

ID2209 – Distributed Artificial Intelligence and Intelligent Agents

# **Assignment 1 – GAMA and Agents**

## **Group 38**

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# Introduction

In this assignment, we were tasked with simulating guests in a festival field. In the festival field there would be information centers and stores. Guests who get hungry or thirsty would visit an information center to get the location of a store and visit the store to satisfy their needs.

There were challenges to improve upon and increase the detail level of the simulation. Such as adding memory and social behaviors to guests. Finally, we were allowed to implement any creative ideas we could think of, I implemented a fun and boredom mechanic for this purpose.

## How to Run

Extract the folder *Assignment-1* from the .zip file and import as a project to GAMA 1.8 version built for Linux. There is a model file *festival.gaml* that contains a single experiment which can be run to observe the simulation. This experiment also has input parameters that can be changed to observe the effects of implementation of certain behaviors or changing the number of agents.

## Species

### Information Center

This agent was responsible for giving the location of the store nearest to the guest asking for one. It would take into consideration whether the guest needs food or water. Otherwise this agent is passive.

### Store

This agent was responsible for providing food and water to the guests requiring some. Stores are randomly split with a 50% chance such that a store either only provides food or only provides water. Otherwise, this agent is passive.

### Guest

This agent is by far the most active and most interesting agent in this model. In summary, guests wander around the festival field and seek out stores if they are hungry or thirsty.

In the most basic model, guests start out with a certain amount of hunger and thirst value. As they move around their values for these decrease. When below a certain value, they feel the need for replenishment. So they seek out a store. But they only know the locations of information centers. So they visit the closest information center first. There they are directed to the closest store that matches their need. If their needs are met, they go back to idling. Which they do by wandering around.

In the improved model, guests can remember the last store they visited. They also have a chance of going back to the last store they visited instead of seeking an information center first, that is if that

store serves what they need. Another improvement is some social behaviors. If a guest is seeking an information center, they ask nearby guests for the stores they know to see if they remember a store compatible to their need. If they do, the guest directly goes to that store instead of visiting the information center first.

Additionally, I implemented a boredom mechanic as part of the creative idea part of the assignment. When enabled, in addition to hunger and thirst, guests also get a fun value. If guests are alone, when no other guest is nearby, they get bored. If guests are on their way to an information center or a store when they are alone, they get even more bored. When they do not have an immediate need, bored guests can exert themselves to regain fun. It can be thought as doing an activity such as dancing at the cost of accelerated hunger and thirst loss in order to have some fun.

## **Results**

Only interesting thing to mention in the most basic implementation is that all guests seek information centers and stores at the same time periodically. That is because they all lose resources at the same rate. Also, closest information centers and stores tend to be the same for every guest. Hence, periodically every guest rushes to information centers first and then rushes to the closest store.

## **Challenge 1**

I implemented the first challenge. Effects are visible. But I could not implement a chart to demonstrate the difference in distance traveled.

## **Challenge 2**

I did not attempt this challenge.

## **Creative Implementation**

My addition of the boredom mechanic helped to counteract the phenomenon I described above in the first paragraph of results section. Basically it allows guests to lose resources at different rates so they do not act in groups. They are also a little more cohesive since it helps them keep their fun levels up.

## **Conclusion**

Overall, it was a good first assignment. However, I do not have time to finish this report.