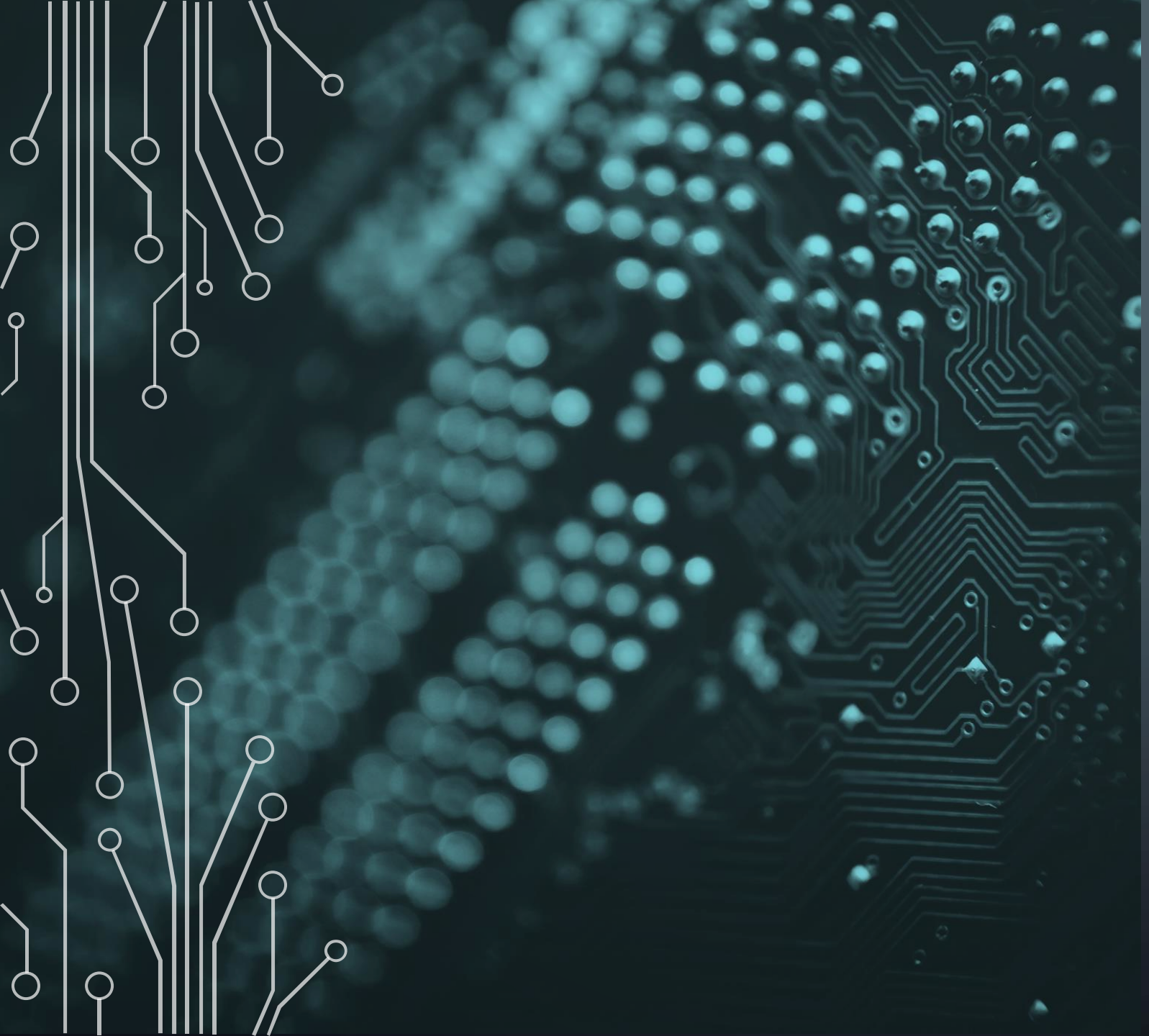
TANGRAI

PAU CUTRINA VILALTA

CARLES PREGONAS GRAELLS

SAMIR KANAAN IZQUIERDO

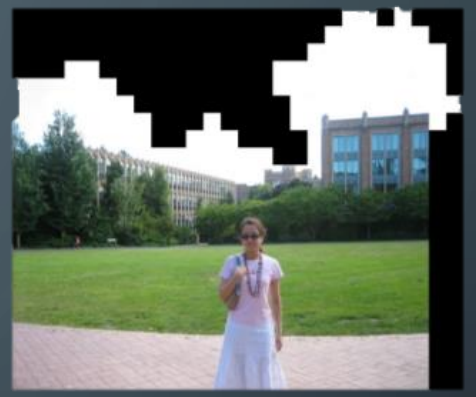


- INTRODUCTION
- SCOPE
- CURRENT STATE
- PENDING TASKS

BACKGROUND

Previous research done:

