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# Towards Real-time Crowd Simulation Under Uncertainty using an Agent-Based Model and an Unscented Kalman Filter

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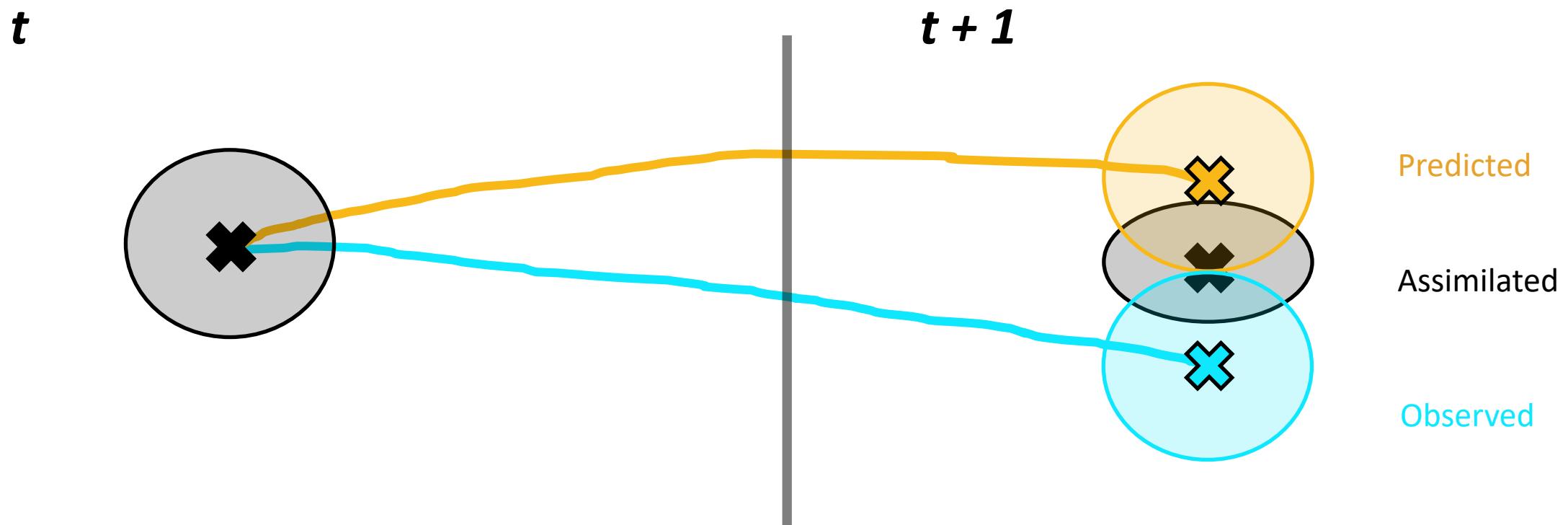


