

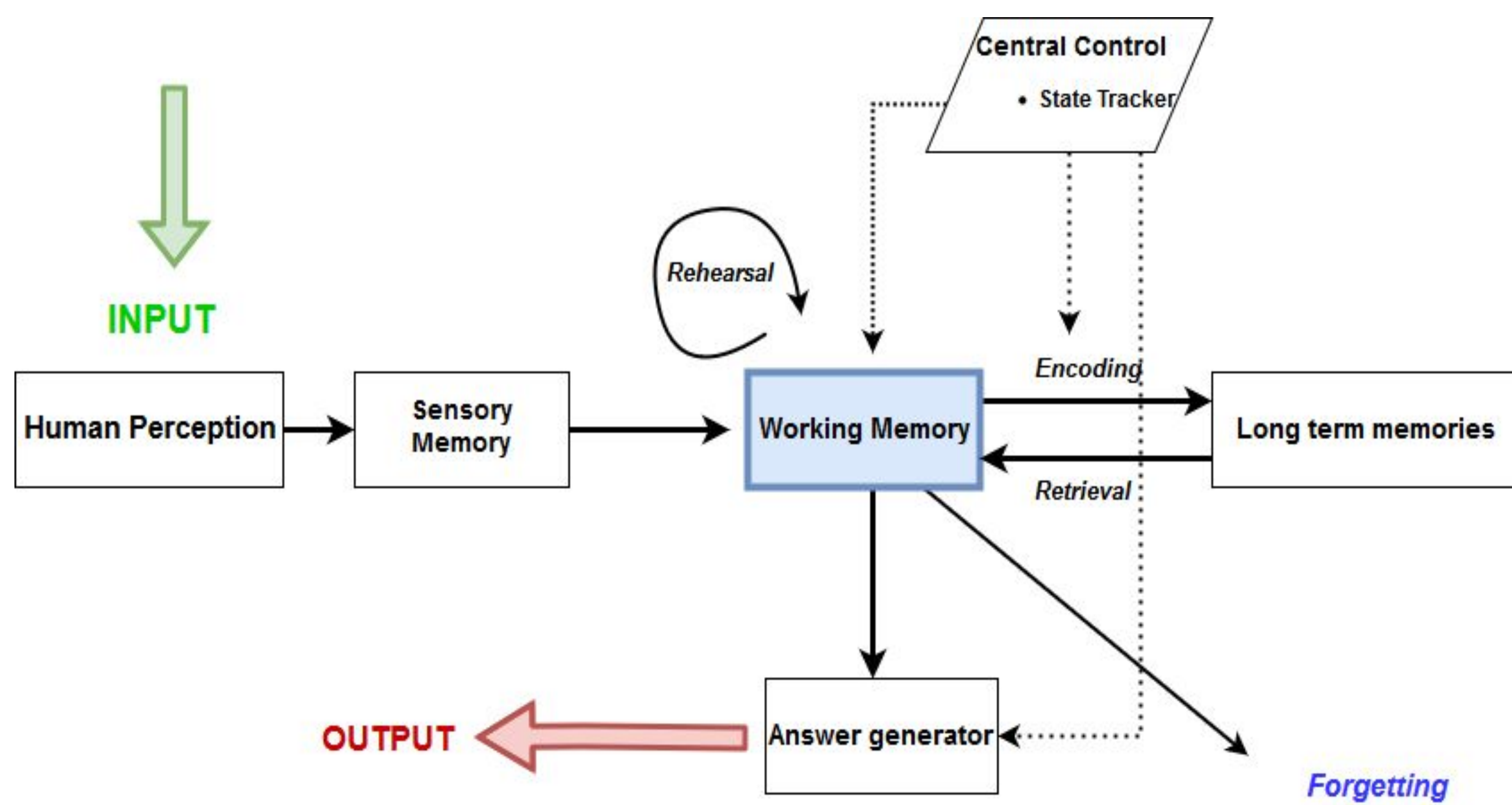
Dialog systems and Memory

Léon-Paul Schaub^{1,3,4} & Cyndel Vaudapiviz²

directeur : Patrick Paroubek | encadrant : Gil Francopoulo

¹Akio ²Er-Tim, INALCO ³LIMSI-CNRS ⁴Université Paris Saclay

1. DIALOG MEMORY MODEL [1]



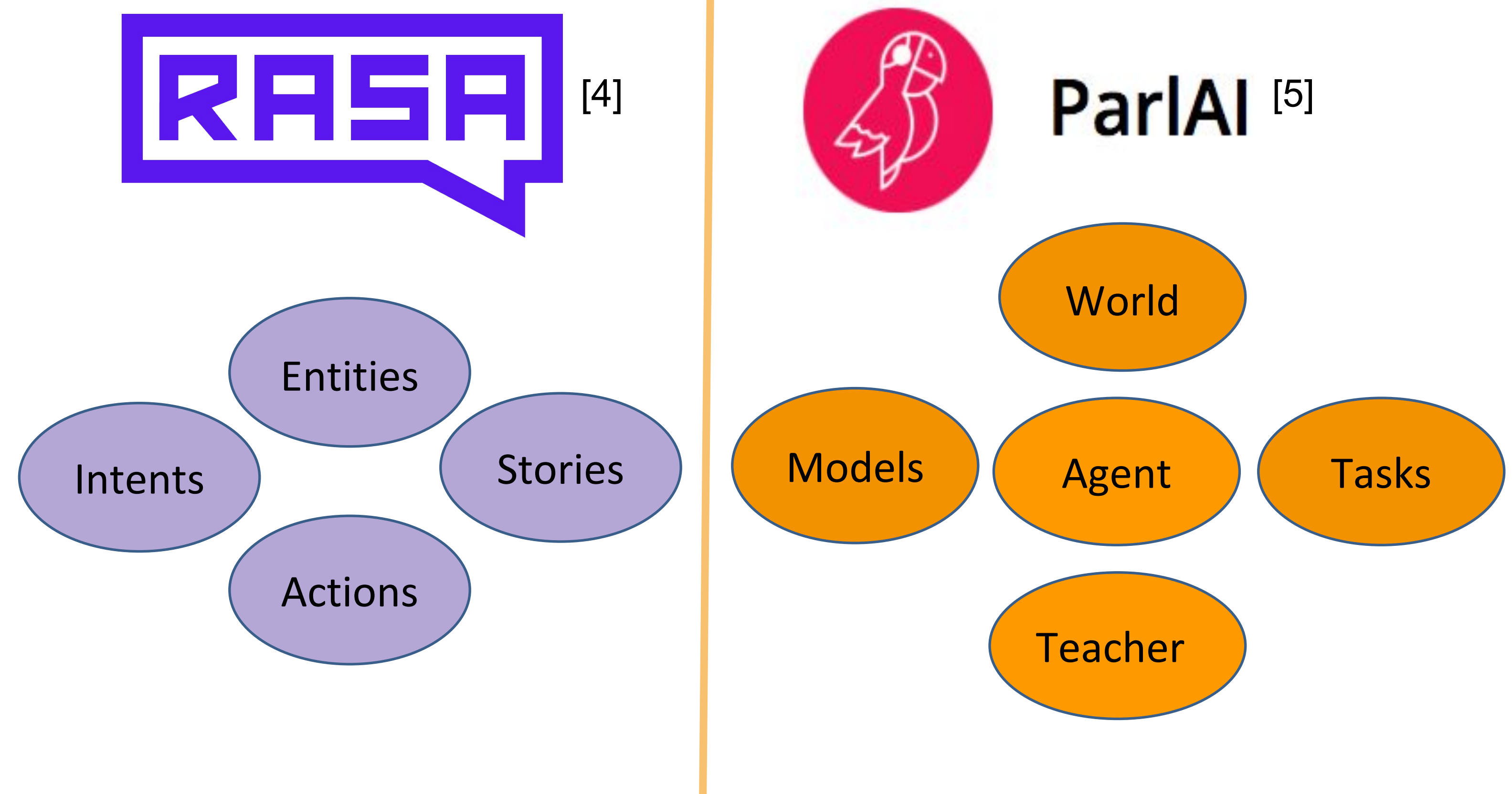
2. CHALLENGES

- IMPROVE performance of dialog systems in real-life cases with a good task adaptation.
- DEVELOP new memory-based models [6] inspired by human cognitive memory models in order to have more realistic dialogs.
- EVALUATE the model on mixed goal-oriented tasks including chitchat subdialogs.

