SAIDA PROJECT

FIRST PROBLEM DEFINITION

OUTLINE

- Project
- Problem #1
- Reference
- Pass/Fail Condition

PROJECT

- Starcraft is most challenging and motivated problem especially in reinforcement learning world.
- You will solve three main problem step by step over 6 month.
- Through solving three problem, you will be an expert for reinforcement learning.

WHY STARCRAFT I?

StarCraft I is close to real world with reasons like followings.

Partially Observed State

- Fog of War
- Agent can't recognize everything about enemies.

Long-Play Time

- 24 frames per second
- 20~30 minutes game play time
- Very sparse reward

Huge Observation and Action Space

- Huge observation action space
- About 100 million actions per step
- The number of cases is 10^1685

Heterogeneous & Multi Units

- Needs to control multiple units at one time
- Needs to cooperate each other to achieve shared goals

PRE-REQUISITE

- Understanding Reinforcement Learning
- Understanding StarCraft I and how to beat enemy units
- Python Programming and Deep Learning Framework(Prefered F/W : Pytorch, Keras, TF 2.0+)
- SAIDA-RL (Reinforcement Learning Research Platform based StarCraft I Environment)

ABOUT SAIDA-RL

We provide challenging problems and multi agent environment and agent side various examples and give researchers with high degree of freedom designing environment, observation, and action.

	Environment	Flexibility	Difficulties	Baselines	Multi Agent
SAIDA RL	Starcraft I	High	Hard	Yes	Yes
Gym & Universe (OpenAI)	Atari and Locomotions	Low	Easy	No	Experimental
PySC2(DeepMind)	StarCraft II	Low	Very hard	No (Dopamine)	No
TorchCraft(Facebook)	Starcraft I	Low	Hard	No (Horizon)	Recently added
ELF(Facebook)	Very simple RTS	Middle	Easy	No	Yes
ML-Agents(Unity)	Games based on Unity	-	-	Yes (ML kits)	Yes

ABOUT SAIDA-RL

Classification	Algorithms	Keras-RL	SAIDA-RL
Value	DQN	√	√
Value	Double DQN	√	√
Value	Dueling DQN	√	√
Value	DRQN		√
Value	Continuous DQN		√
Value	Deep SARSA	√	√
Actor Critic	DDPG		√
Policy Gradient	PPO		√
Multi Agent	MADQN		√
Multi Agent	BiCNet		√
Multi Agent	MADDPG		√

SUB-PROBLEM #1 : VUL_VS_ZEAL_V0(~3)

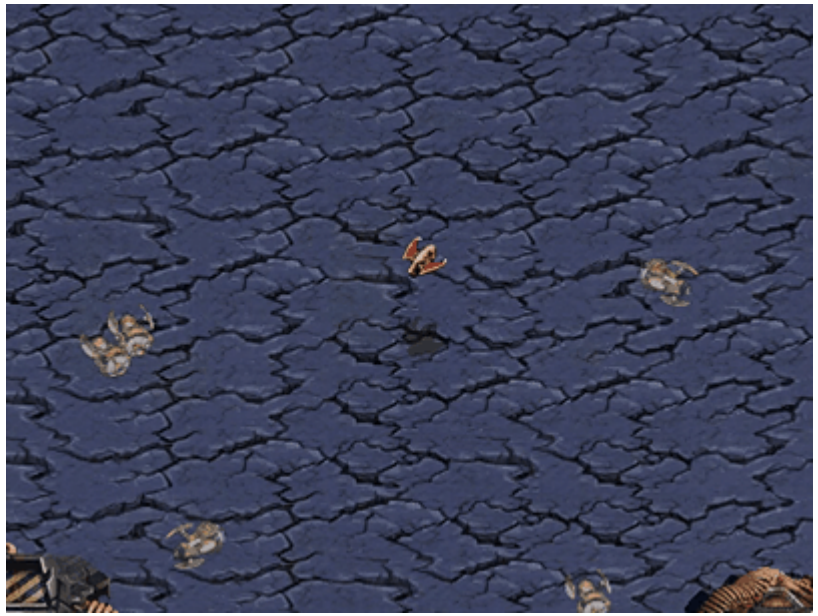
- Agent(Terran Vulture) should kill all Protoss Zealots while being damaged minimally. The number of zealots and existence of terrain depend on the version of map.

Environment Name	VultureVsZealot
Agent	Vulture
Terrain(Y/N)	It depends on the version of map.
Action Space	Move to specific direction, Patrol to enemy(meaning attack)
Termination Condition	kill all Zealots or defeated

SUB-PROBLEM #2 : AVOID_OBSERVER_V0

- Reach the top of map while avoiding observers in the middle area.

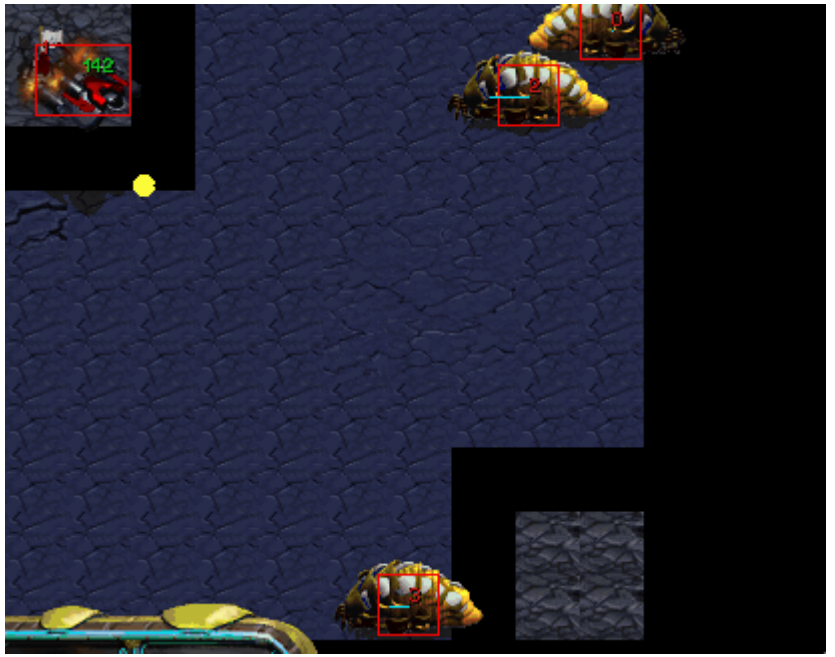
Environment Name	AvoidObserver
Agent	Scourge
Terrain(Y/N)	N
Action Space	Move to specific direction
Termination Condition	Reach the goal or bumped with observers



SUB-PROBLEM #3 : AVOID_REAVER_V0

- Reach the right-bottom area of the map while avoiding reavers in the middle area.

Environment Name	AvoidReaver
Agent	DropShip
Terrain(Y/N)	It depends on the version of map.
Action Space	Move to specific direction
Termination Condition	Reach the goal



REFERENCE

GitHub page

https://github.com/teamSAIDA/SAIDA_RL

Installation guide

https://github.com/teamSAIDA/SAIDA_RL#installation

Tutorials

https://github.com/teamSAIDA/SAIDA_RL#tutorials

API

https://github.com/teamSAIDA/SAIDA_RL#api

PASS / FAIL CONDITION

- 3 Scenario needs to be completed
  - Each scenario's win rate over 90% within last 100 games.
  - If you solve a scenario over version 1or2 which means having more difficulty, you will get additional bonus.
- Reward, Observation Engineering could be allowed.
- Total training episode count will be used to relative evaluate.