Optimising geospatial epidemic policies with reinforcement learning

prof. dr. Pieter Libin

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ARTIFICIAL INTELLIGENCE RESEARCH GROUP

INTRODUCTION

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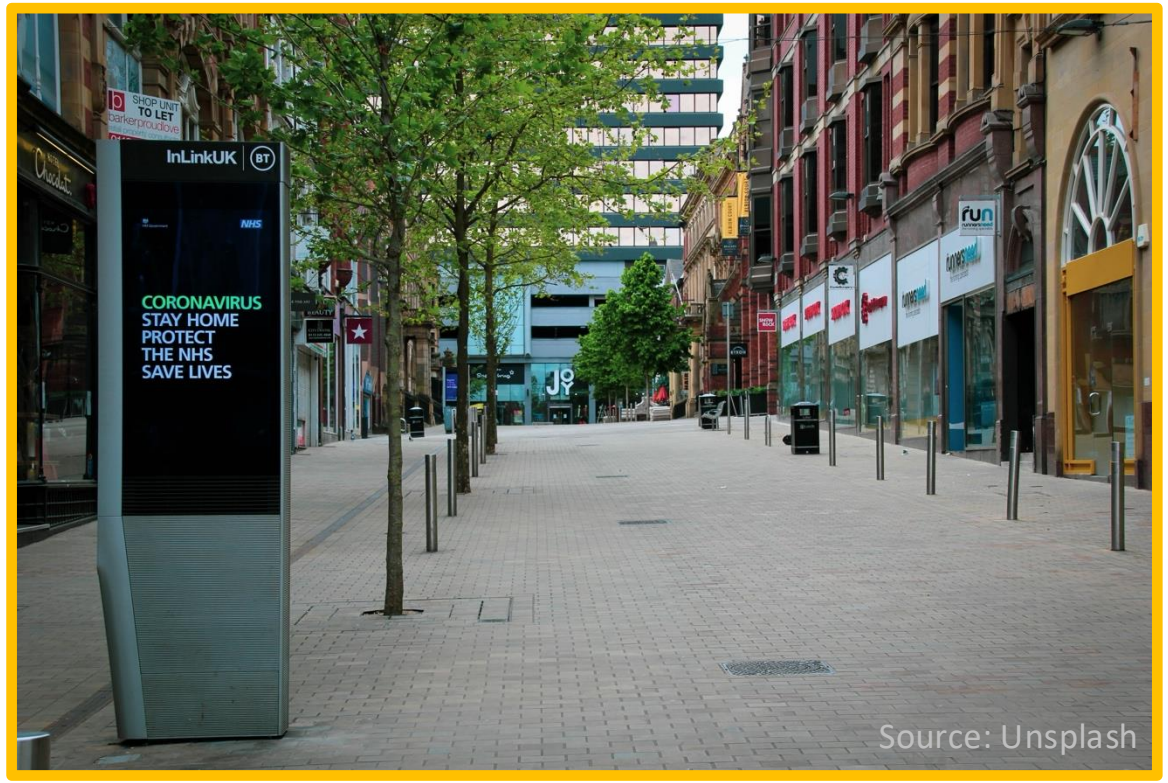
- Assistant Professor (AI lab, VUB)
- Research: decision making using realistic models and reinforcement learning

