Towards Multi-Agent L-NovelD
Current progress & First results

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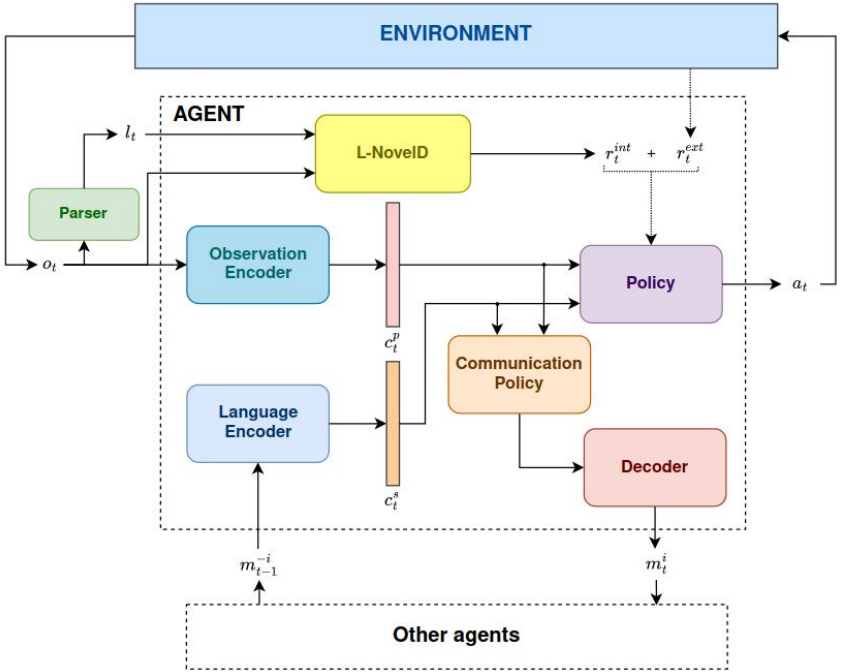
Developing MA-L-NovelD

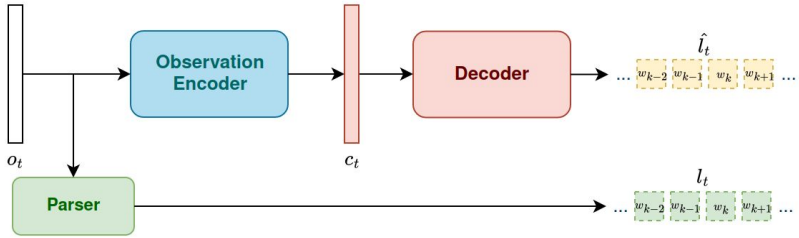
Steps



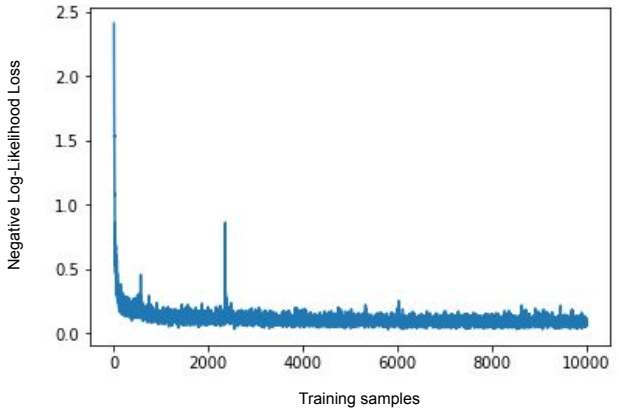
Task		Status
L-NovelD	Build	Done
	Test	Done
Language Encoder	Build	Done
	Test	Done
Decoder	Build	Done
	Test	Done
Observation Encoder	Build	Done
Learning decoding (observation captioning		Ongoing
Learning encoding (contrastive learning)		
Communication policy	Design	
	Build	
	Test	
Policy	Integrate	
Code training algorithm		
Train		

