

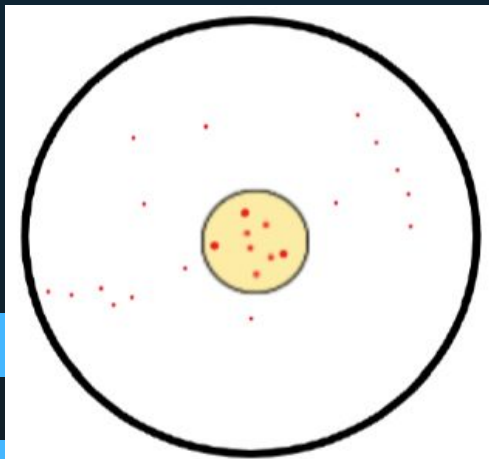
# Collective Intelligence

## Assignment 1: Aggregation

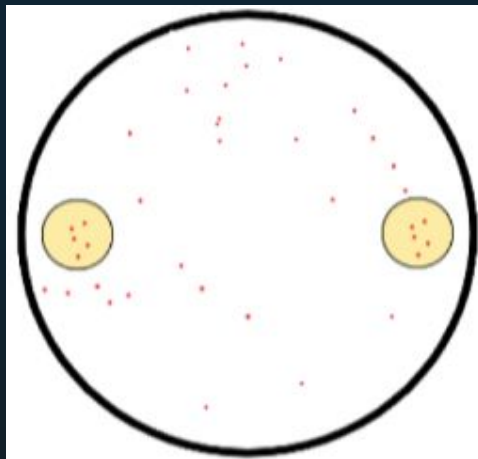
Laryza Mussavi, Seeun Park, Aryanne Thompson, Ohad Daniel, Angela Jagessar

# THE TASK

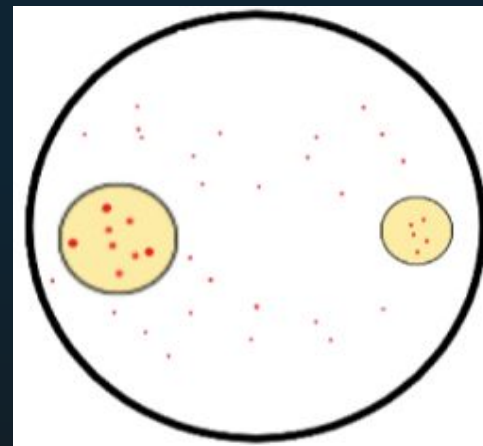
To have agents aggregating as much as possible towards one among the potential sites, instead of splitting in the aggregates.



