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PAPER TITLE: Translating Neuralese

1. What is the main problem or issue that the authors are addressing?

Ans: According to the author, machines can communicate with each other using a differentiable communication channel, which is in machine language by communicating their states over a period of time and computing the actions.

The author proposes the use of natural language to convey states, and the belief of the agent about their immediate environment, and this would take much less number of state tracking for both the agents in the driving game and color-identification game. But the problem is there is no existing dataset that defines the inter agent messaging as message vectors and converts them to natural language and vice versa. In a standard Markov process if two agents two agents a and b does action at time t denoted by ua(t), ub(t) which changes their states respectively, and they communicate it with the other agent. The agents uses a deep Q RNN for their policy. The work is based on the paper by Lazaridou et al 2016. In short, the author tries to establish that machine language can be converted to natural language and vice versa for multi-agent cooperation

1. Provide a short summary of the authors’ approach/argument.

Ans: The author uses 2 games the driving game, where two cars navigate an intersection, the XKCD color dataset for color identification and the Caltech birds dataset with accompanying natural language descriptions. The main challenge was that there was no preexisting dataset that converted the neuralese to natural language. They constructed 2 models, the ‘learned agent model’ and the ‘human model’(‘Deaf Human Model’). The model human matches the neuralese 83% time for color task and 77% of the bird identification task. In case of the games they took 400 games and 2000 messages exchanged, from which 100 game traces were used as the test set.

Propositions:

1. Semantic translations reward rational listeners. Rational listeners choose the best action wrt speaker’s state.
2. Semantic translations find hidden states.
3. What are the main strengths and/or weaknesses of the approach?

Ans: The main weakness of this approach is that they don’t consider the fact that sometimes in navigation signals and message vectors can be corrupted by the channel, if the driving game was happening in real life.

Based on the bird from the Caltech dataset the listening rational agent was not asked to change its state to a strategy or in other word the bird type was not asking the agents to change their respective strategies.

1. Provide at least 1 question regarding the paper that you’d like to address during class discussion.

Ans:

How to use this technology to enable robots to play better robo soccer?

How to use this to regularize or fill the gaps during loss of communication in a real world?

How to compensate for a lossy communication medium if this is implemented in the real world?