

# Deep Reinforcement Learning Seminar

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Battleships Results and Discussion

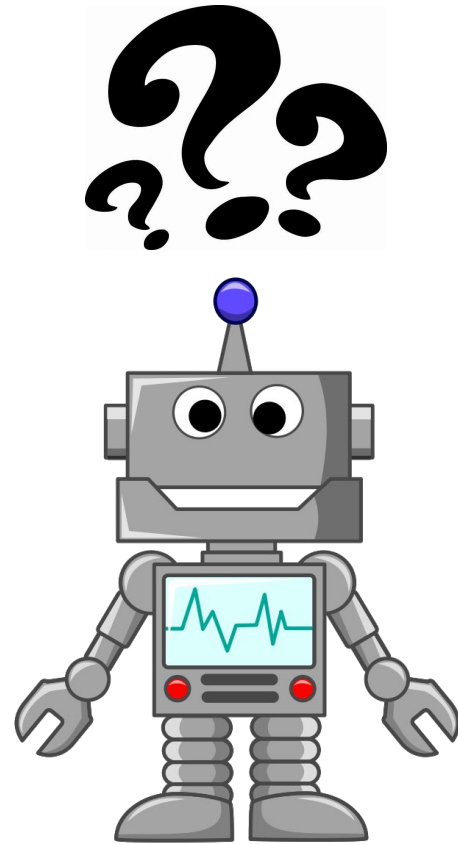
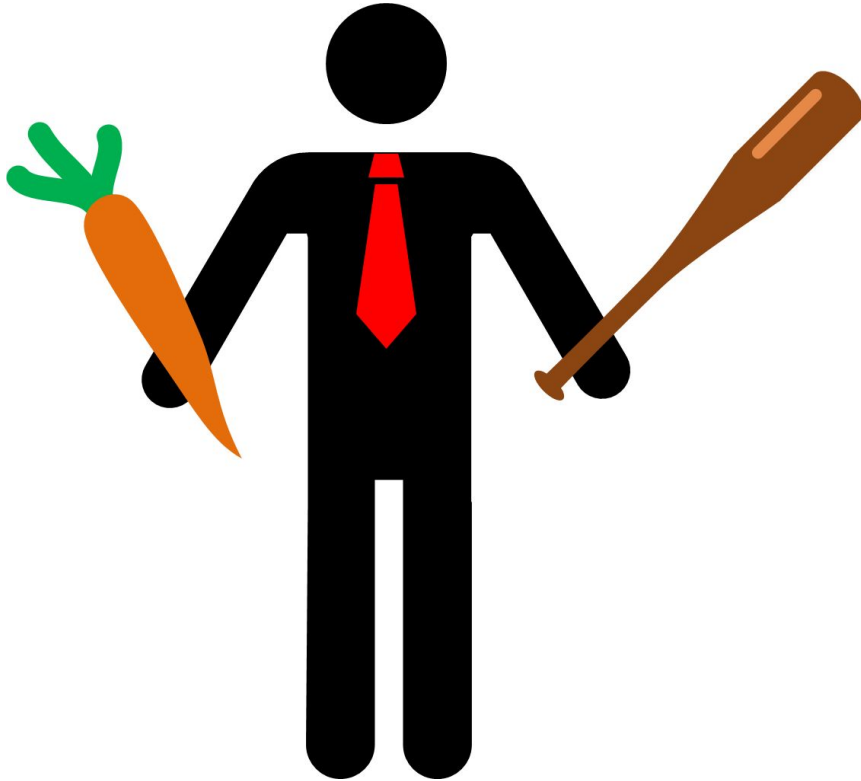
First of all...