Jonge Academie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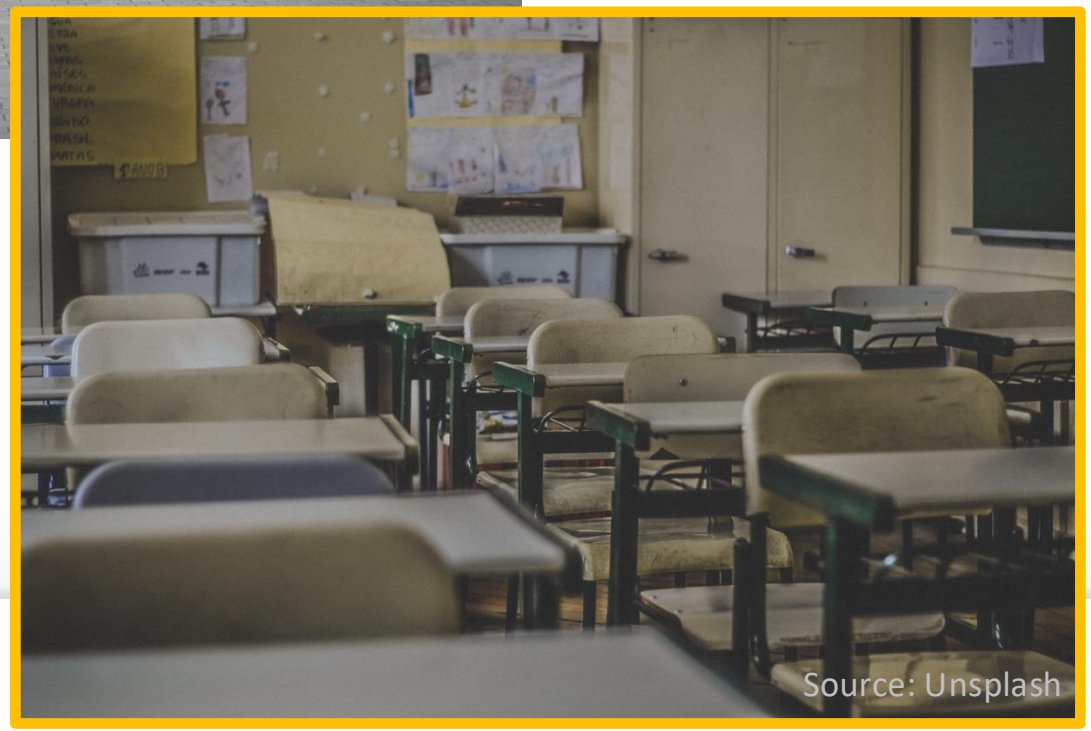
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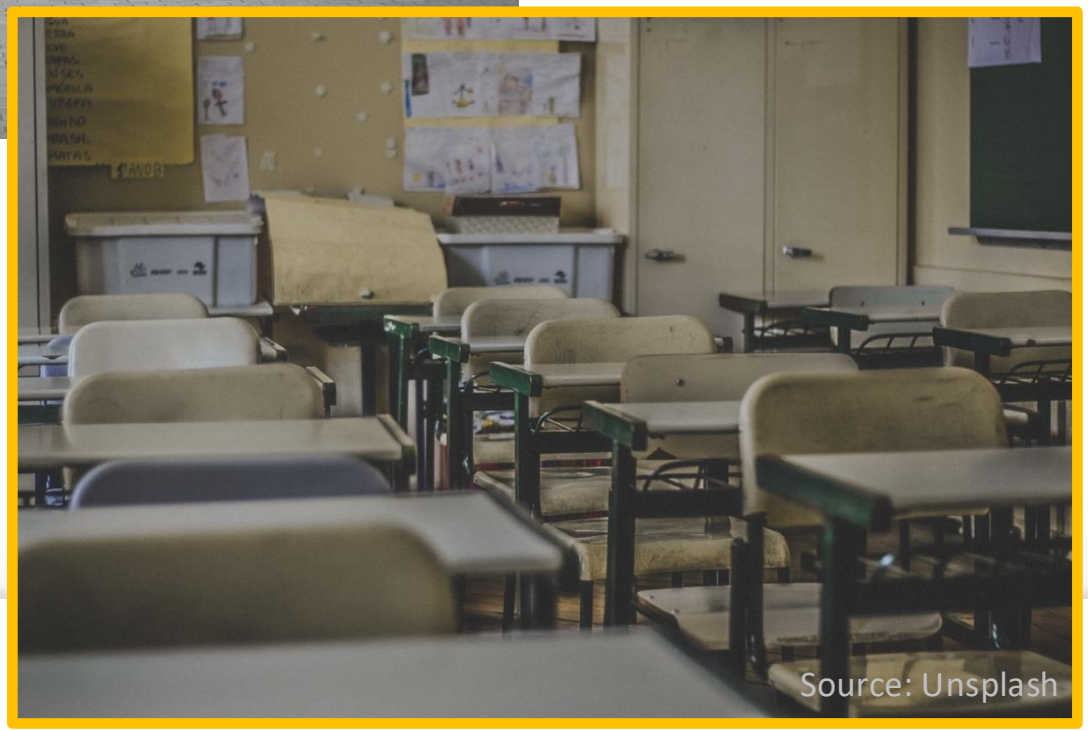
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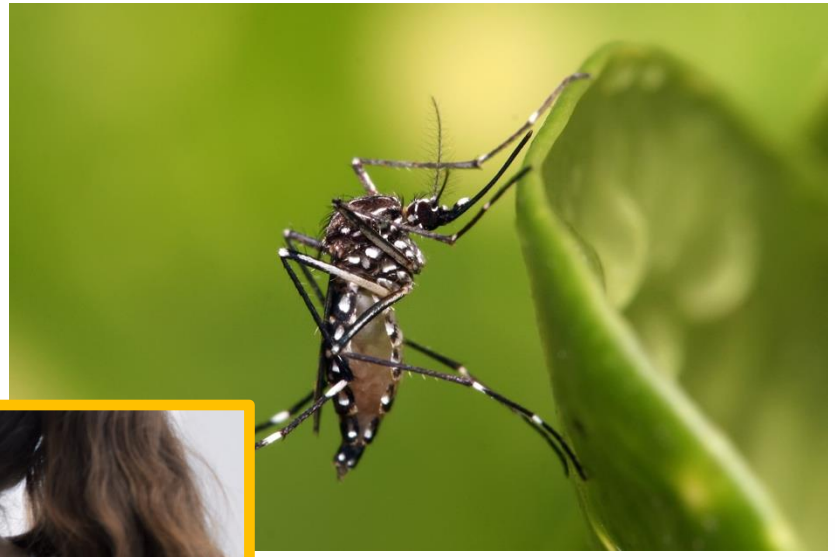