- Puzzle
- Rubik's cube
- Tetris
- Others:



Initial State

1	2	3
8		4
7	6	5

Goal State

2	8	1
	4	3
7	6	5

		1	2			
		1	1	0	4	3
2	2					
1	2					
	2					
2	1					
	0					

https://pathak22.github.io/large-scale-curiosity/

https://blog.openai.com/reinforcement-learning-with-prediction-based-rewards/

https://sandipanweb.wordpress.com/2017/03/24/solving-4-puzzles-with-reinforcement-learning-q-learning-in-python/

PROPOSED PROJECT

TangrAI goals:

- Minimize the empty spaces.
- Use all the seven pieces.

SCOPE

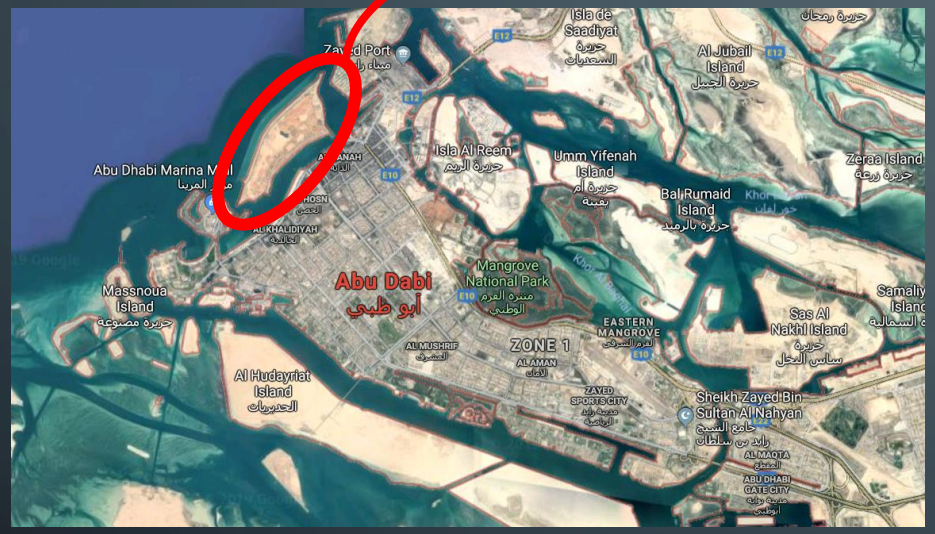
WHAT ARE WE LOOKING FOR?

Project scope:

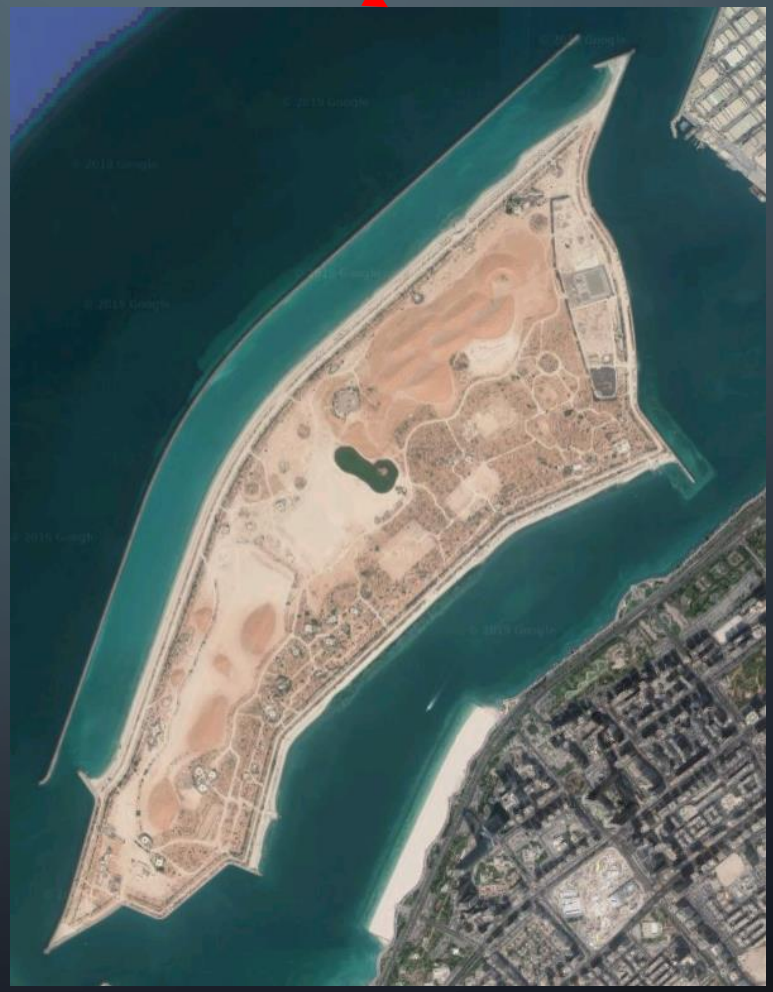
- How many different positions achieve the goal? → Space optimization
- Could be found any piece with only one possible result? → Design

