NEURAL INFORMATION PROCESSING SYSTEMS

OMNI-EPIC

Open-endedness via Models of human Notions of Interestingness with Environments Programmed In Code

Maxence Faldor[1 *], Jenny Zhang[2,3 *], Antoine Cully[1 †], Jeff Clune[2,3,4 †]

[1]Imperial College London, [2]University of British Columbia, [3]Vector Institute, [4]Canada CIFAR AI Chair

*co-authors, †co-senior authors

Motivation

- Open-ended algorithms aim to **learn** to do **new**, **interesting** things **forever**
- Require **vast** task and environment spaces
- To achieve **Darwin Completeness** (Clune, 2019)
- How do we generate **any** learning environment?

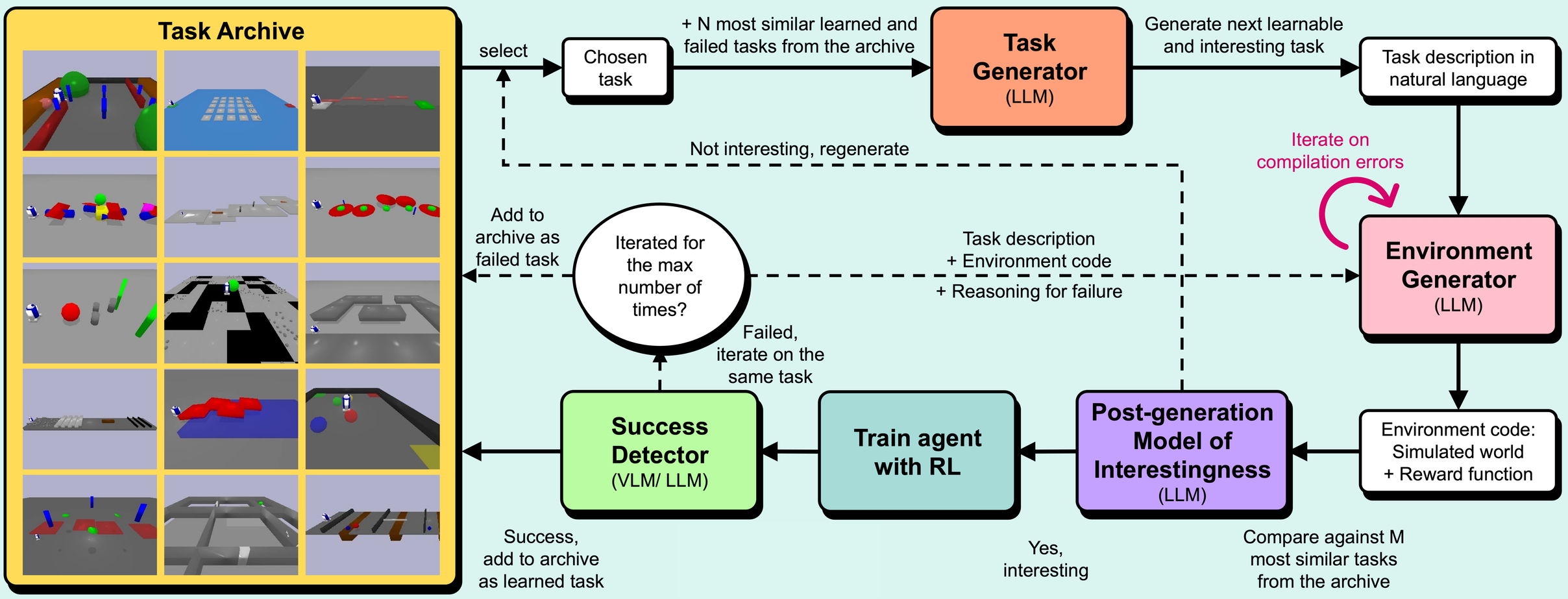
Previous Work - OMNI

- Foundation models, trained on the entire internet, **already know what is interesting**
- Generate learnable and interesting tasks
- Limitation – single domain

