

Modelling Movement with Bigraphs

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Motivation



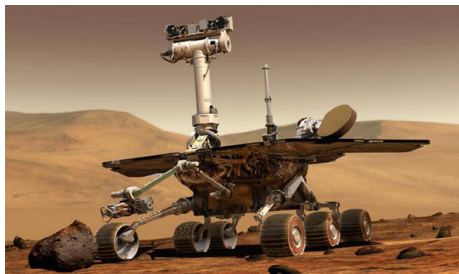
Motivation



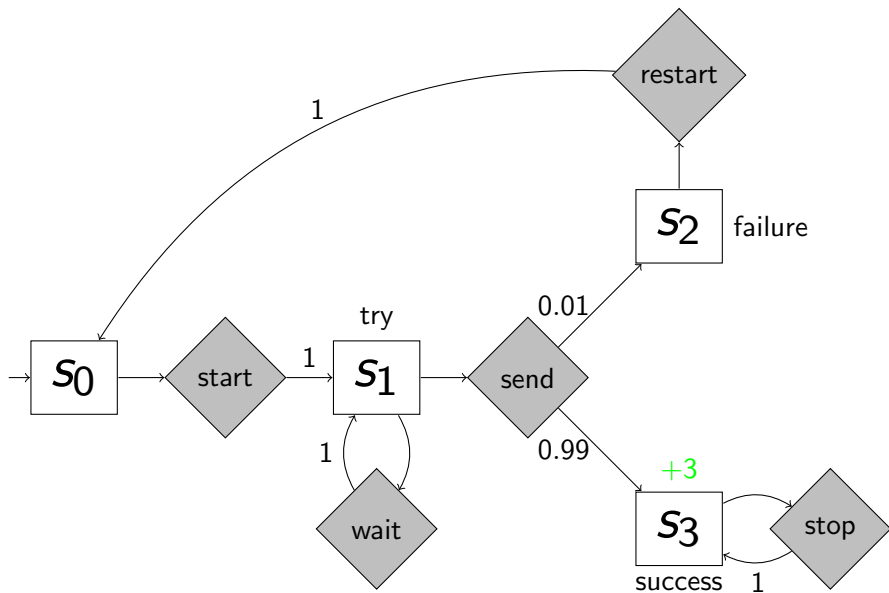
Motivation



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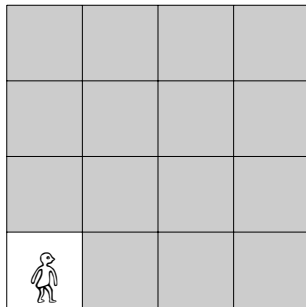
Markov Decision Process



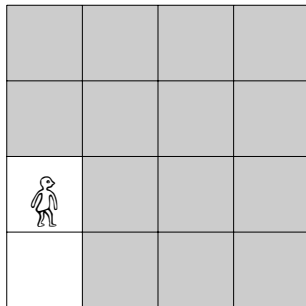
Collecting Objects in a Grid

- Each cell is either visited or unvisited.
- When entering an unvisited cell, with probability p the agent may receive an object.
- Once a set number of objects is collected, the agent heads home.

