Using Animal Experiments to Design Reinforcement Learning Environments

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Intro

The Goal: Achieve animal level intelligence in computational agents

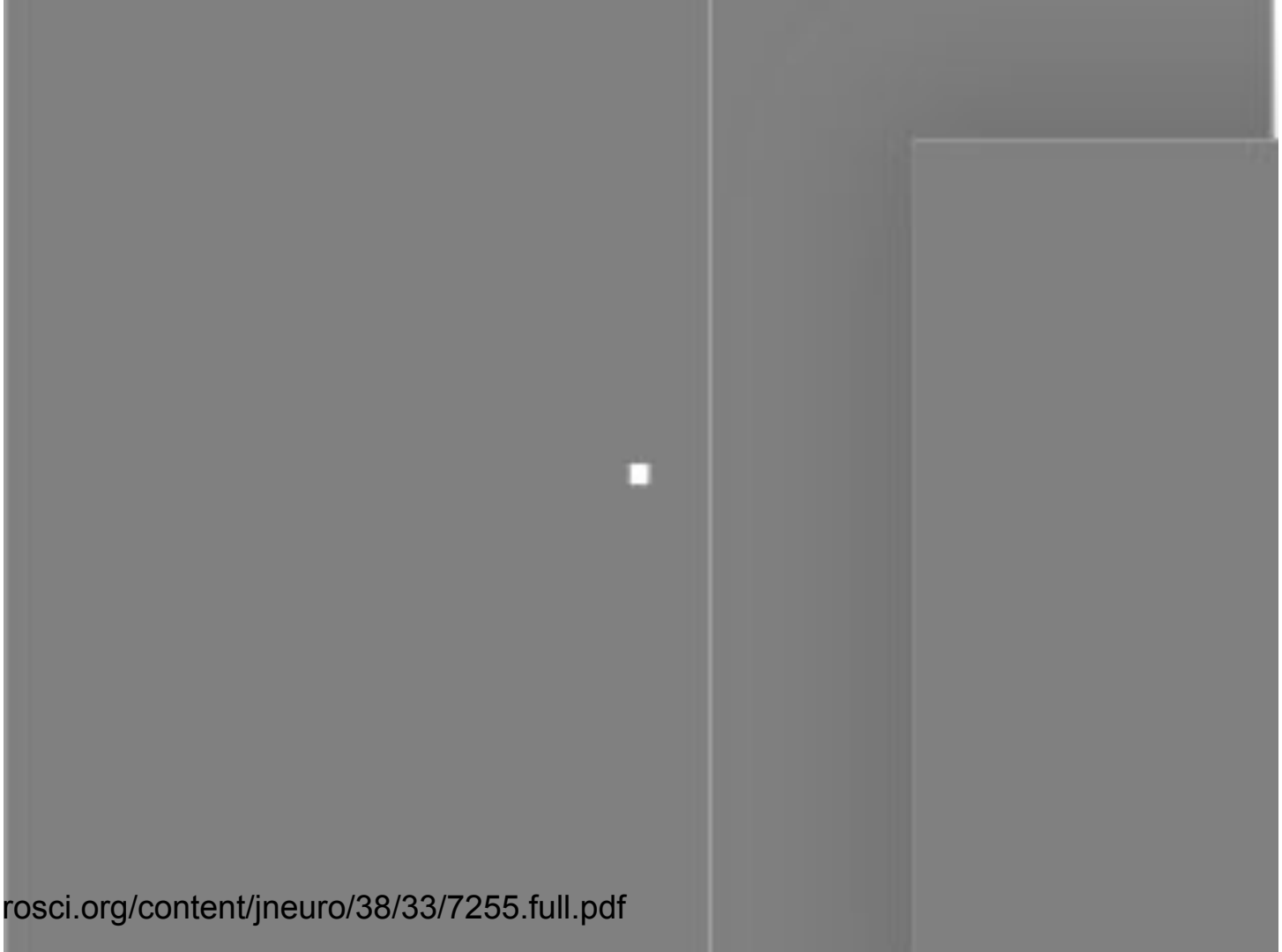
The Help: Computational environments that encode key issues overcome by animals