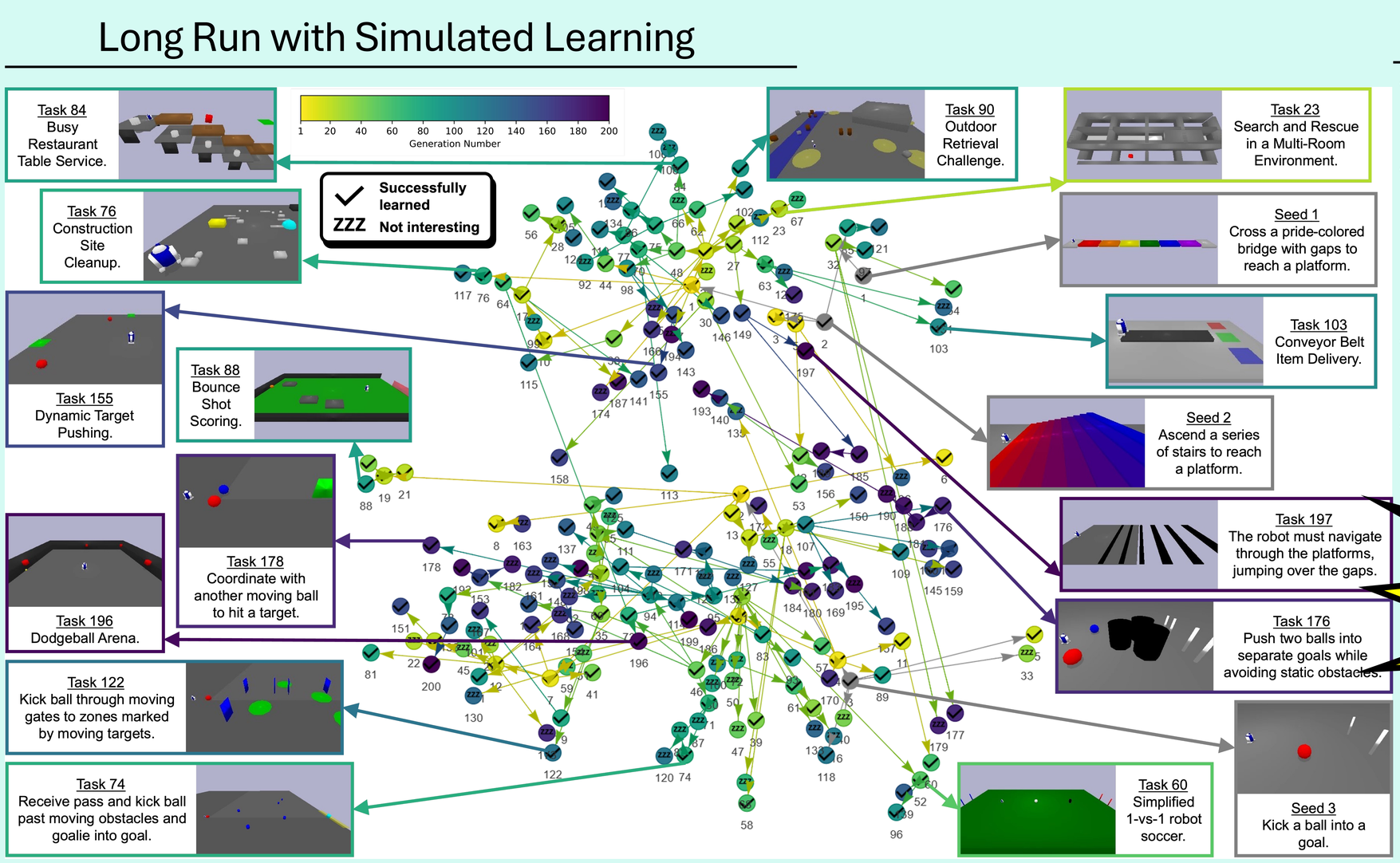
Insight for OMNI-EPIC

- Utilize **foundation models** to create tasks **via code**
- Many programming languages are **Turing Complete**
- Able to create **any** computable environment

Method



Long Run with Simulated Learning



Discussion & Future Work

- In theory, generating code can create any learning environment
- Future work to allow the ability to download , use, or modify any existing simulator, or even code entirely new ones
- OMNI-EPIC proposes a path towards open-ended learning
- Generates a continuous stream of learnable and interesting tasks

What happens with more compute??