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



*Thanks for taking part!*

If I missed your submission, please let me know immediately

# Amray

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

# 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?

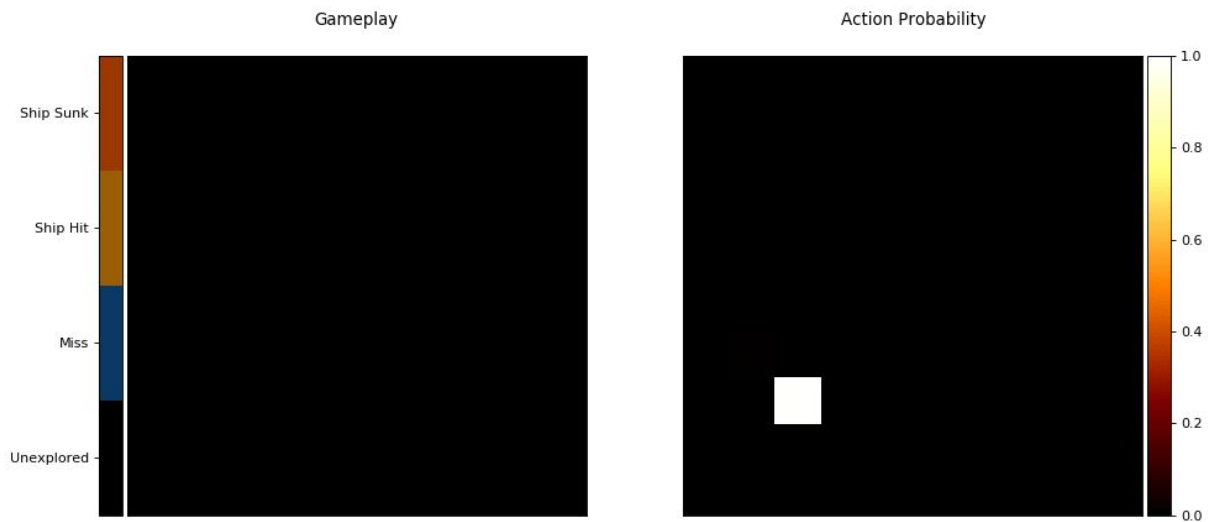
# Michael

- 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

# Valentin

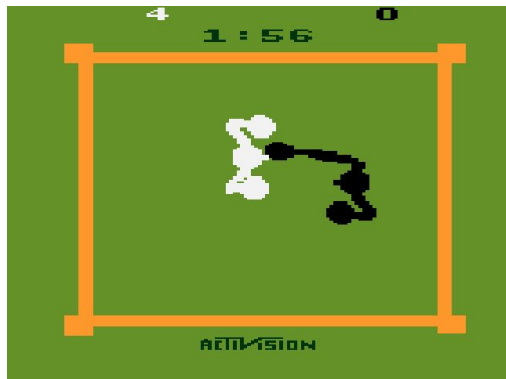
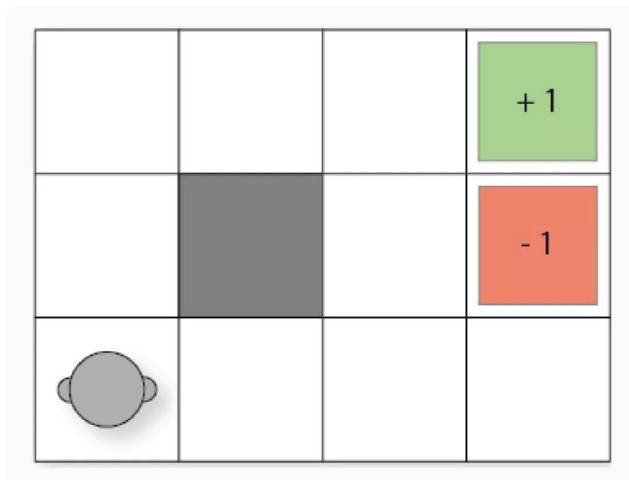


But what made it so  
hard?

# Action space

Grid world:

Up, Down, Left, Right  $\rightarrow$  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







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, symetrie

# Discussion

When should domain knowledge be applied? And when not?

Thank you for being part  
of this seminar!