Macaque Visual Matching Experiment

1 used hands

1 used eyes

~106000 trials total



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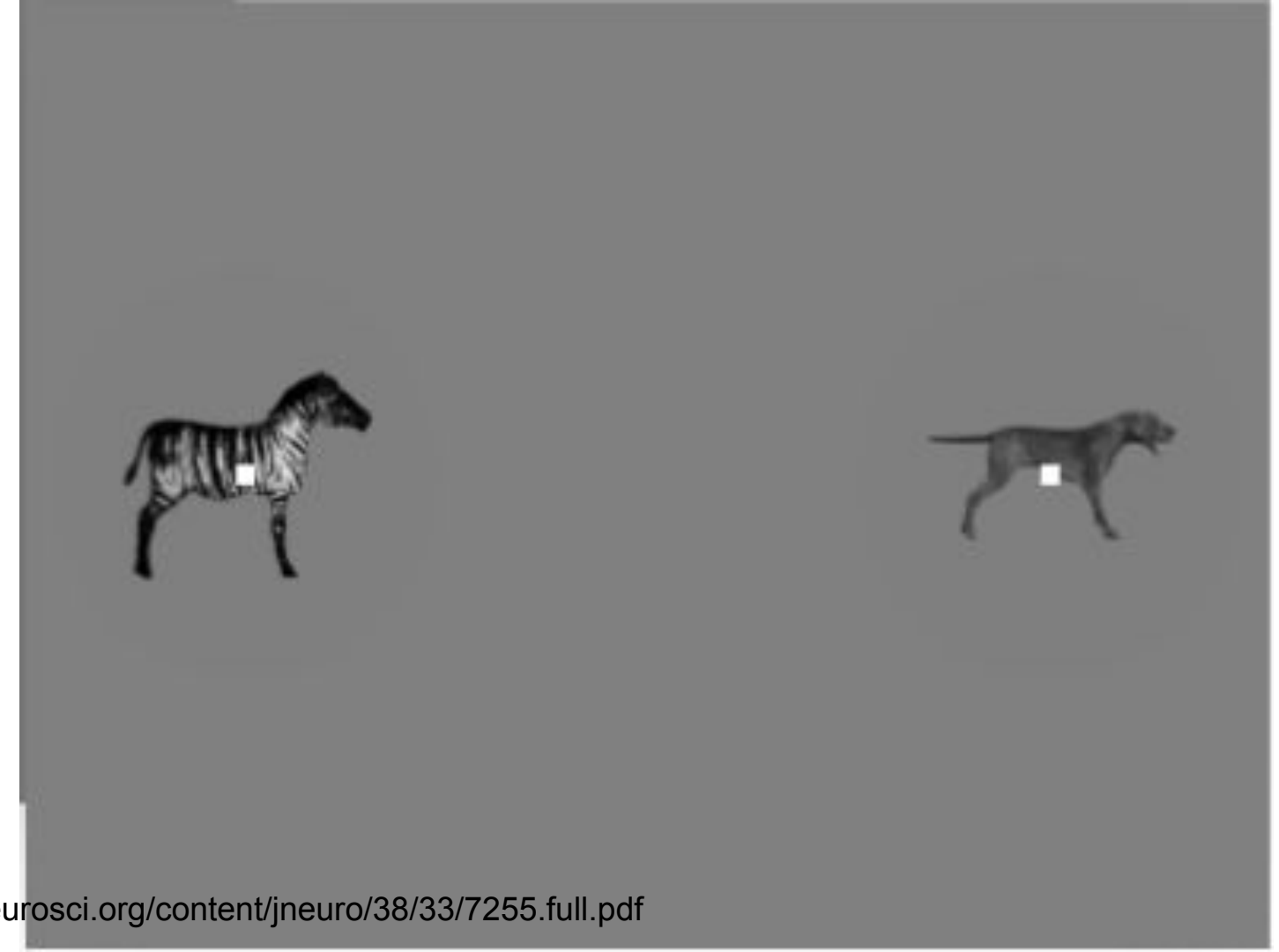