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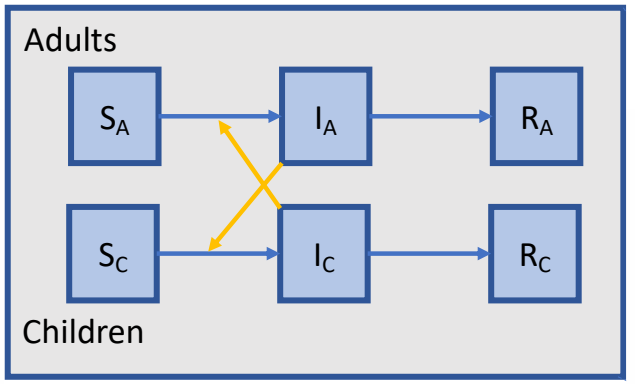
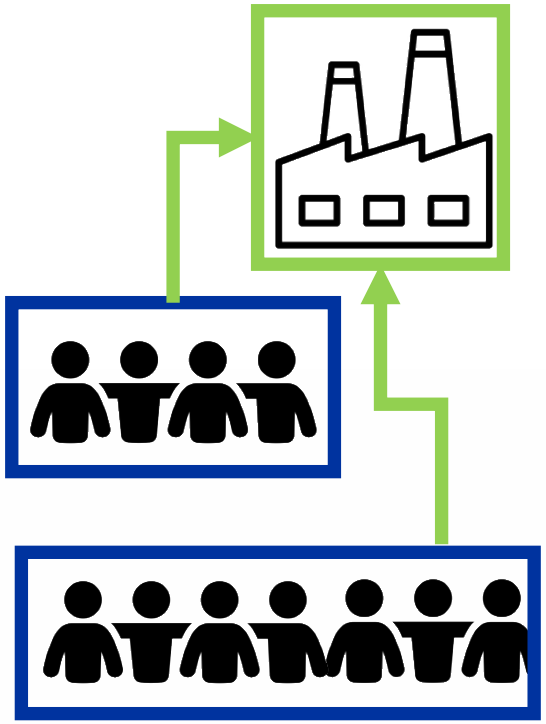
EPIDEMIOLOGICAL MODELS

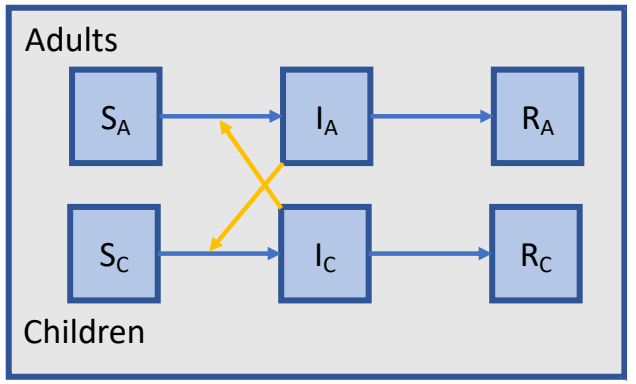


Compartmental models

EPIDEMIOLOGICAL MODELS



Individual-based models



Compartmental models

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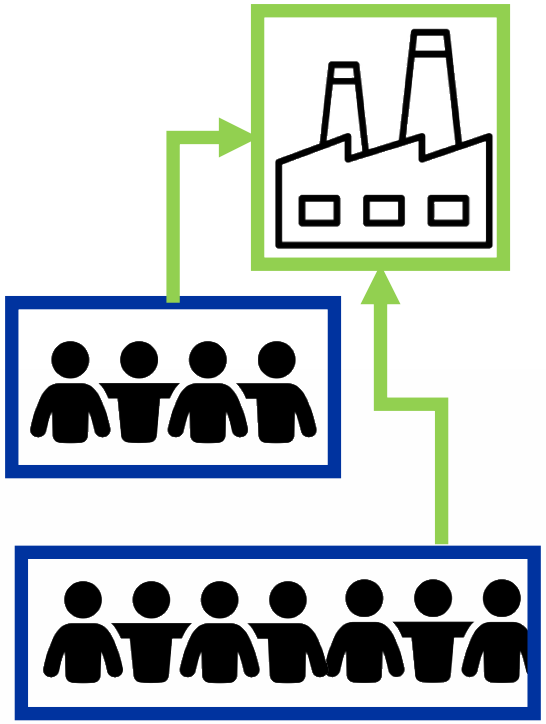
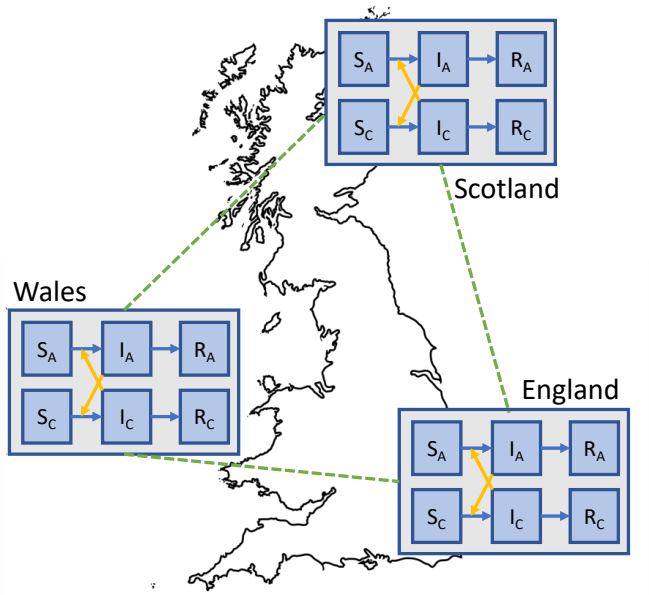
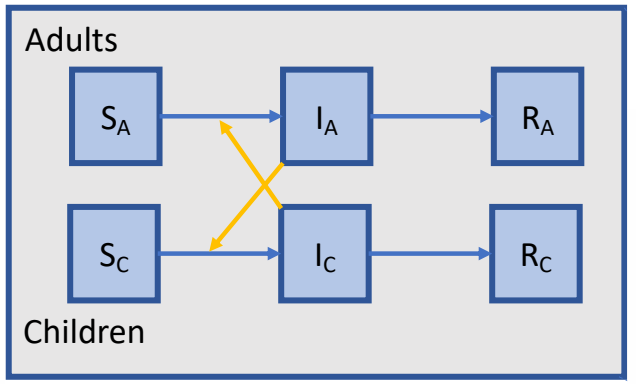