Developing MA-L-NovelD

Modules: Observation encoding, training the decoder



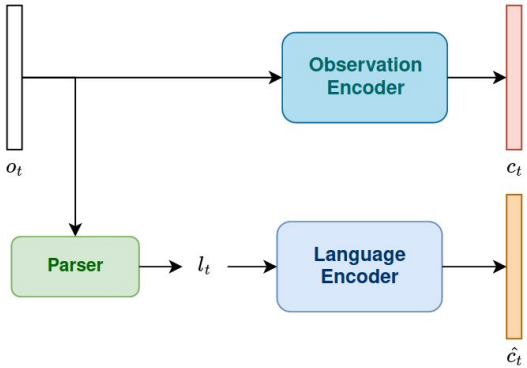
Task: Generating the caption from the observation.



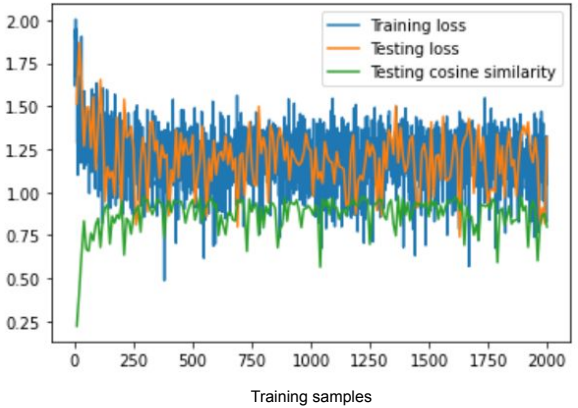
- Easy to learn
- Very slow
- Will overfitting be an issue ?

Developing MA-L-NovelD

Modules: CLIP learning, training the encoders



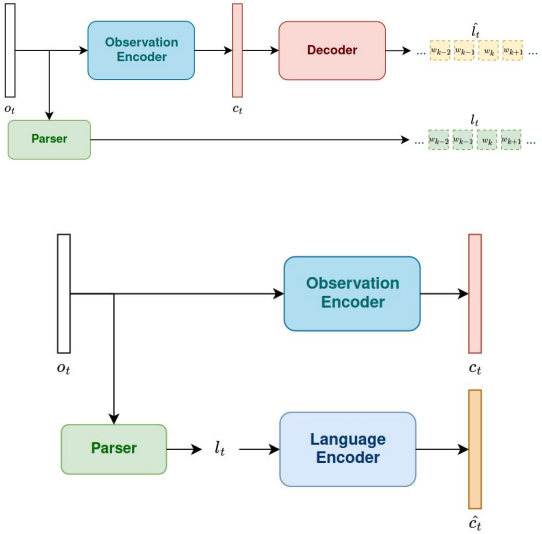
Task: Generate similar encodings of the observation and the description.