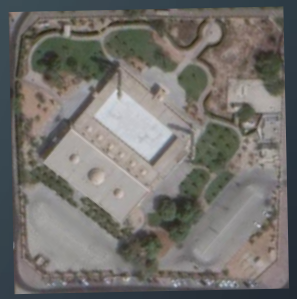
SCOPE

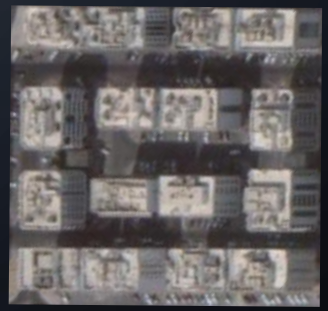
WHAT ARE WE LOOKING FOR?



Goal: As much buildings as we can

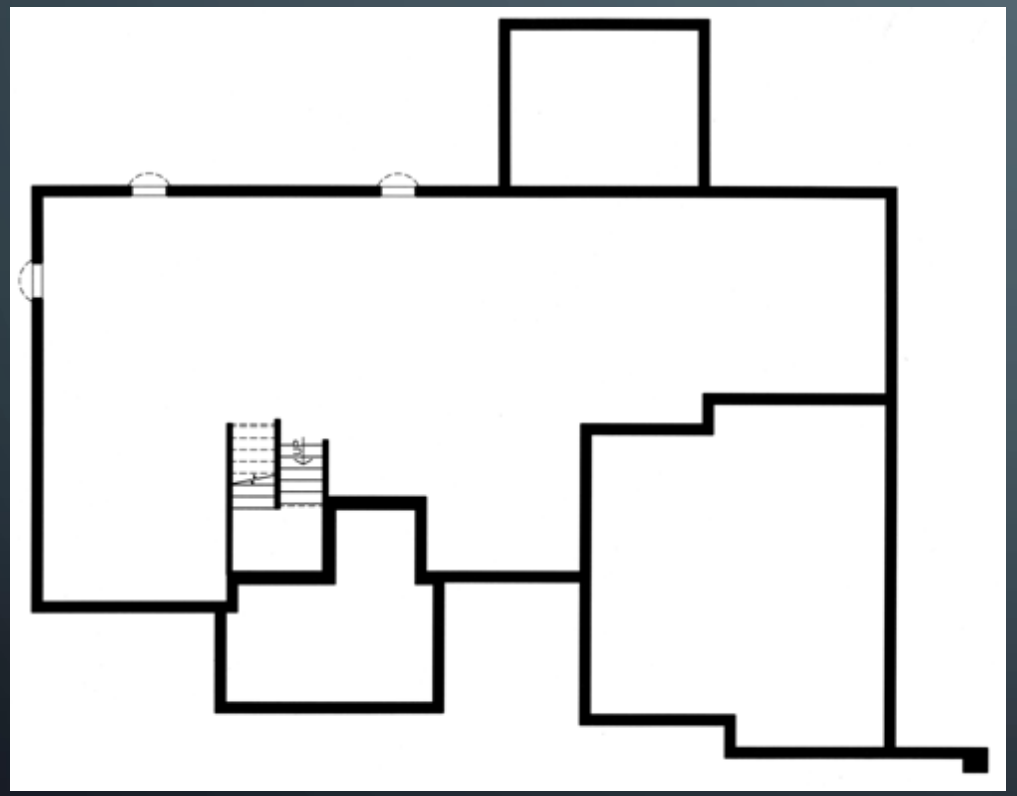






SCOPE

WHAT ARE WE LOOKING FOR?