Individual-based models



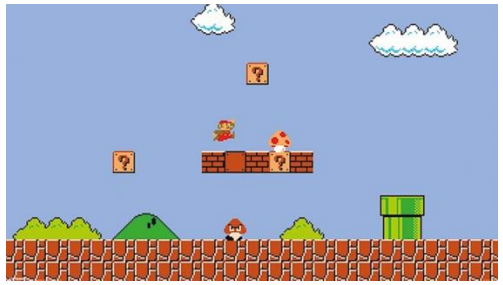
Metapop models

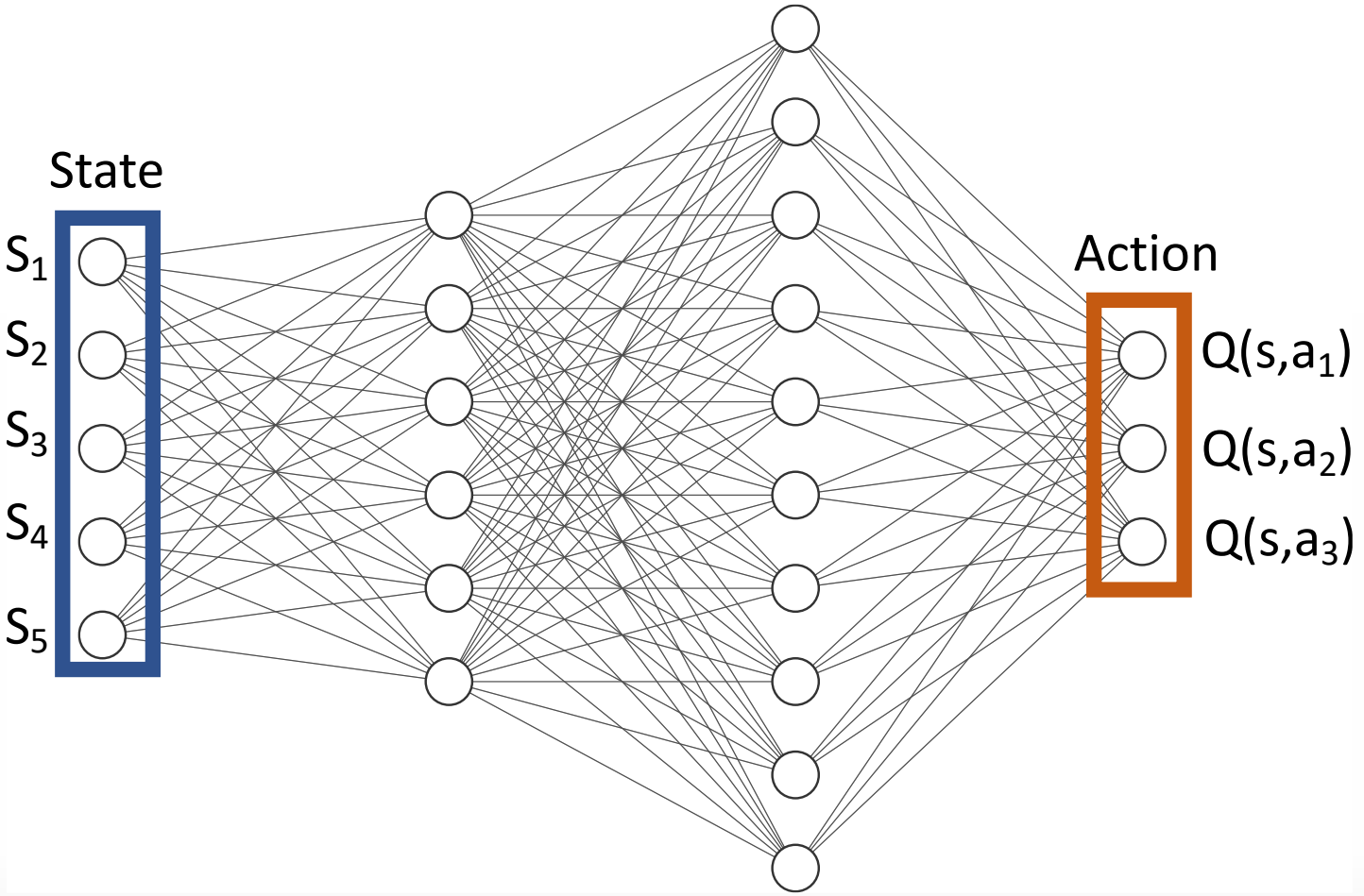