Only one location



Symmetric location -  
same size



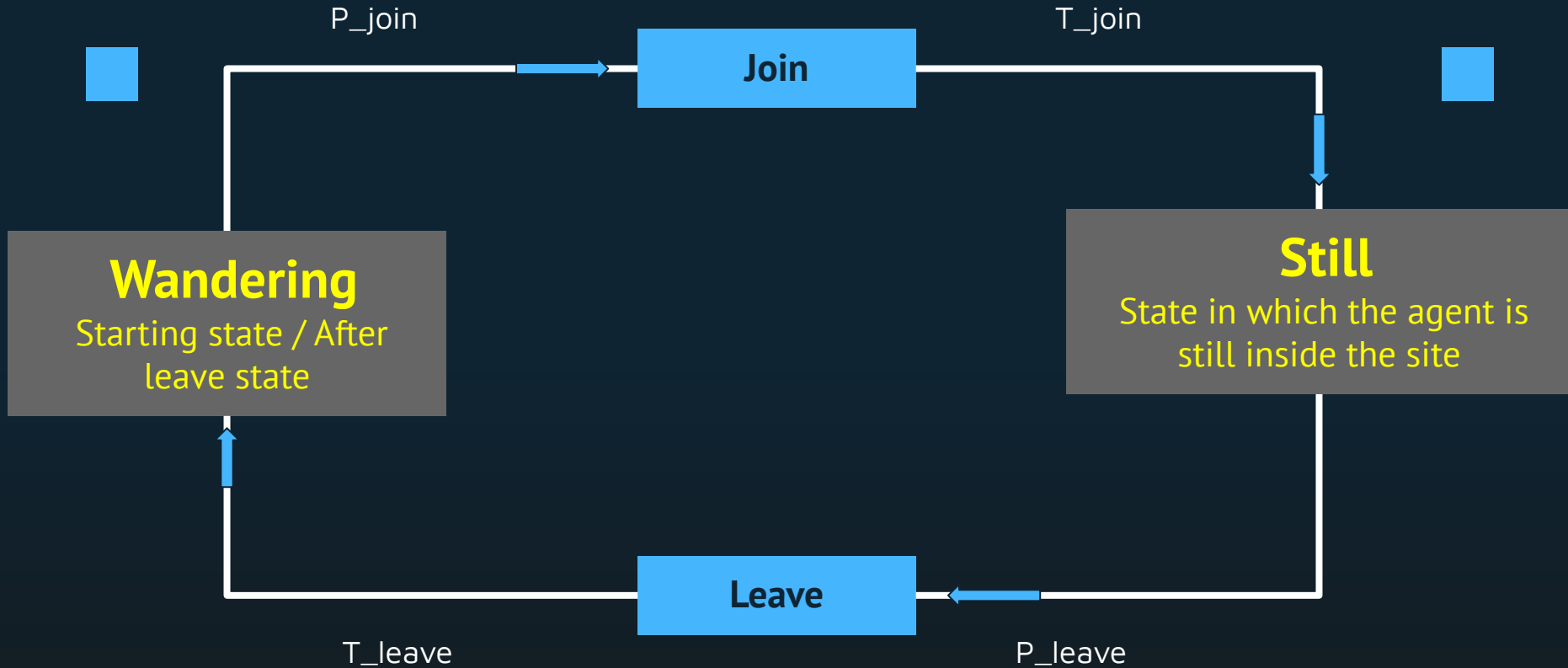
Symmetric location -  
different size

# INTRODUCTION

QUESTIONS ANSWERED WITH THE SIMULATION:

- **How does the size of a shelter affect the aggregation behavior of the agents?**
- **Which probability method is most appropriate when determining the join and leave action of the agents?**

# METHODOLOGY



# Probability Functions

$$P_{stay} = 0.03 + 0.48 * (1 - e^{-an});$$

$$P_{leave} = e^{-bn};$$

[1] N. Cambier, Bio-inspired collective exploration and cultural organisation. PhD thesis, 2019. Thèse de doctorat dirigée par Frémont, Vincent Informatique : Unité de recherche Heudysic (UMR-7253) Compiègne 2019.

