Deep Reinforcement Learning Seminar

Battleships Results and Discussion
First of all...

Big thank you!

It really meant a lot to me!
We have come a long way...
What is your main take away?
Let’s talk Battleships

Admittably, not an easy challenge

But some of you took on the challenge
Who are the brave?
Amray Schwabe
Jinfan Chen
Mayank Mittal
Michael Seeber
Valentin Anklin

If I missed your submission, please let me know immediately.

Thanks for taking part!
Amray

- First tried DQN but then switched to policy gradients
- Discrete action space
- Used max probability action for evaluation
- What performance did you achieve?

Please correct if I'm wrong
Jinfan

- Used A3C with 5 workers
- Discrete action space
- Achieves a mean episode length over 5 episodes of 67 - 100 timesteps
Mayank

- Used PPO
- Discrete action space
- Upscaled input image to 100x100
- What results did you achieve?

Please correct if I’m wrong
Michael

- Started from a published policy gradient solution to a simpler version of Battleships
- Turned input into 1-hot encoding
- Experimented with different replay buffers
- Achieved an average game length around 80
Valentin

- Also used policy gradients
- Discrete action space
- Used max probability action for evaluation
- Achieved an average game length around 61 after 50 hours of training

Please correct if I’m wrong
Valentin
But what made it so hard?
Action space

Grid world:

Up, Down, Left, Right → 4 actions

Atari:

18 discrete actions

DM lab:

11 discrete actions
Battleships?

100 (!) discrete actions

Masked to 2 continuous action dimensions...

... such that plug&play solutions don’t work 😇
What else?

High stochasticity

Almost nothing shared between episodes

→ Not much to learn!
So how to address such a task?

Not much to learn → a few parameters are enough

Stochasticity → small learning rate, larger batch sizes, **adjust evaluation**

Only 1 task → use domain knowledge

No repeated action, locality, symmetry
Discussion

When should domain knowledge be applied? And when not?
Thank you for being part of this seminar!