Compartmental models

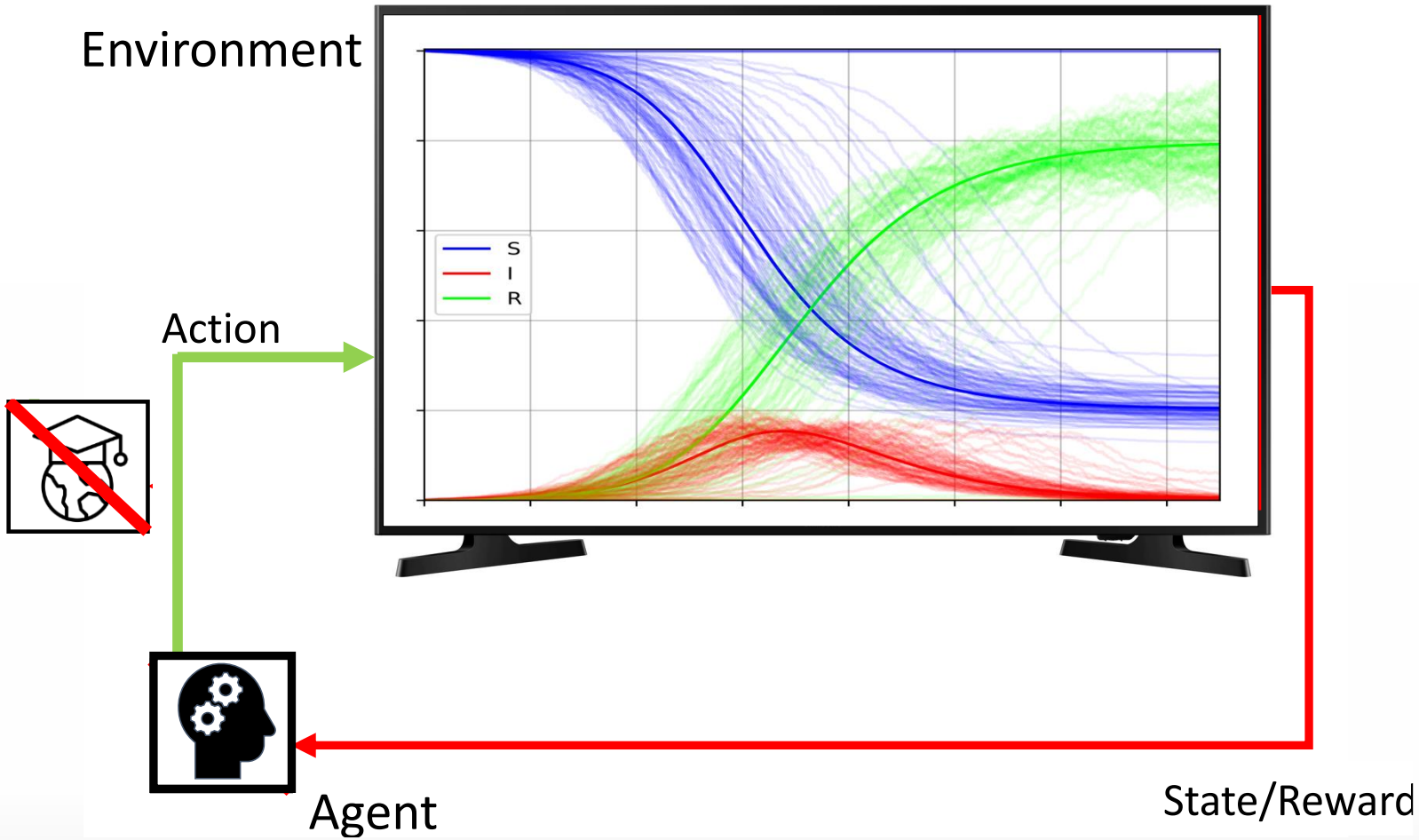
REINFORCEMENT LEARNING (RL)