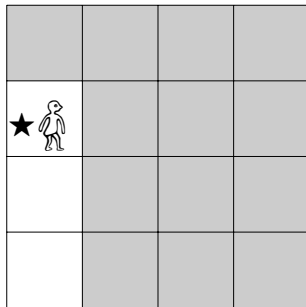
Collecting Objects in a Grid



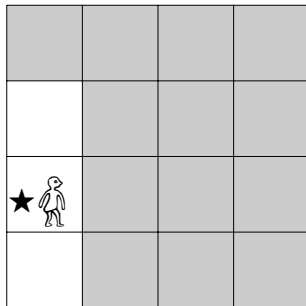
Collecting Objects in a Grid



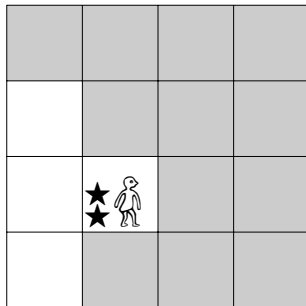
Collecting Objects in a Grid



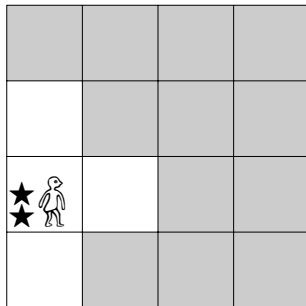
Collecting Objects in a Grid



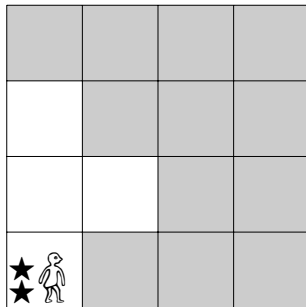
Collecting Objects in a Grid



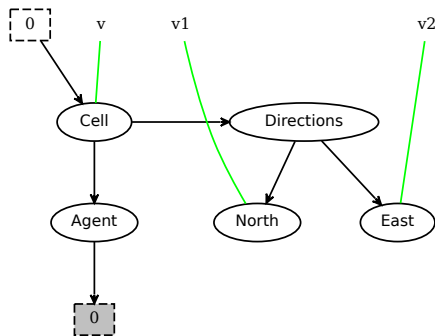
Collecting Objects in a Grid



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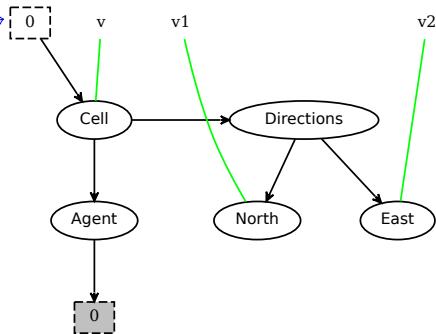