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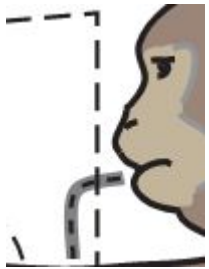
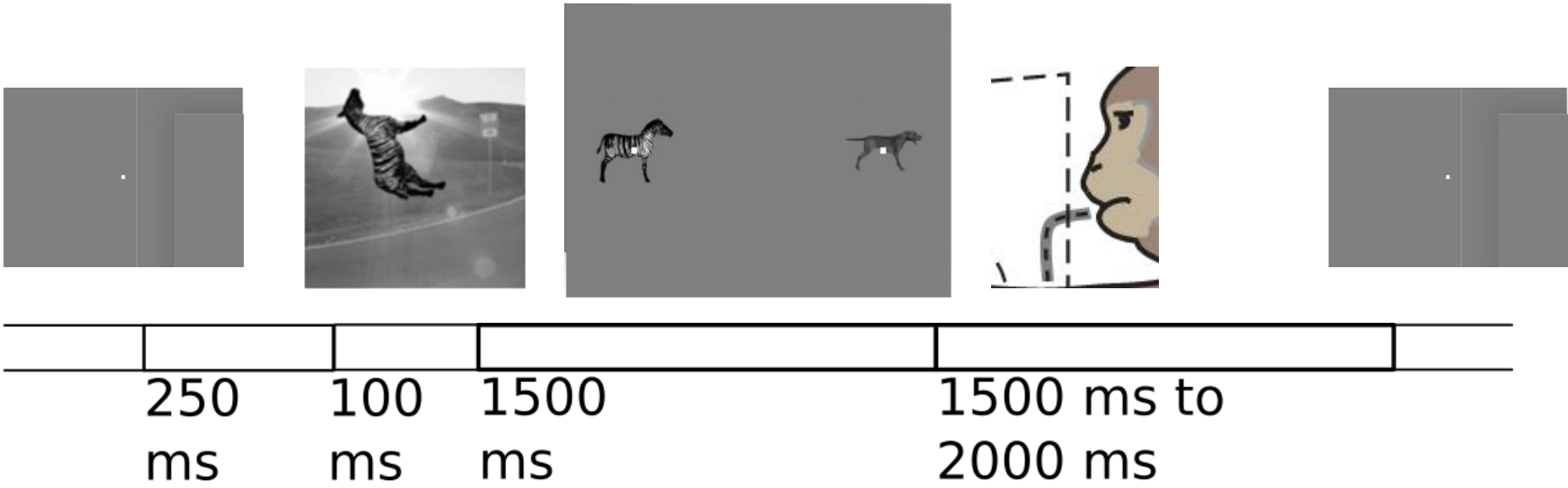
Reward/Time-out