DEEP REINFORCEMENT LEARNING

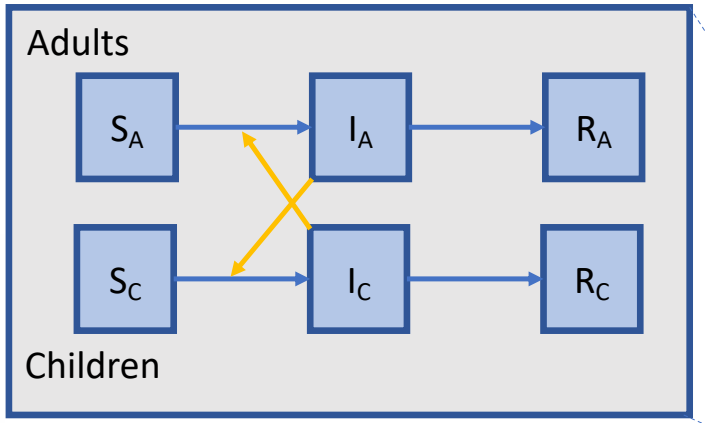


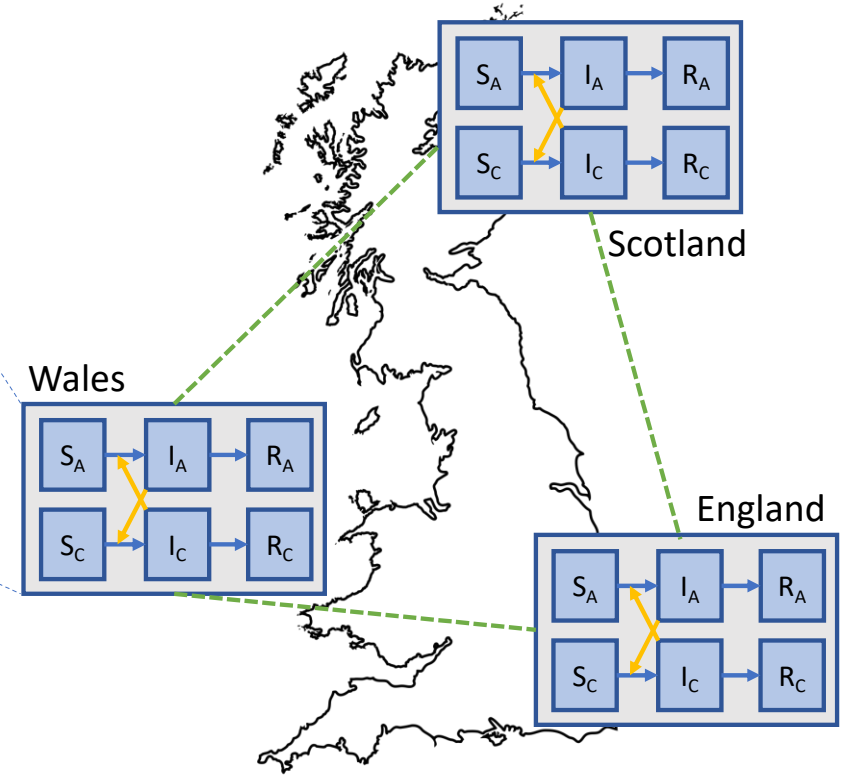


RL TO MIGITATE EPIDEMICS

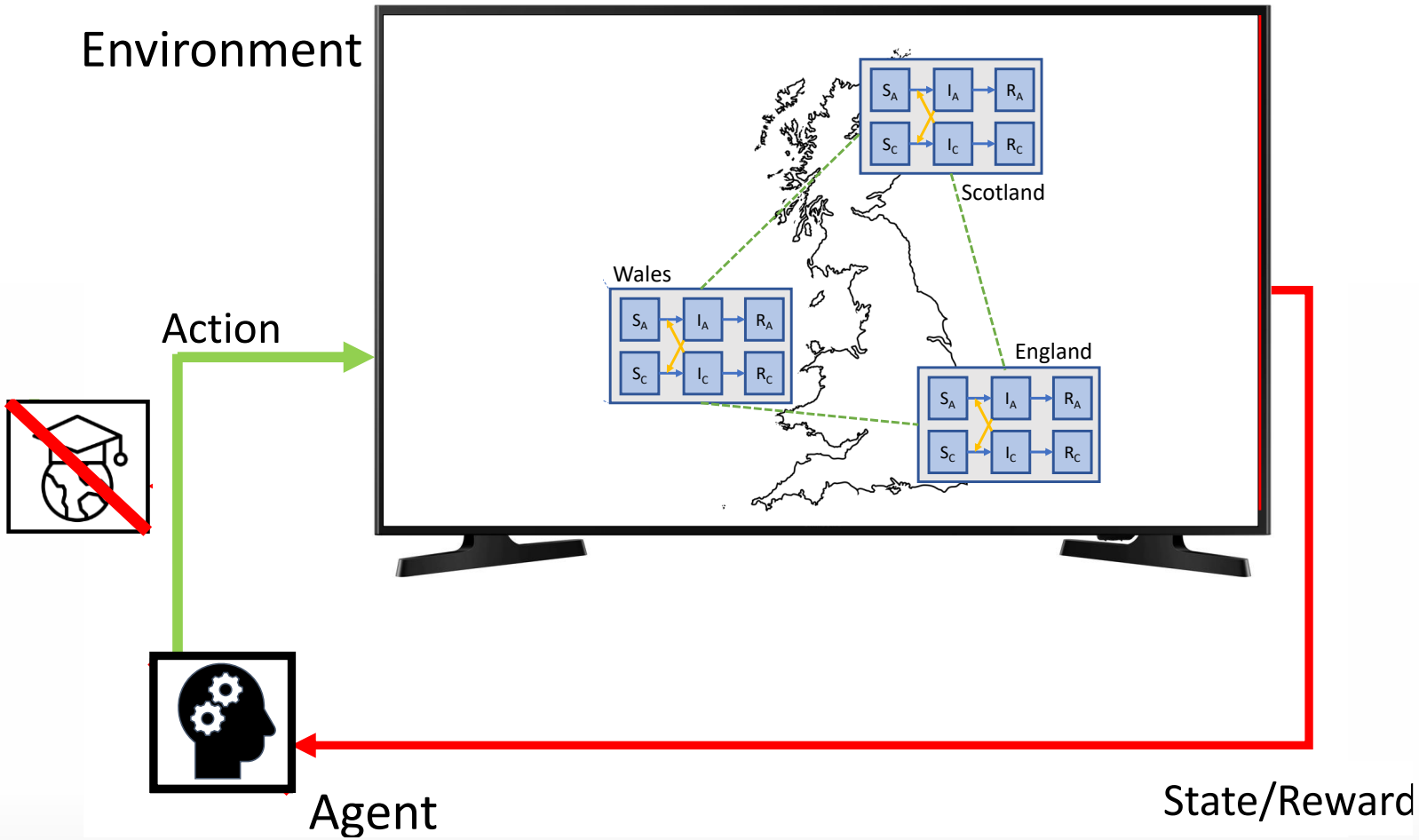


SCHOOL CLOSURE POLICIES - META-POPULATION MODEL

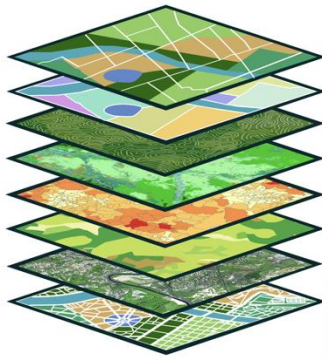


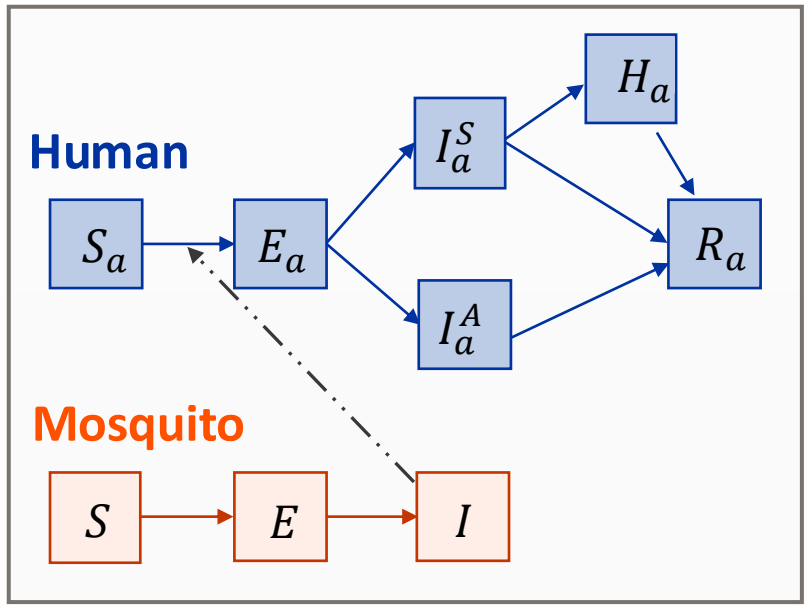


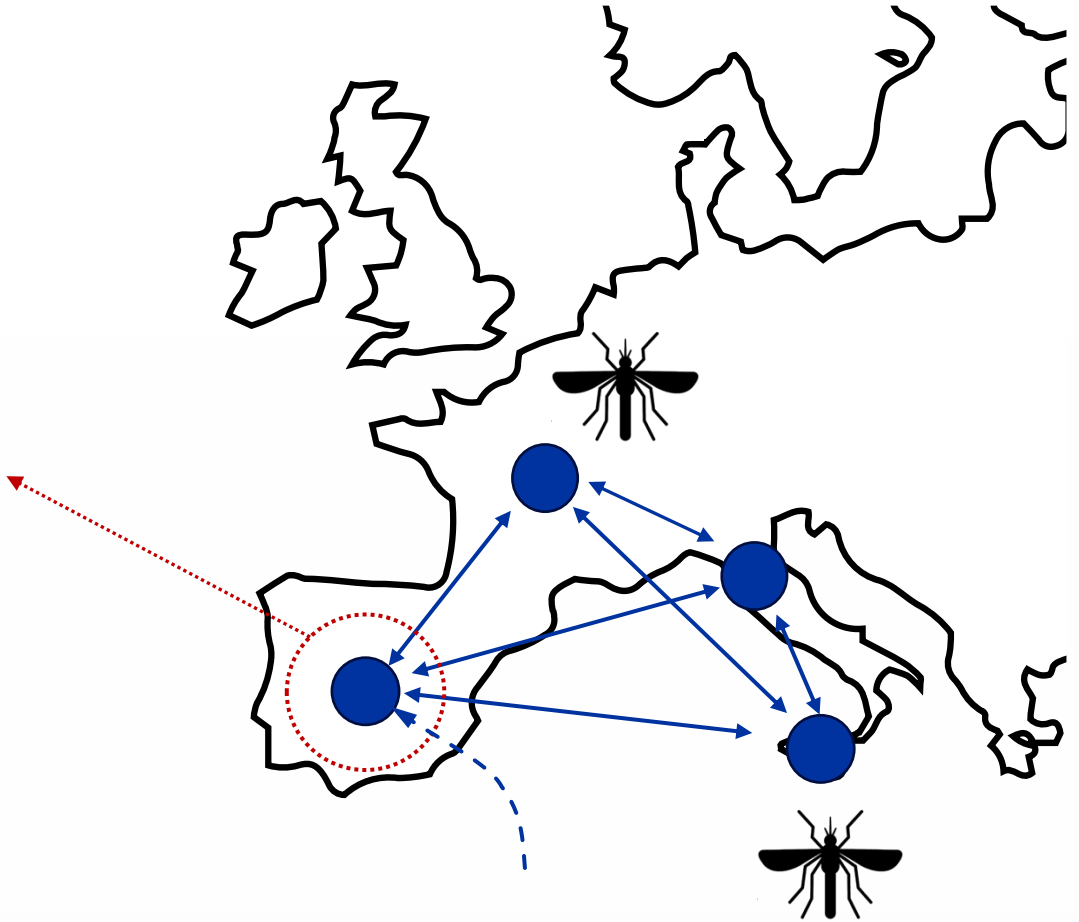
RL TO COORDINATE SCHOOL CLOSURES