Goal: As better distributed as we can

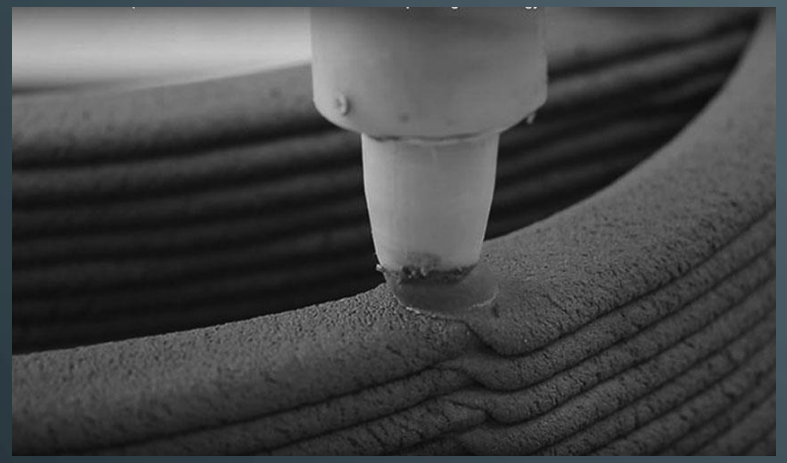
SCOPE

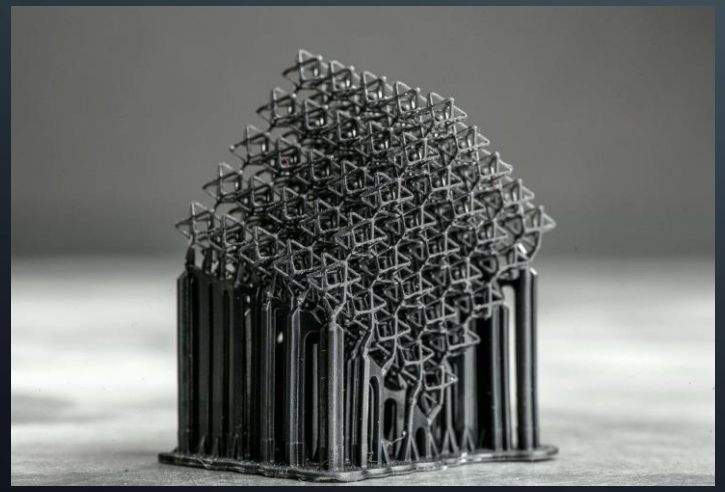
WHAT ARE WE LOOKING FOR?

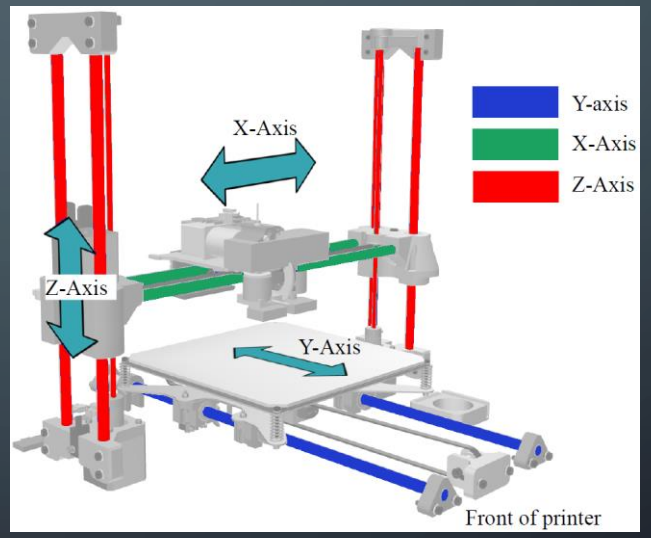
Goal: organize spaces using computer vision

SCOPE

WHAT ARE WE LOOKING FOR?