# What are Agent-Based Models?



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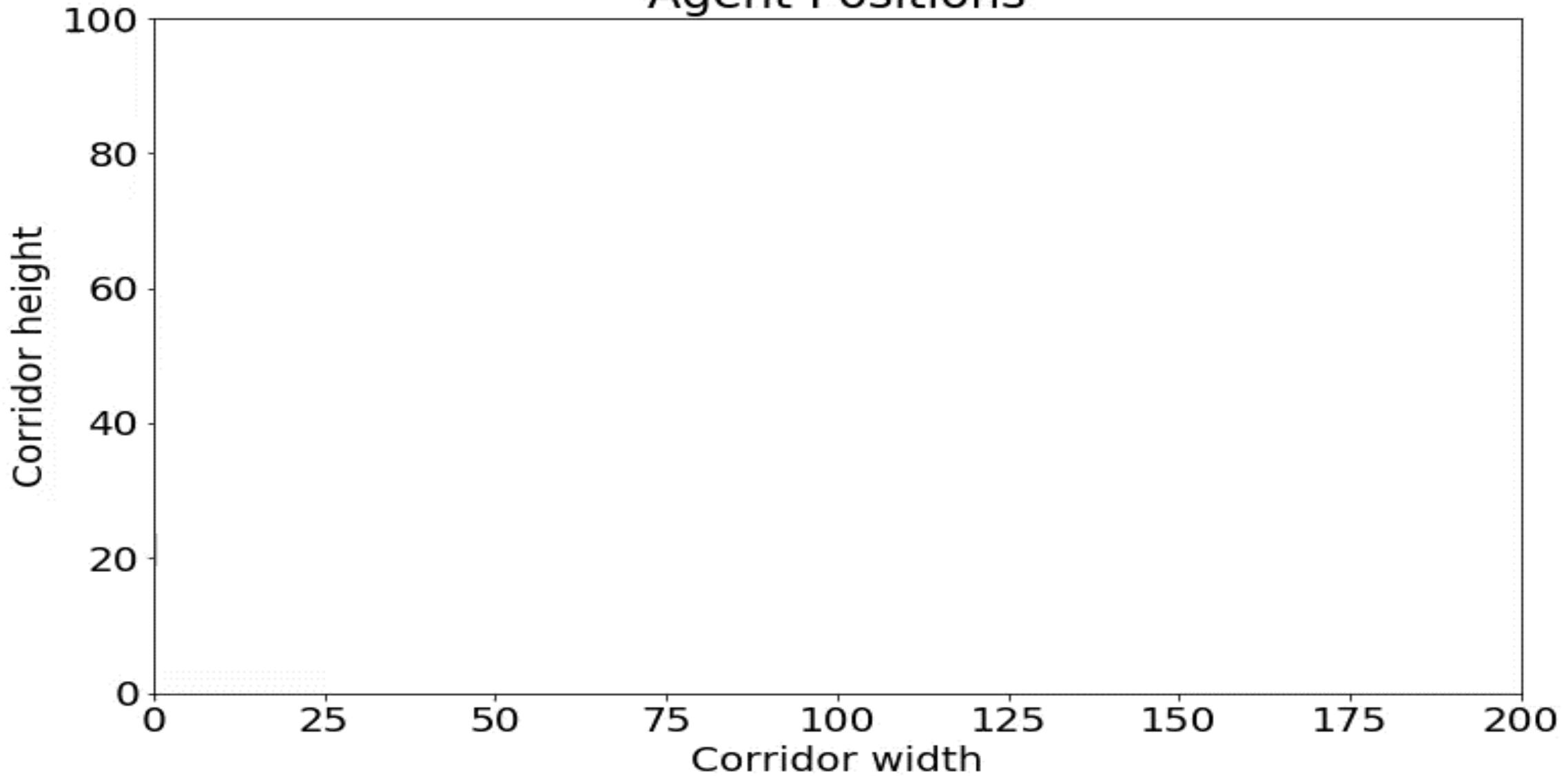
# Data Assimilation (DA)



# Ensemble Data Assimilation

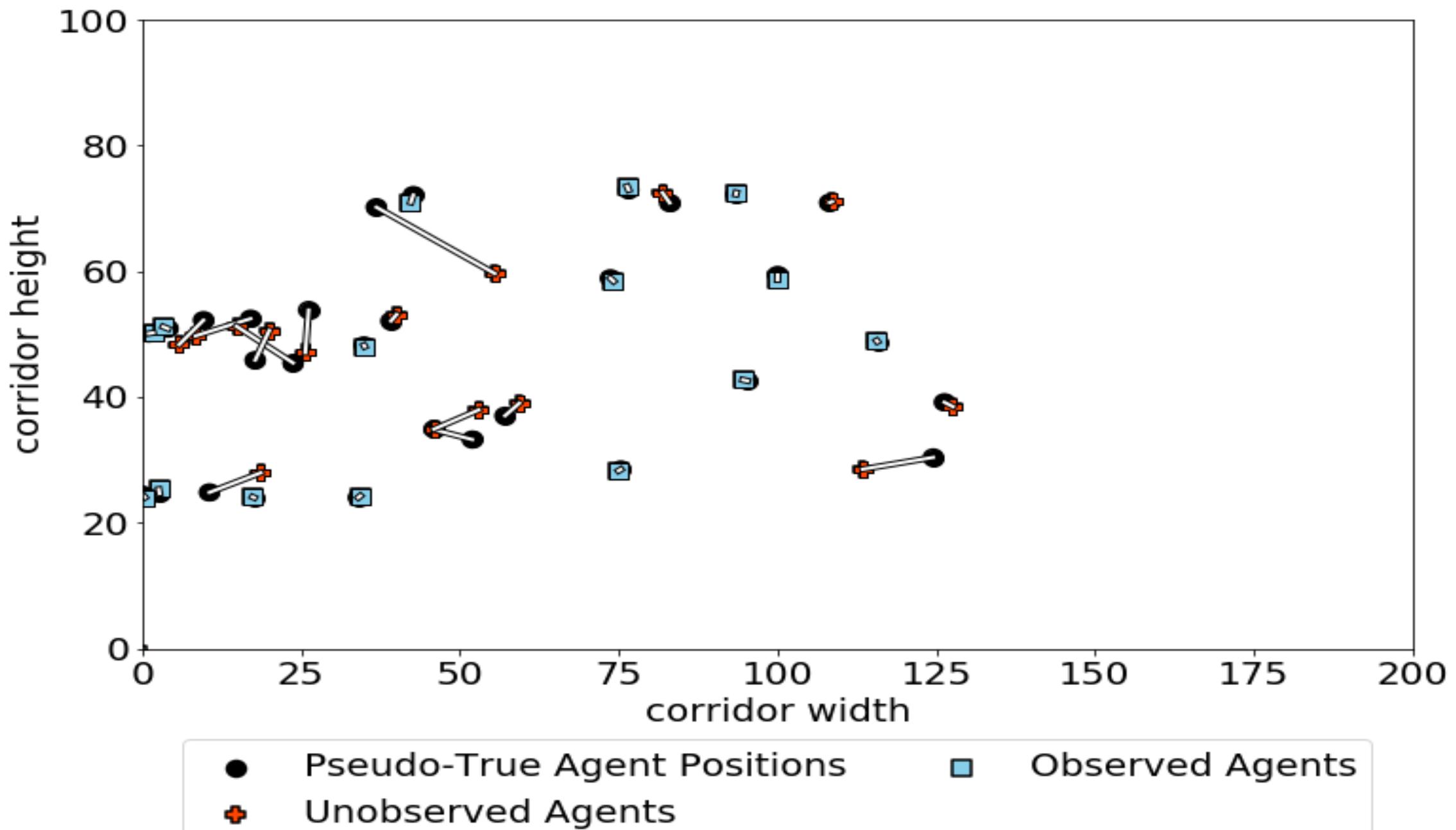
- Commonly used techniques such as Particle Filtering and Ensemble Kalman Filtering.
- Robust and accurate but computationally expensive.
- The Unscented Kalman Filter is proposed as a more efficient alternative.