RL TO COORDINATE ARBOVIRUS SCREENING AND MITIGATION







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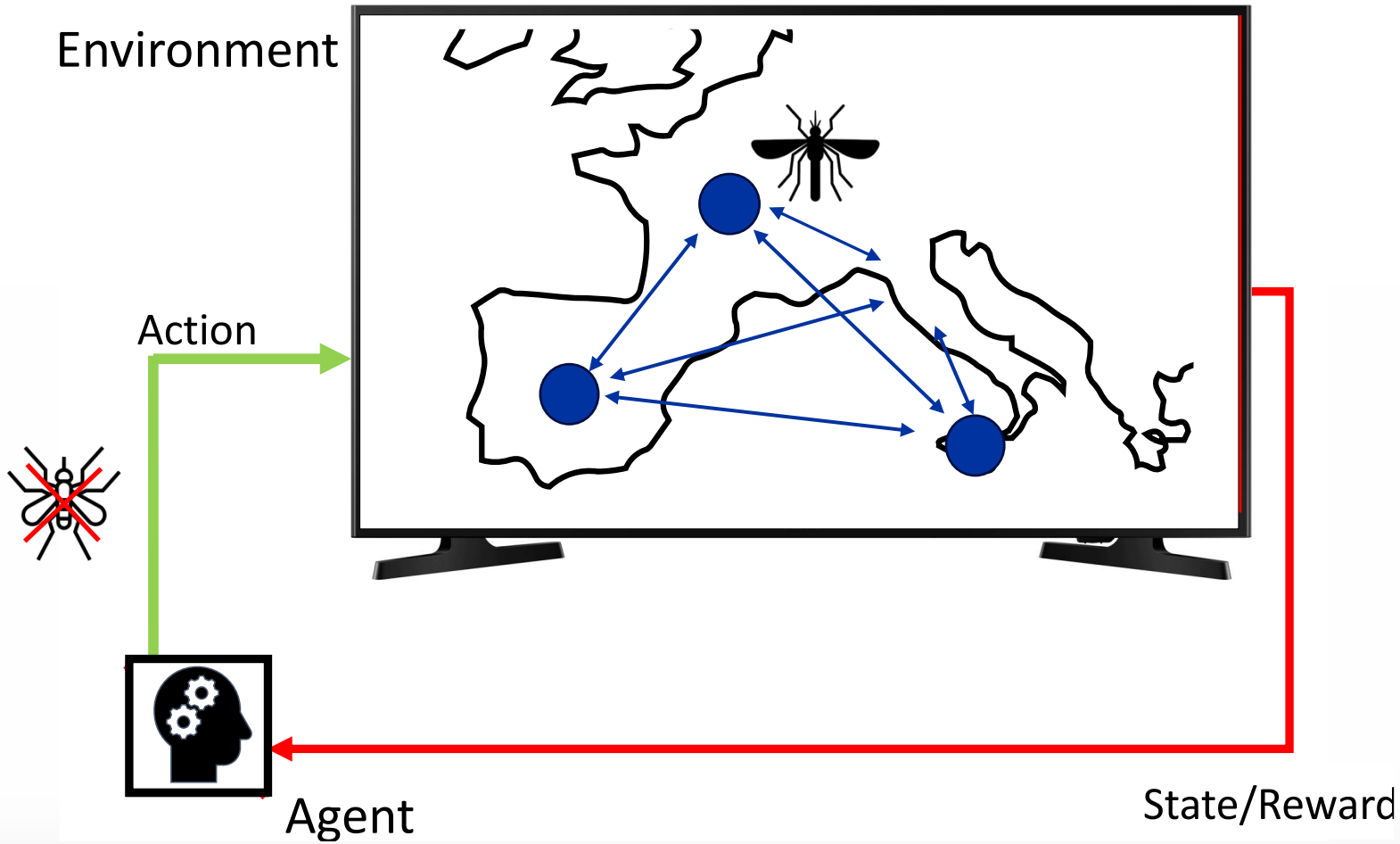

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THANK YOU! ANY QUESTIONS?

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GRAPHIC CREDITS

- Cats/dogs/crackers/drugs/ICU/bike/robot/LHC/beer/westvleteren/Las Vegas: unsplash
- Mouse/mouse trap/Atari/Bayes/Mosquito: Wikipedia
- Cheese: Kaasdok.nl
- Go board game: https://www.go-jigs.eu/what-is-go/
- Lee Sedol: New Yorker
- Clinical trials: https://www.cbinsights.com/
- Telecom application: Ericson website
- ICU covid: sciensano
- Value functions in super mario: Gemini

REFERENCES

- Libin, Pieter JK, et al. "Deep reinforcement learning for large-scale epidemic control." *Machine Learning and Knowledge Discovery in Databases., ECML PKDD 2020, Ghent, Belgium.*