Macaque Vision Experiments



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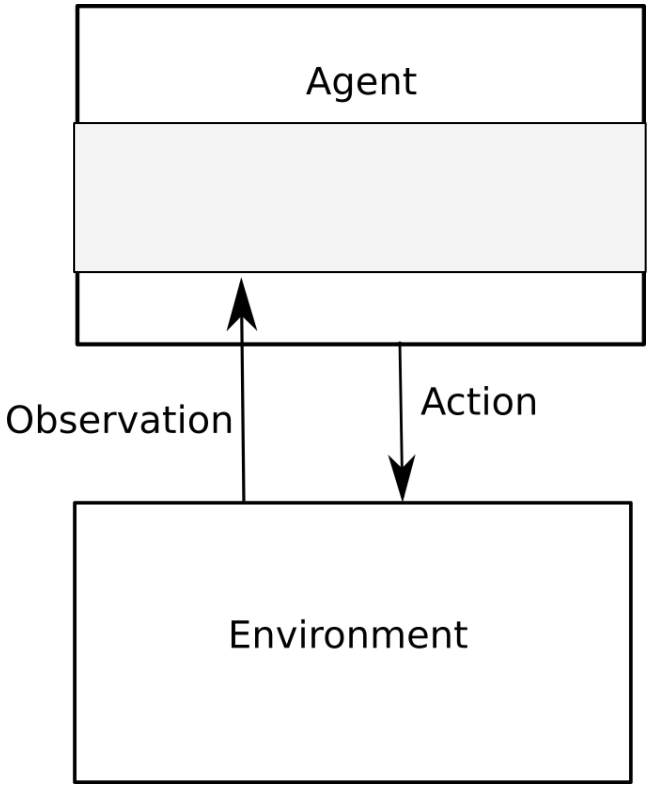
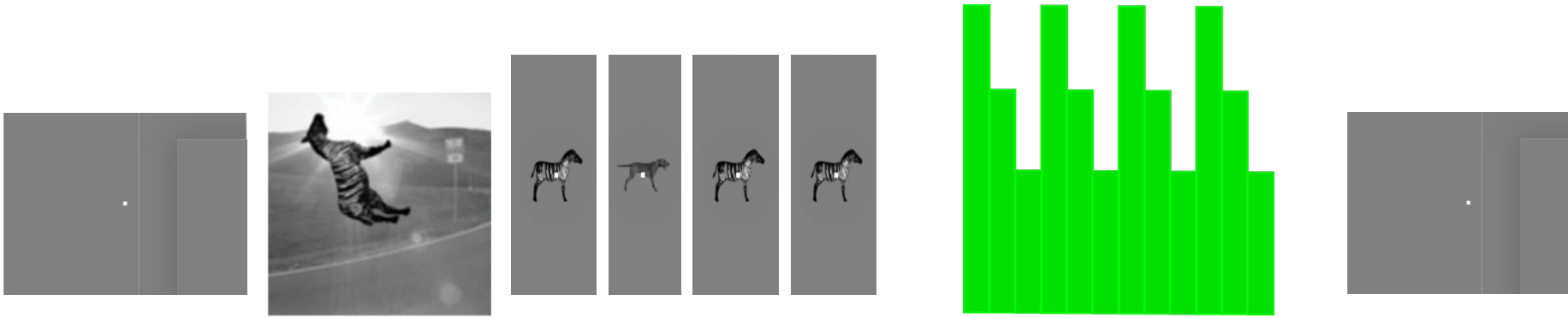
The Problem of Online Partial Observability



Computational Macaque Vision Environment



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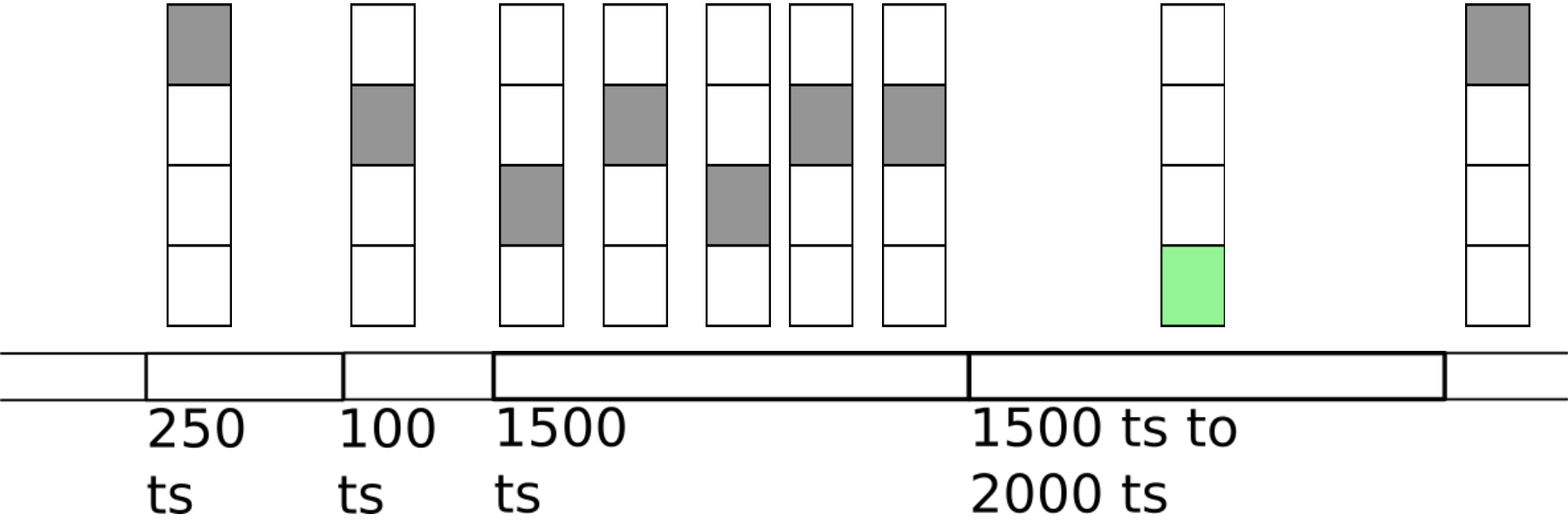
Important Aspects