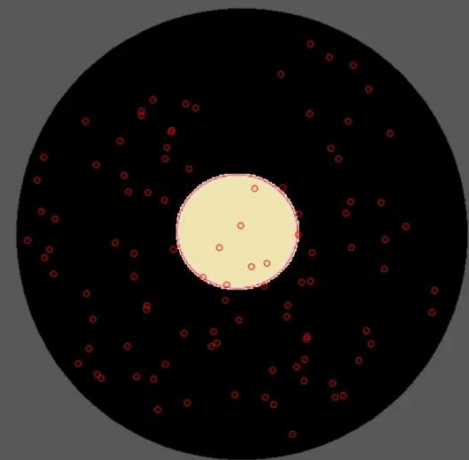


# Results

Result Analysis

# Demos

Violet

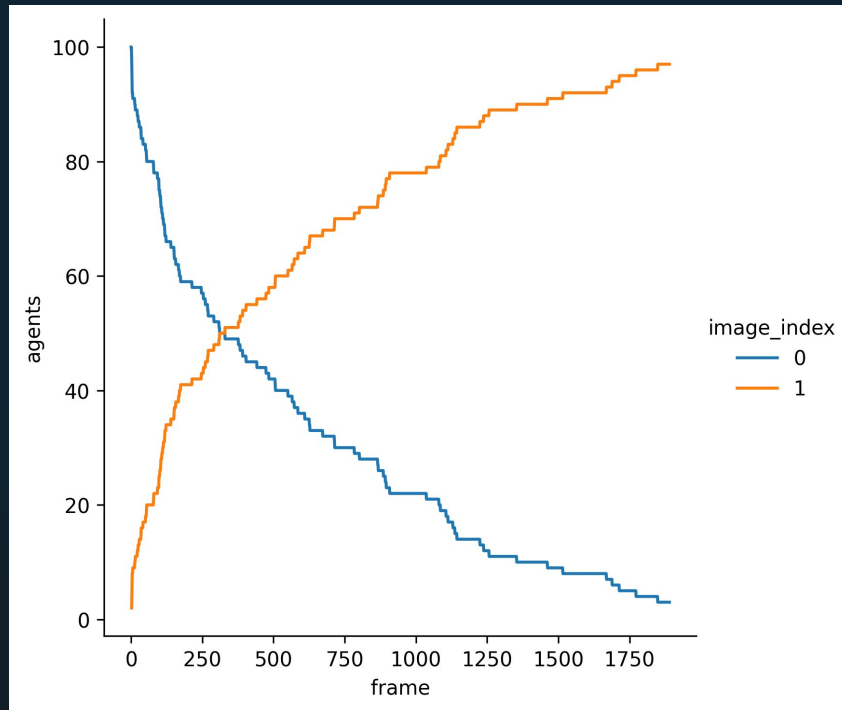


# Parameters

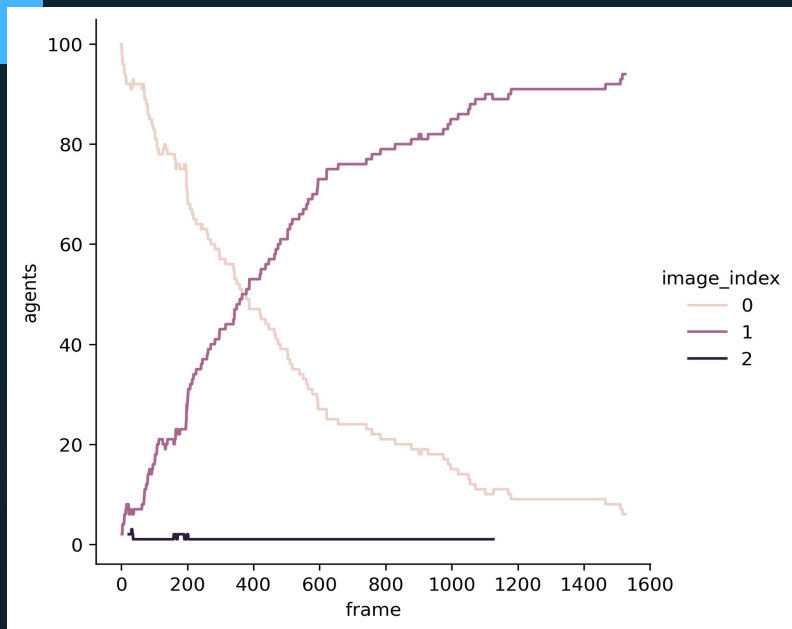
- Number of agents  $\rightarrow 100$
- Radius  $\rightarrow 50$
- $T_{\text{join}} \rightarrow 1$  second
- $a \rightarrow -1.70188$
- $b \rightarrow -3.88785$