Bigraphs

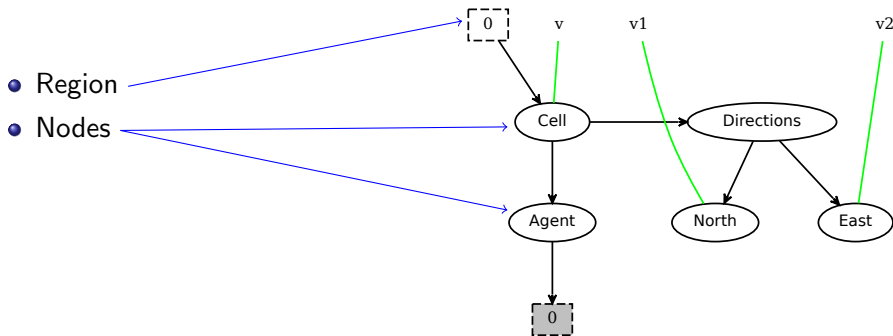


Bigraphs

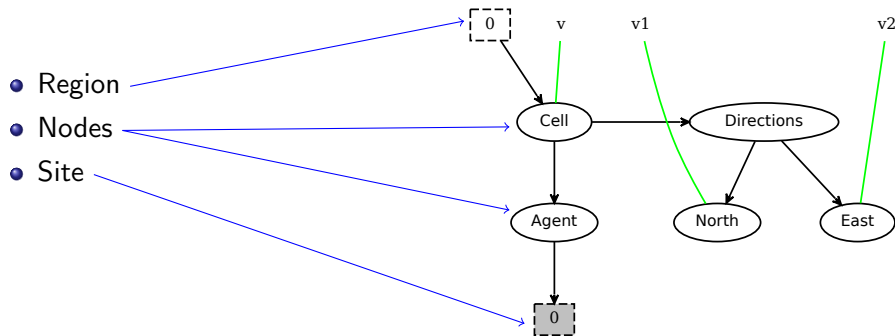
- Region



Bigraphs

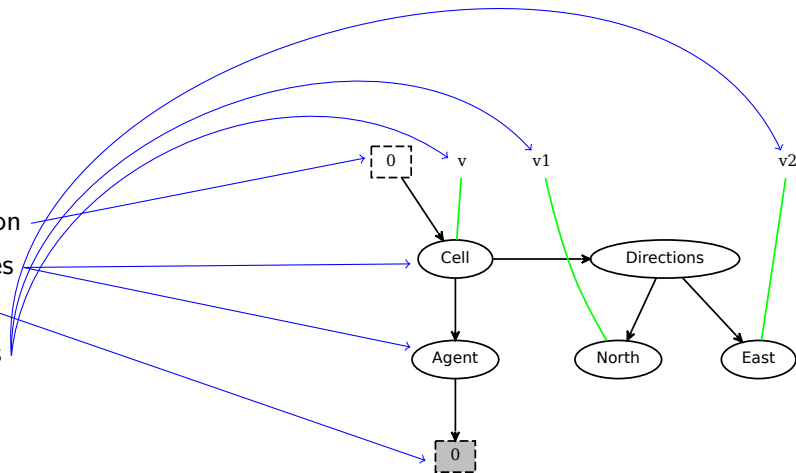


Bigraphs

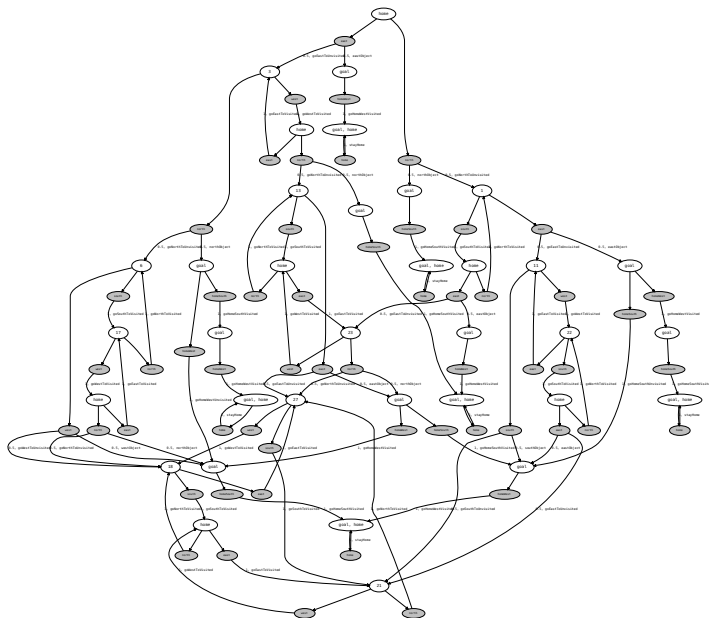


Bigraphs

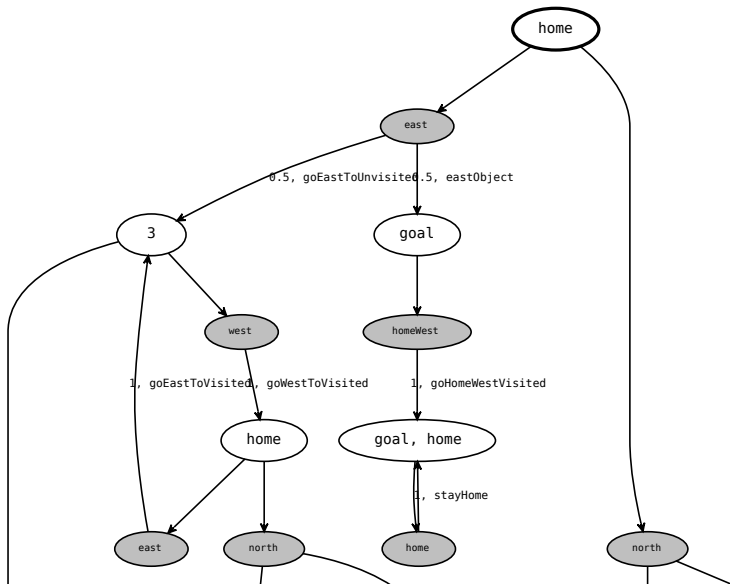
- Region
- Nodes
- Site
- Links



Transition System



Transition System



A Tale of Schrödinger's Wall...



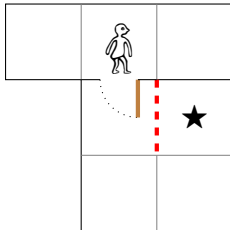
A Tale of Schrödinger's Wall...



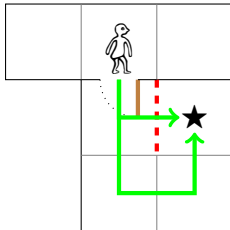
A Tale of Schrödinger's Wall...



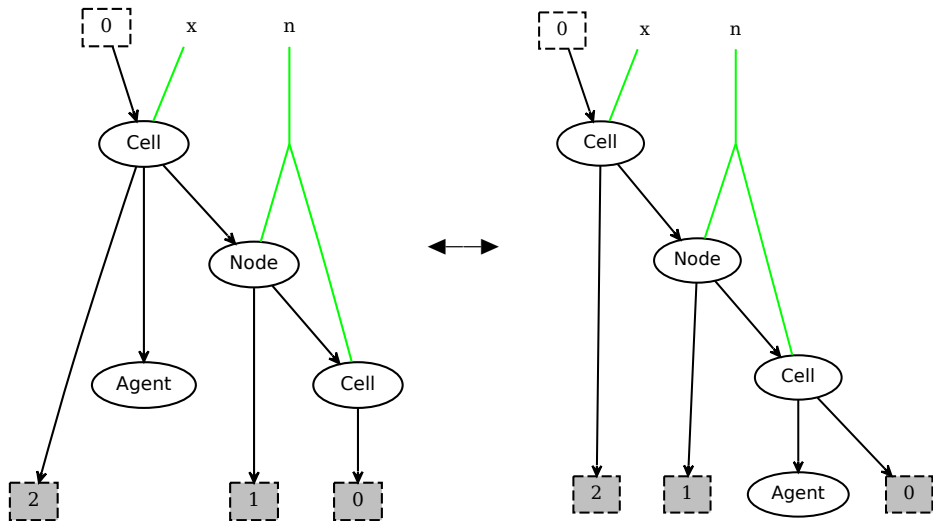
A Tale of Schrödinger's Wall...



A Tale of Schrödinger's Wall...



Reaction rules



Conclusions

- + A direct visual representation of the modelled situation
- + Easy to represent complicated spatial structures and uncertainty about them
- + Succinct and easy to modify
- Some simple ideas are impossible or hard to implement
- Not every aspect of a model can be exported for quantitative analysis
- More work to be done on probabilistic space