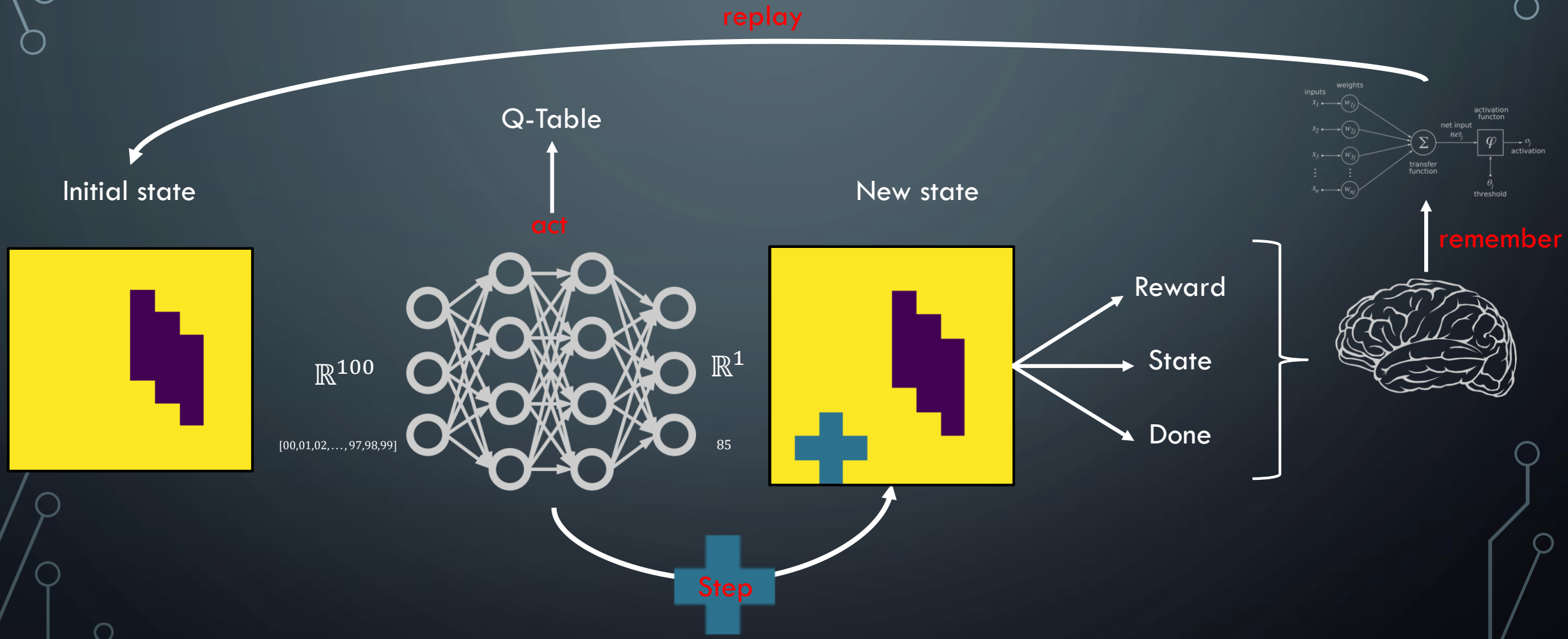




Goal: use less material as possible

CURRENT STATE

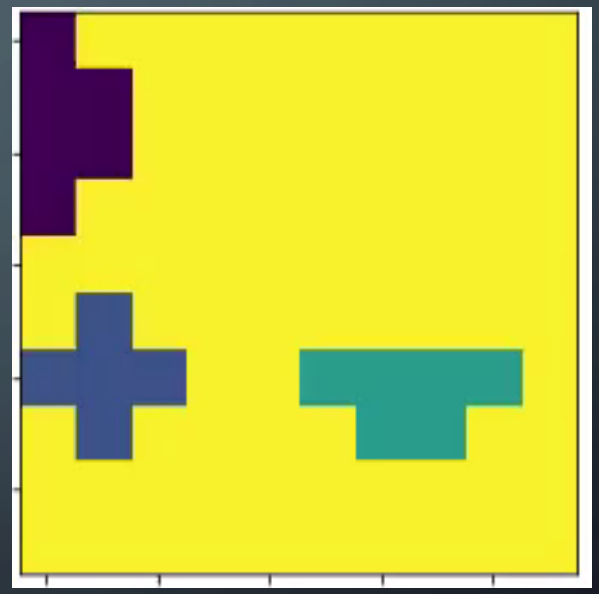
STRUCTURE



CURRENT STATE

DISPLAY EXAMPLE

HackathonCU\
- setup.py — Create openAI environment
- tangrai_agent.py — Execution and training
- tangrai
  - __init__.py — Environment registration
  - envs\
    - __init__.py — Import functions
    - tangrai_engine.py — Functionality
    - tangrai_env.py — Connect engine and agent