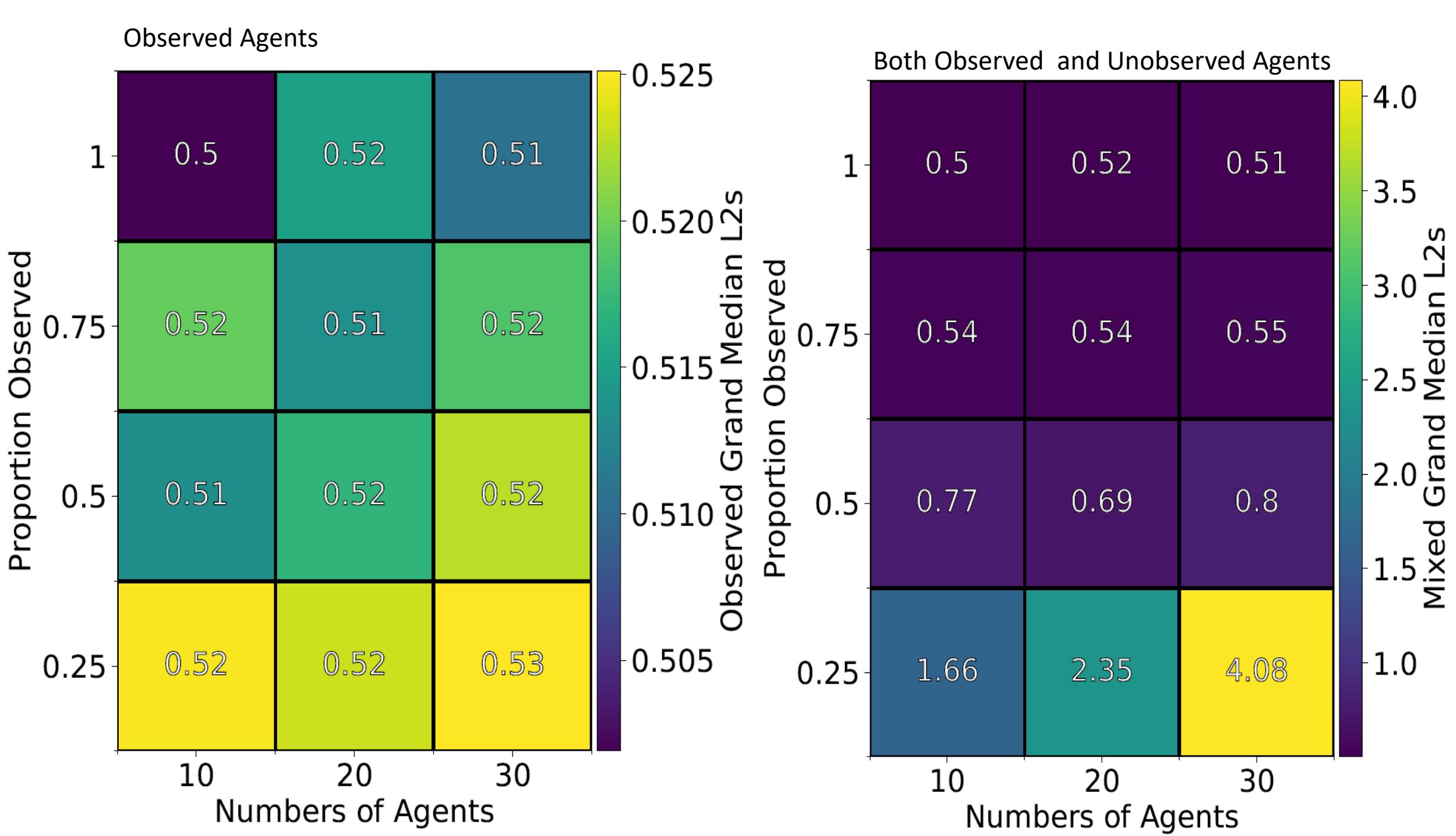
## Agent Positions



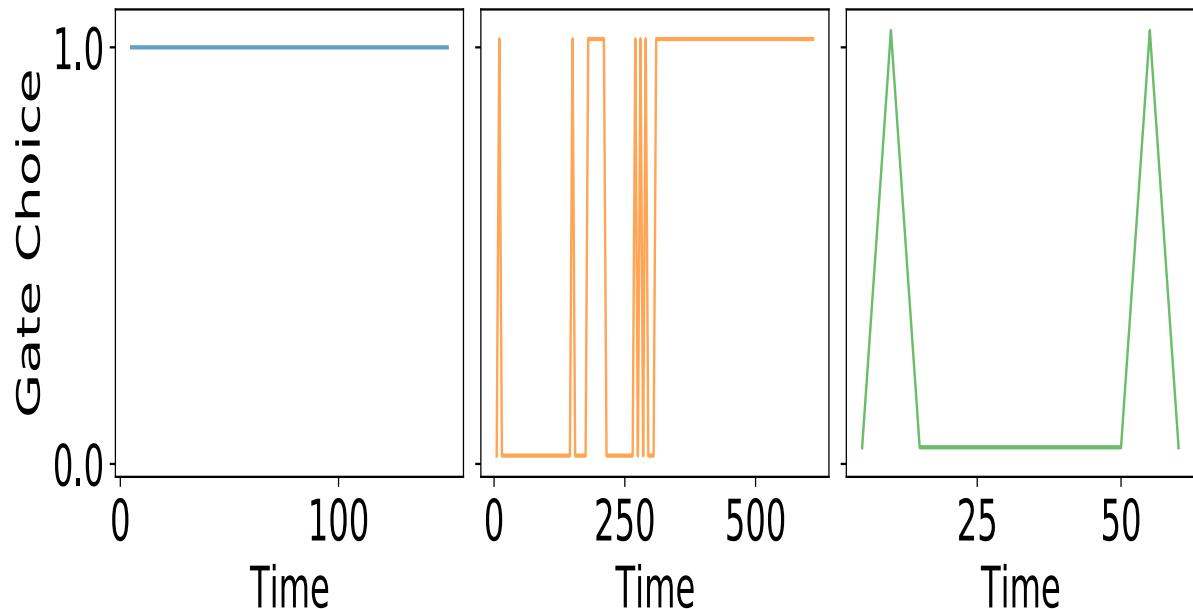
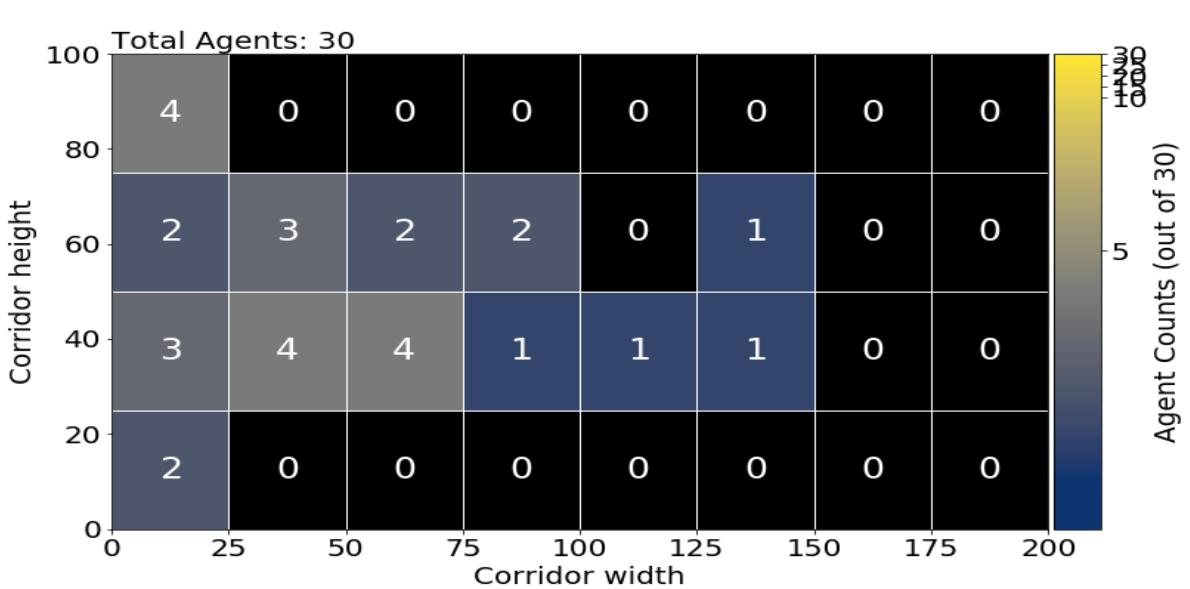
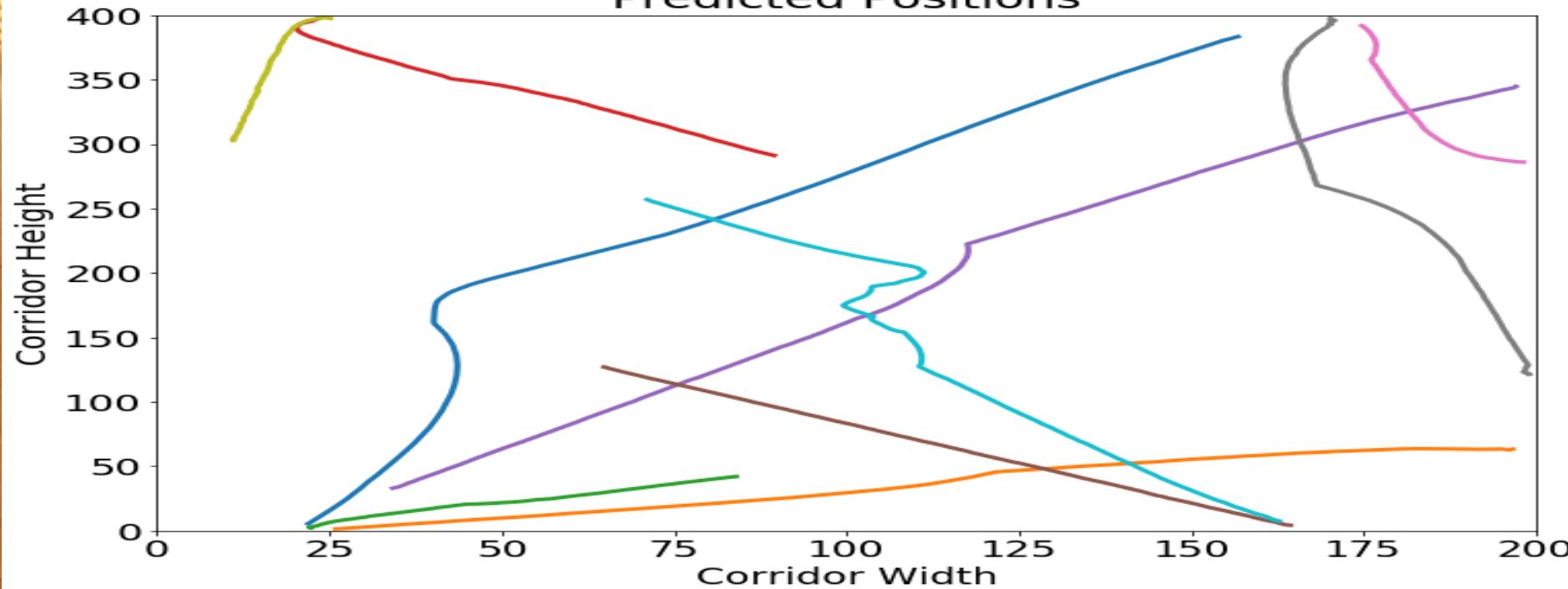
# Missing Data Experiment

- The aim of this random omission is to emulate a crowd where only some proportion of people are tracked.
- Some agents are fully observed, and some are only observed as they enter the model.





## Predicted Positions





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Thank you for your time.

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