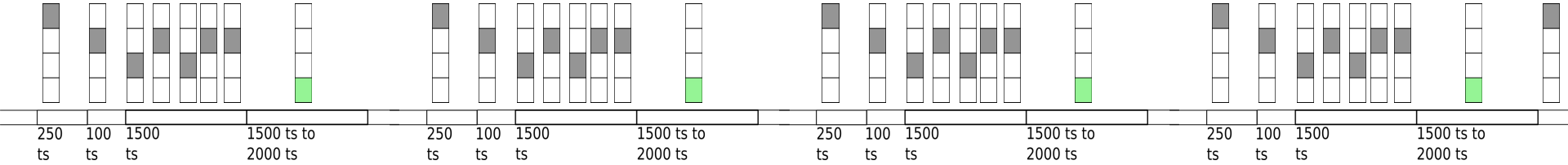
Visual Challenge

Temporal Challenge

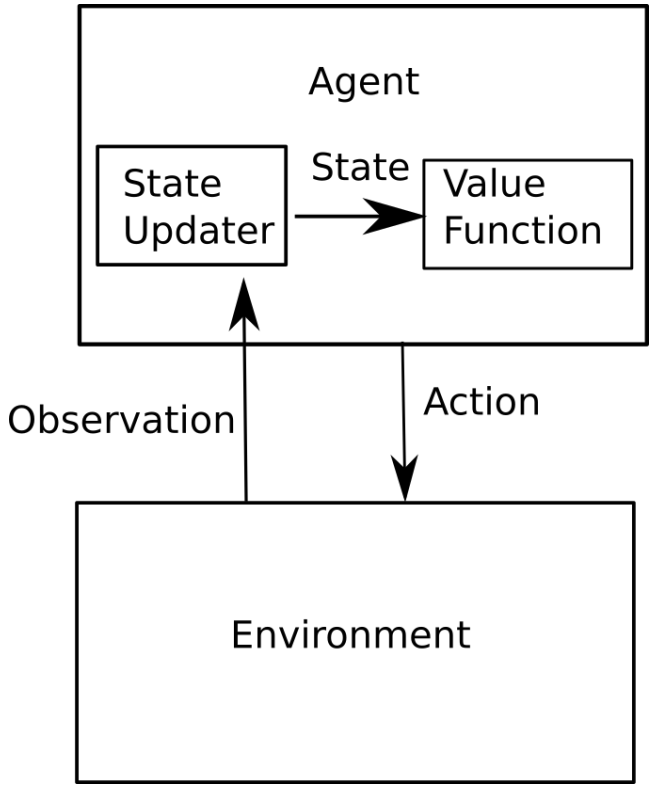
Abstracting the Temporal Challenge



Abstracting the Temporal Challenge



State Update Issues



Conclusion

Animal Experiments -> Computational Experiments

- Highlights real and specific abilities of animals

Easy for humans

Hard for computers

Thoughts and questions?

Outline

1. Where state updates fit in AI
2. Goal of AI
3. Evaluation platforms for AI

Goal of Machine Intelligence

Animal Intelligence focus

Uncover missing links from Machine Intelligence and Animal Intelligence

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