CURRENT STATE

CURRENT PARAMETERS

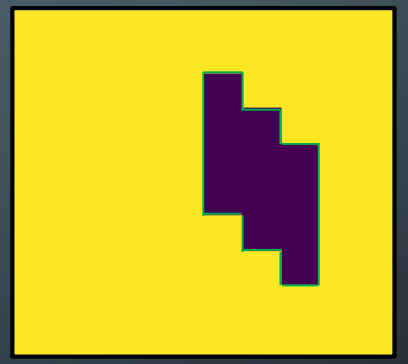
- episodes=5000
- max_env_steps=7
- epsilon_decay=1
- epsilon=0.8
- epsilon_min=0.01
- gamma=0.8
- learning_rate=.001
- alpha_decay=0.1
- batch_size=4

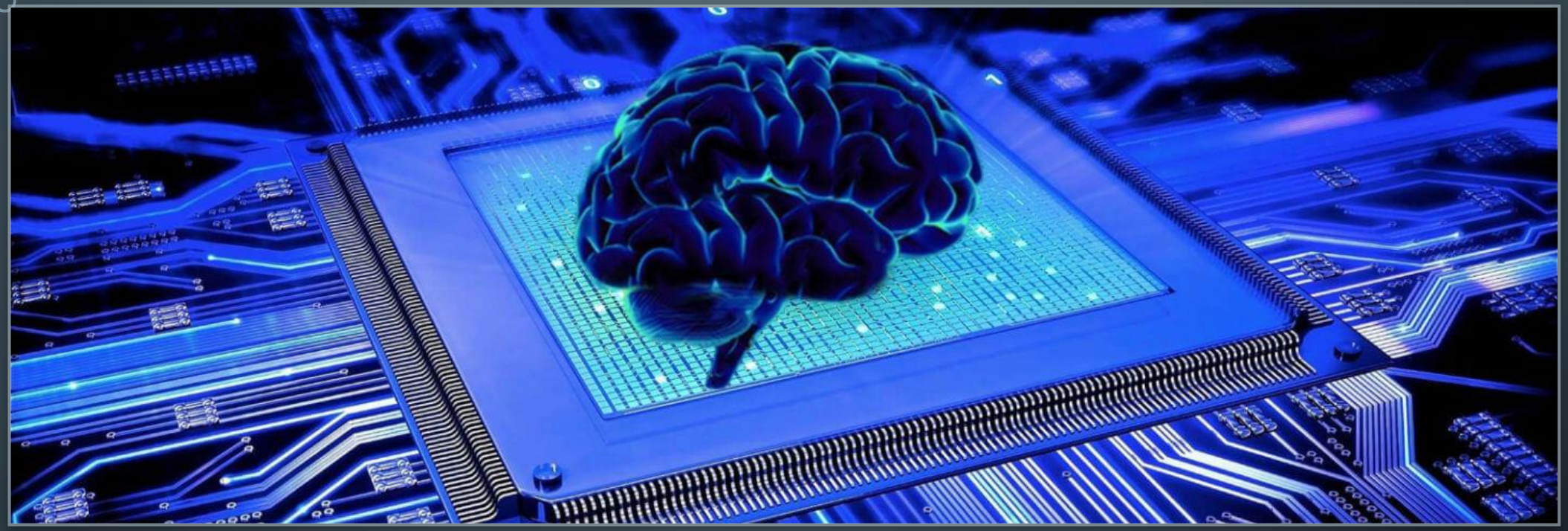
PENDING TASKS

- Render the states.
- Increase the evaluation techniques to improve the feedback.
- Adjust the parameters.
- Include rotations and random choice of each piece.
- Test the results using unseen pieces.
- Optimize the neural network.

PENDING TASKS

CNN to define the states → Generic algorithm





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