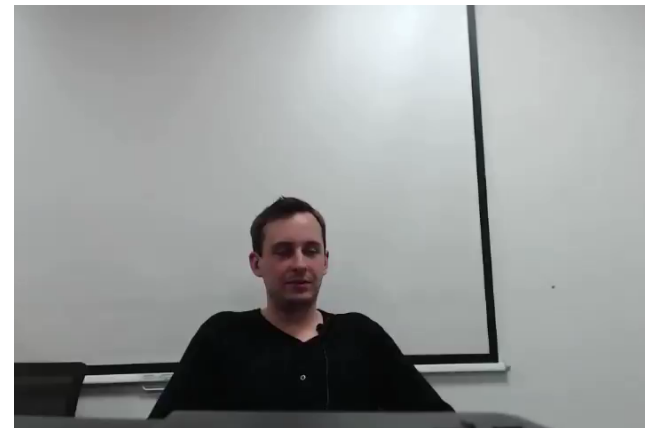
Social



Excessive



Self-derision



General knowledge

Rules creation

Created rules : 72 rules for each set

set 1 : Liking + Trust + Dominance + jokeType + Sex + Age + Sense of Humor Scale → (Liking' | Trust' | Dominance')

set 2 : Liking + Trust + Dominance + commentType + Sexe + Age + Sense of Humor Scale → (Liking' | Trust' | Dominance')

Using the rules for the robot behavior : an exemple

- Extracted rule : [1-1#10000]
- Translation in natural language :
“Women under 30 years and a SHS-score below 100 are more likely to appreciate the robot after a social joke”.
- Algorithm for the robot's behavior :
If $Age_p < 30$ and $SHS_p < 100$ and $Sex_p = \text{Woman}$
Then $Topic \leftarrow \text{Joke}_{\text{SOCIAL}}$

Humor in HRI

- Work in progress:
 - adapt the robot humoristic strategies in further experimentations to **evaluate** and **validate their robustness (age (ROMEO2) and cultural differences (JOKER) EN/FR)**
 - **use** the multimodal **behavior** of subjects to compute liking, trust and dominance / or engagement measures for learning behavioral rules
 - study of a new database collected at the LIMSI cafeteria (8h) : 45 French speakers in social interaction with NAO using the JOKER **intelligent user interface providing a multimodal dialogue system with social communication skills including humor, empathy, compassion.**
 - longitudinal study – new data collection in May.