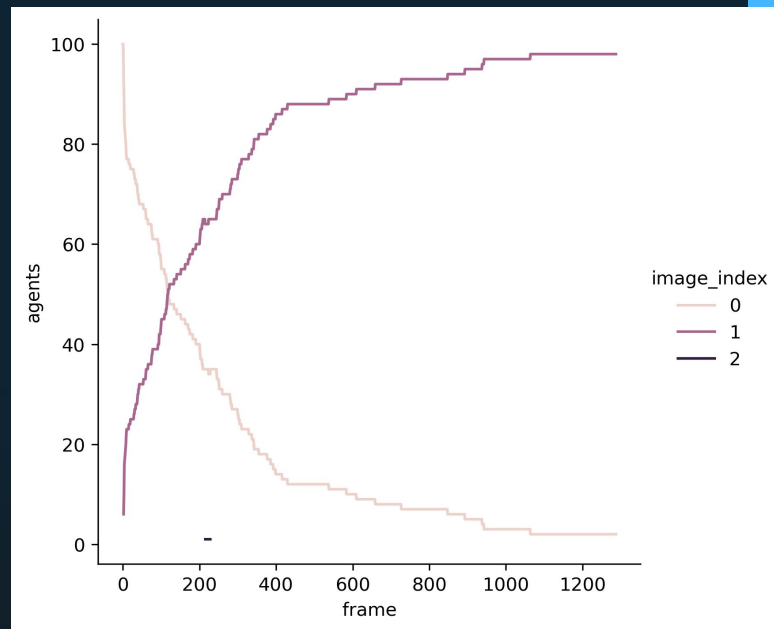
# Join



# Join

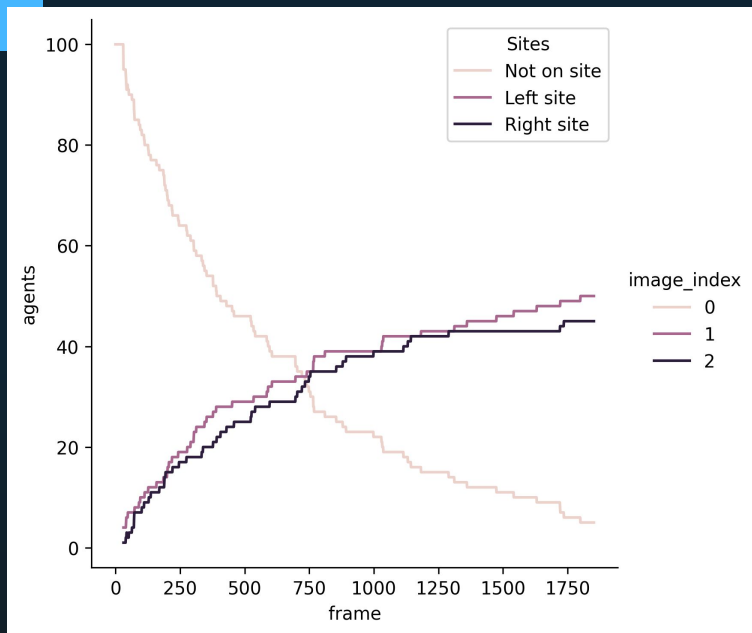


Equal Sizes

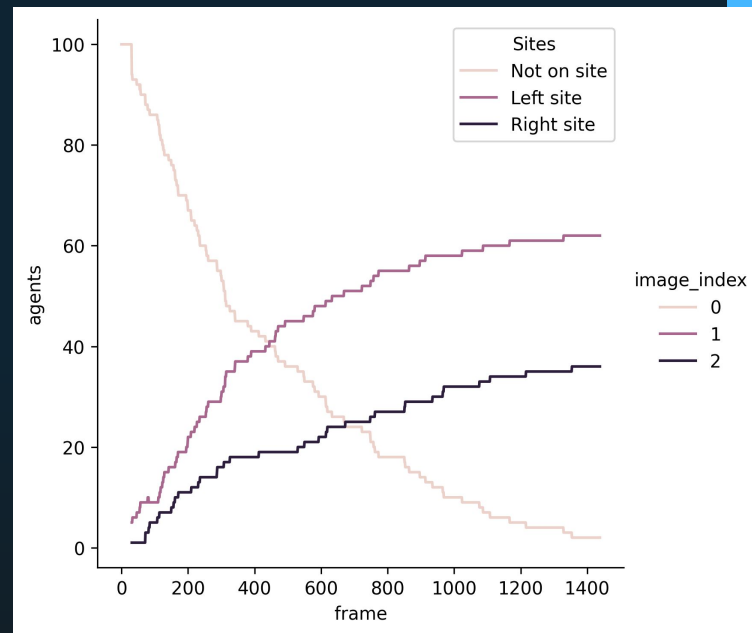


Varying sizes

# Join



Equal Sizes



Varying sizes

## Expectations

- Aggregation within shelters
- No sticking to edges
- Aggregation in one shelter
- Aggregation in bigger shelter
- Separation of agents

## Results

- Aggregation within shelters
- No sticking to edges (few cases)
- No unique shelter chosen  
→  $P_{\text{leave}}$
- Bigger shelter, higher chances
- No separation

# Conclusion



## Aggregation of agents

- In a shelter
- In multiple shelters

# Skills Learnt



Visualizing Data



Parameter  
Evaluation



**Thank you!**