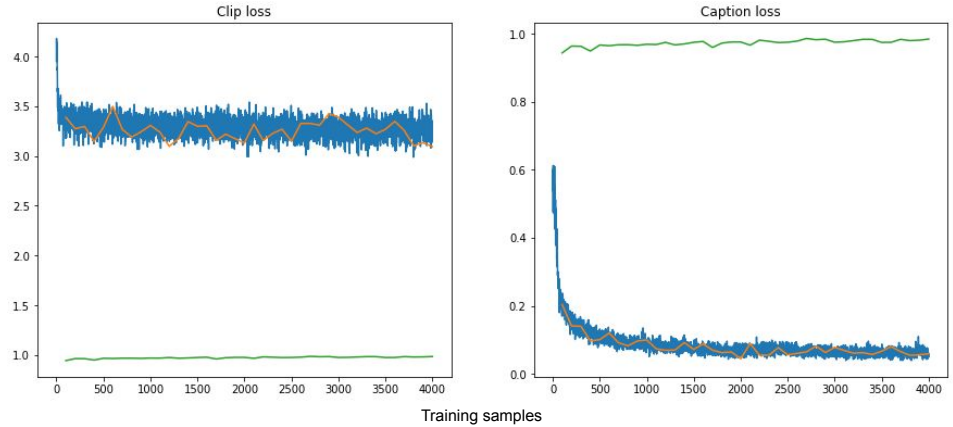


- Easy to learn
- Fast

Developing MA-L-NovelD

Modules: Training the encoders and decoder at the same time

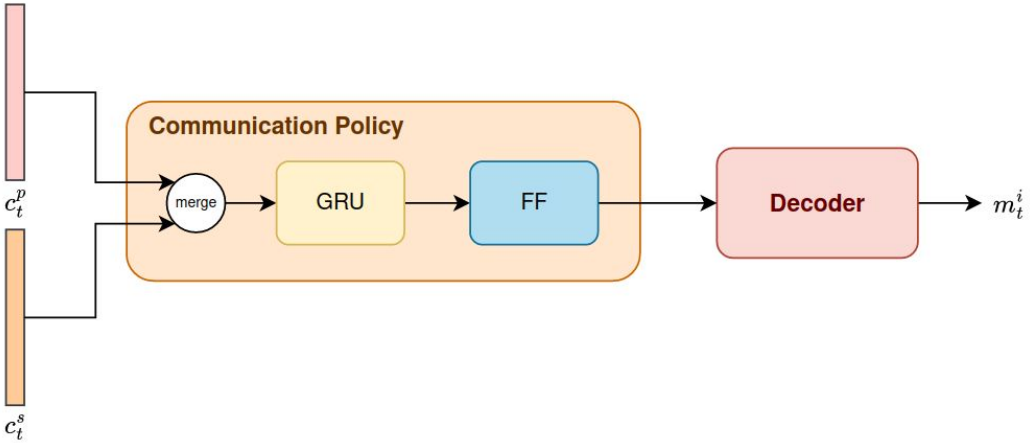




- Best learning rate = 0,007
- Best context dimension = 16
- Best batch size = the more the better

Developing MA-L-NovelD

Modules: Communication policy

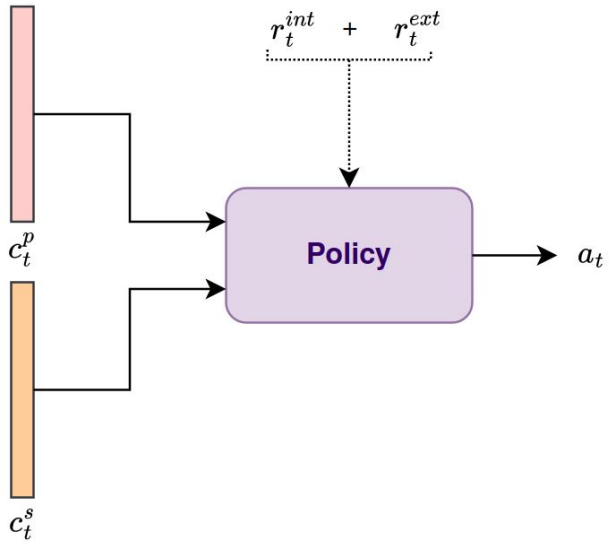


Options for merging:

- Concatenation
- Average
- Addition
- Feed forward neural network

Developing MA-L-NovelD

Modules: Policy

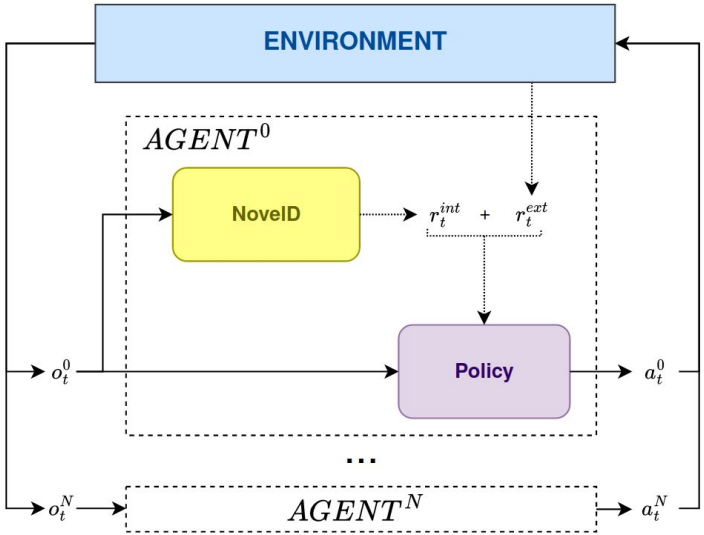


First steps:

- Re-implement MADDPG
- Proper training by frames
- Add NovelD…

Developing MA-L-NovelD

Modules: MADDPG with Per-Agent NovelD



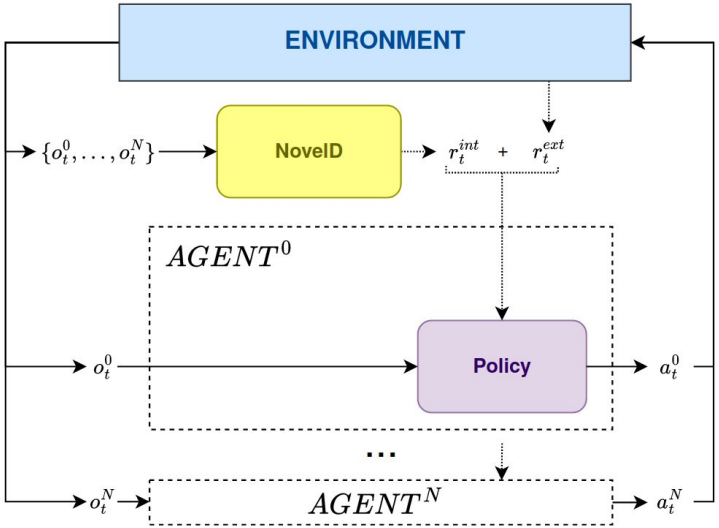
MADDPG_PA_NOVELD

- One NovelD module for each agent

→ We look for local novelty

Developing MA-L-NovelD

Modules: MADDPG with Multi-Agent NovelD



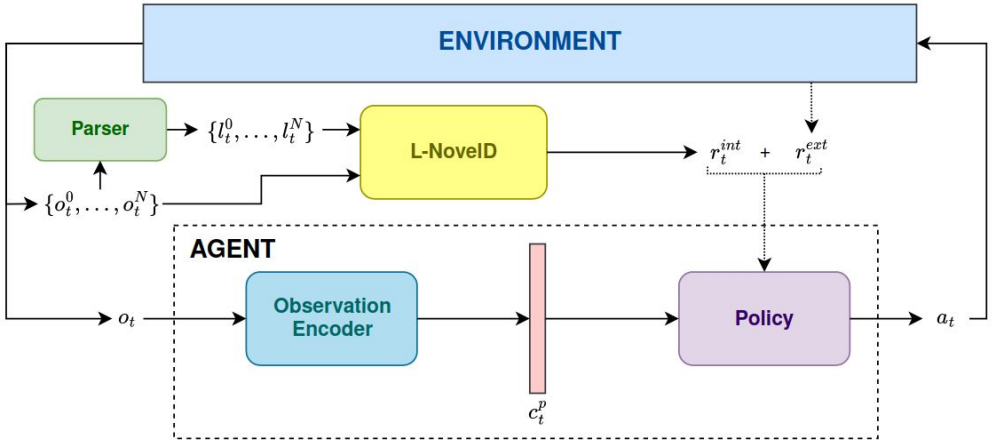
MADDPG_MA_NOVELD

- One NovelD module for the whole multi-agent system

→ We look for novelty in the joint observations

Developing MA-L-NovelD

Modules: Towards Multi-Agent L-NovelD

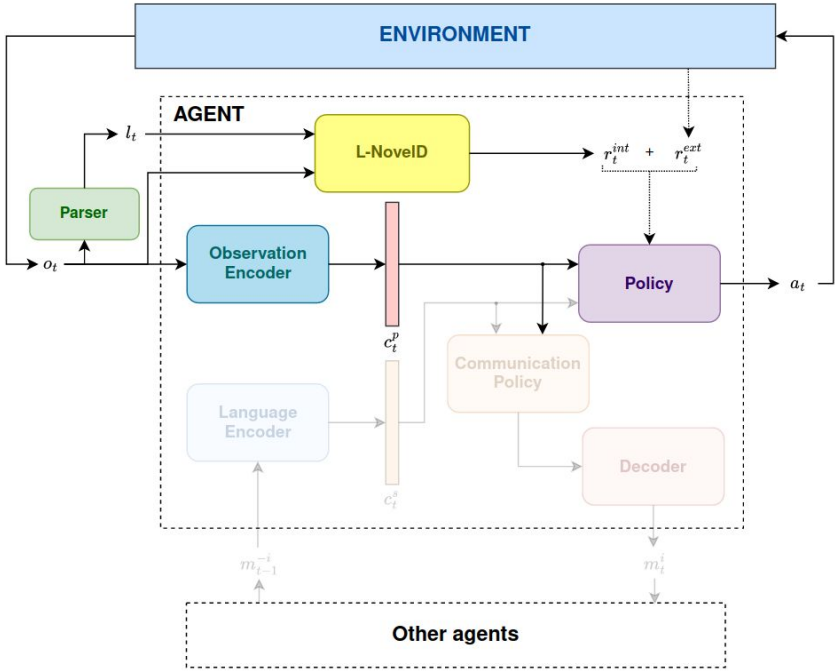


MALNOVELD_v1

- One L-NovelD module for the whole multi-agent system