3. PROPOSITION [3]

NLU	DM	NLG
Paraphrase	NLU encoding	Linguistic realizat.
Listener / Speaker	Dialog state track	K-B request
Sentiment Anl.	Error management	Recomposition
Question / Answering	Answer decision	
Auto summary	Forget-Remember	

4. APPLICATION



5. EXPECTED RESULTS

New architecture for cognitive memory based goal-oriented dialog system with :

- WORKING MEMORY - buffer conversation history
- EPISODIC MEMORY - past conversations
- SEMANTIC MEMORY - knowledge base
- Strong dynamic coupling between the three memory modules

Proactive & Retroactive interference deletion [8]

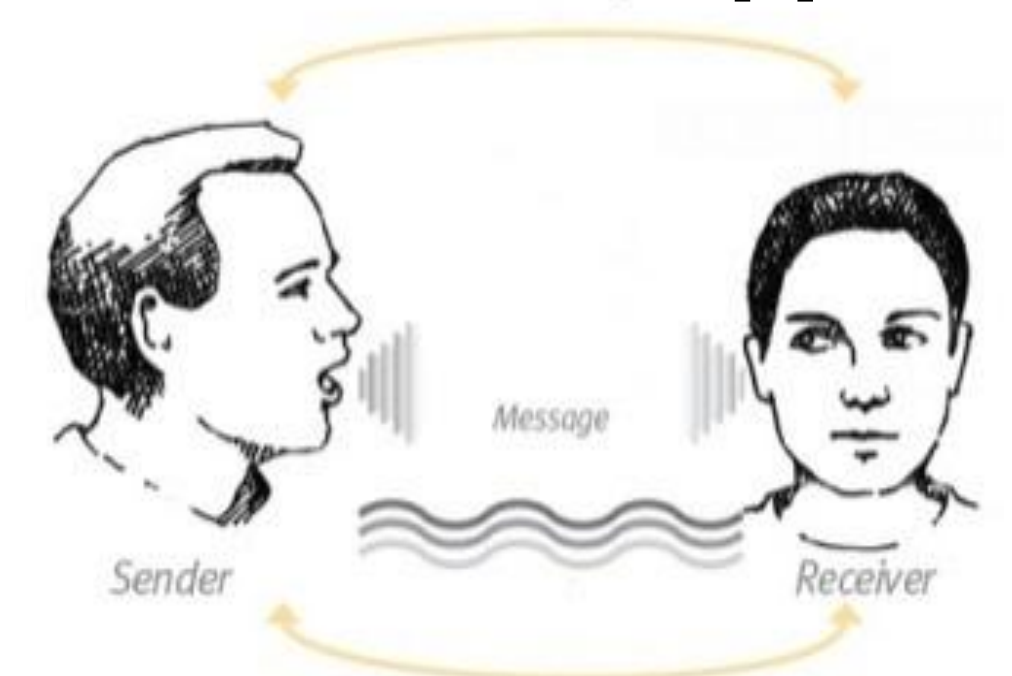
6. FUTURE WORK

GANs [2]

$$\min_G \max_D V(D, G)$$

$$V(D, G) = \mathbb{E}_{x \sim p_{data}(x)} [\log D(x)] + \mathbb{E}_{z \sim p_z(z)} [\log(1 - D(G(z)))]$$

COSMO [7]



REFERENCES

- [1] Tulving, E. (1972). Episodic and semantic memory. *Organization of memory*, 1, 381-403.
- [2] Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., ... & Bengio, Y. (2014). Generative adversarial nets. In *Advances in neural information processing systems* (pp. 2672-2680).
- [3] Chen, H., Liu, X., Yin, D., & Tang, J. (2017). A survey on dialogue systems: Recent advances and new frontiers. *Acm Sigkdd Explorations Newsletter*, 19(2), 25-35.
- [4] Bocklisch, T., Faulkner, J., Pawlowski, N., & Nichol, A. (2017). Rasa: Open source language understanding and dialogue management. *arXiv preprint arXiv:1712.05181*.
- [5] Miller, A. H., Feng, W., Fisch, A., Lu, J., Batra, D., Bordes, A., ... & Weston, J. (2017). Parlai: A dialog research software platform. *arXiv preprint arXiv:1705.06476*.
- [6] Sukhbaatar, S., Weston, J., & Fergus, R. (2015). End-to-end memory networks. In *Advances in neural information processing systems* (pp. 2440-2448).
- [7] Barnaud, M. L., Bessièrre, P., Diard, J., & Schwartz, J. L. (2018). Reanalyzing neurocognitive data on the role of the motor system in speech perception within COSMO, a Bayesian perceptuo-motor model of speech communication. *Brain and language*, 187.
- [8] Baddeley, A. (1992). Working memory. *Science*, 255(5044), 556-559.