- Language and Observation encoders learnt with CLIP

Developing MA-L-NovelD

Current progress



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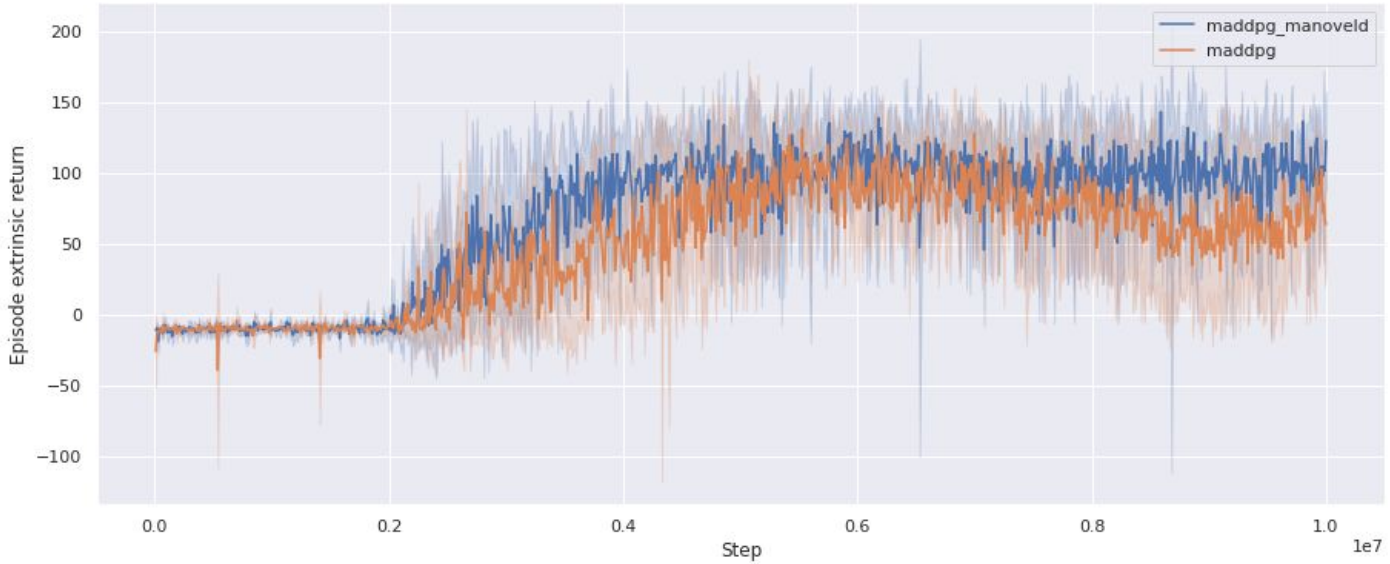
Observation Captioning	Training	Done
	Find best hyperparameters	Done
Contrastive Learning	Training	Done
	Test selecting minibatch elements	Done
	Find best hyperparameters	Done
CLIP + Captioning	Training	Done
Communication policy	Design	Done
	Build	Done
	Test	Done
Policy	Redo MADDPG, train by frames	Done
	Add NovelD per agent	Done
	Add NovelD multi-agent	Done
	Add LNovelD	Done
	Add Language learning	Done
	Add QMIX	
Add communication		
Train		Ongoing

Training

First results: NovelD

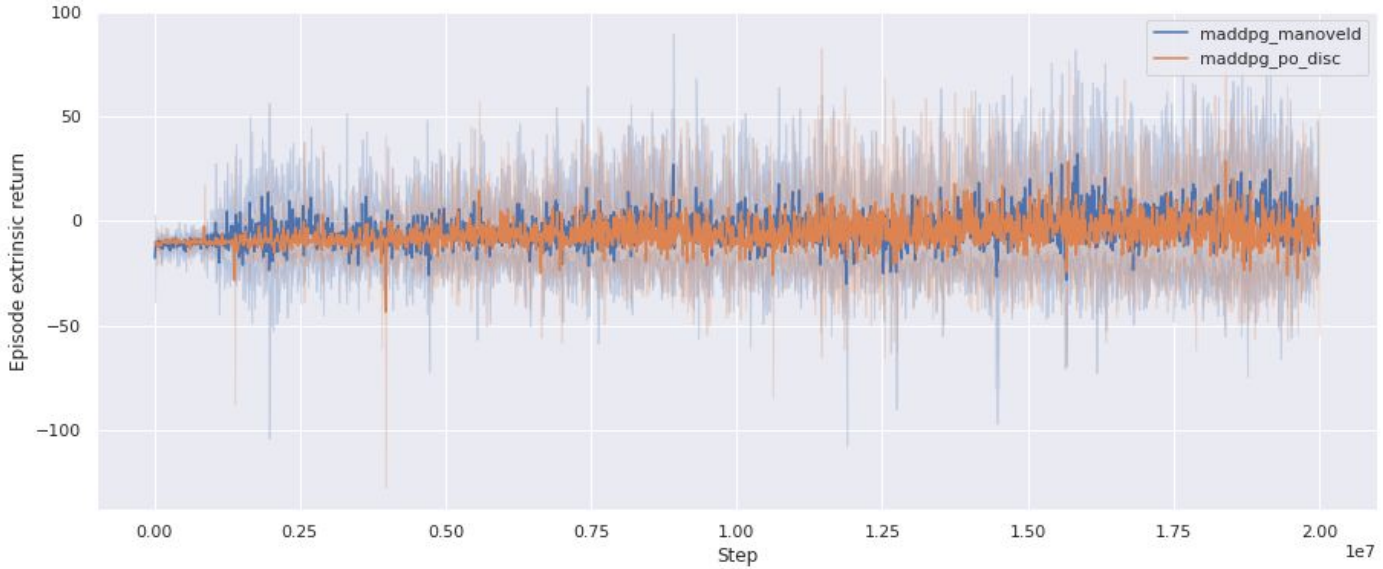
Fully observable environment (5 runs each)



Training

First results: NovelD

Partially observable environment (11 runs each)



Training

First results: MALNovelD

Not enough runs for now… promising results though…

Training

Early findings

- NovelD alone does not help a lot
- Language adds a lot of compute time
- More hyperparameters to tweak

Next steps

- Train more runs
  - With other hyperparameters
  - With PA-(L-)NovelD
- Code QMIX
- Code PA+MA NovelD
- Try other tasks
- Start writing paper

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Add communication		
Train		Ongoing

Upcoming conferences

Conference	Submission
AAMAS 2023	October 21, 2022
SWARM 2023	October 27, 2022

Thank you for you attention !

Questions ?