Market
in NetLogo

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Introduction

We have decided to model our market as a commerce transaction between art galleries and collectors, where the sold / bought products are paintings.

Motivation and description of the system

Which market?

Art (paintings).

Which agents?

Art galleries (of *Madrid* and *Albacete*) and collectors (*1, 2, 3, 4*).

How should agents interact with each other?

Talking and negotiating in a bilateral way (*peer to peer*).

Interaction protocols

We have designed our communication protocol depending on the success or the failure of the advertisement presented by the art gallery.

Advertisement attributes in order to compare them with customer's preferences: *author* and *price*.

Example:

```
Art gallery of Madrid -> AD: 'The kiss' at 60 billion euros, a true bargain! with values [60 Gustav Klimt The kiss] to Collector 2
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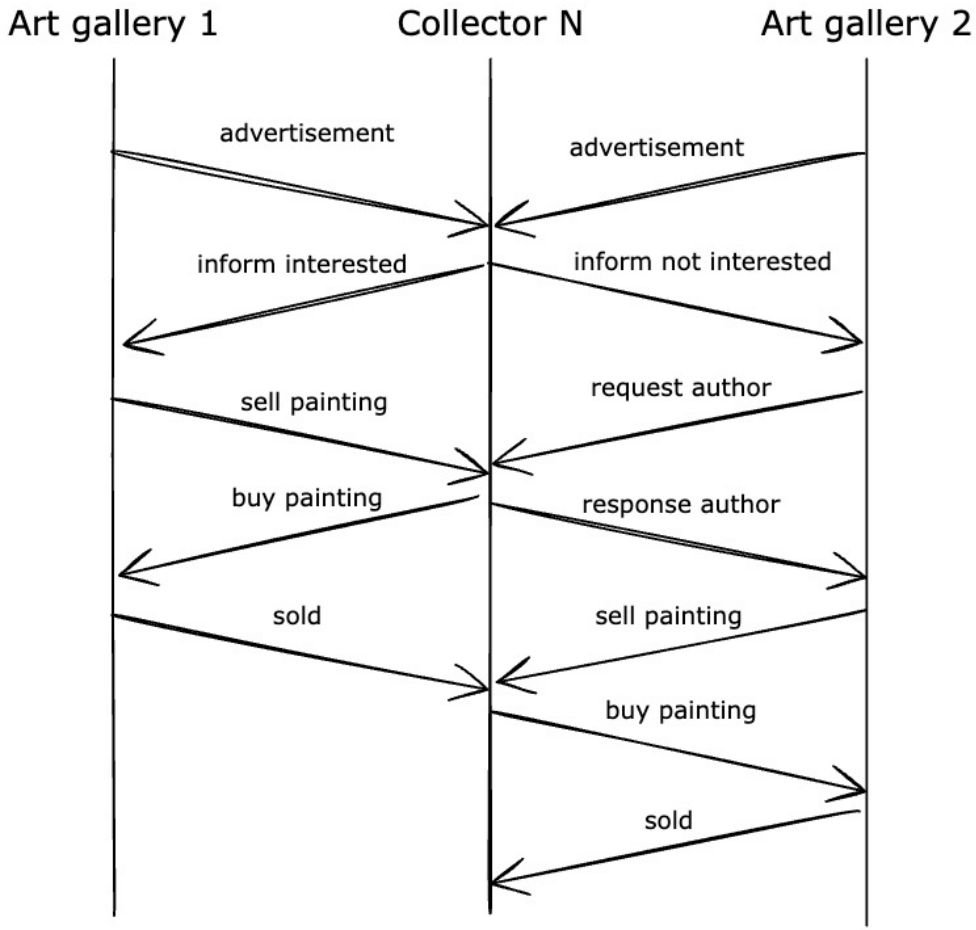
Interaction protocols. *Optimal cases*

This diagram represents the optimal cases of our communication protocol, where the collector ends up buying a painting from both galleries.

These ways, every agent is satisfied.

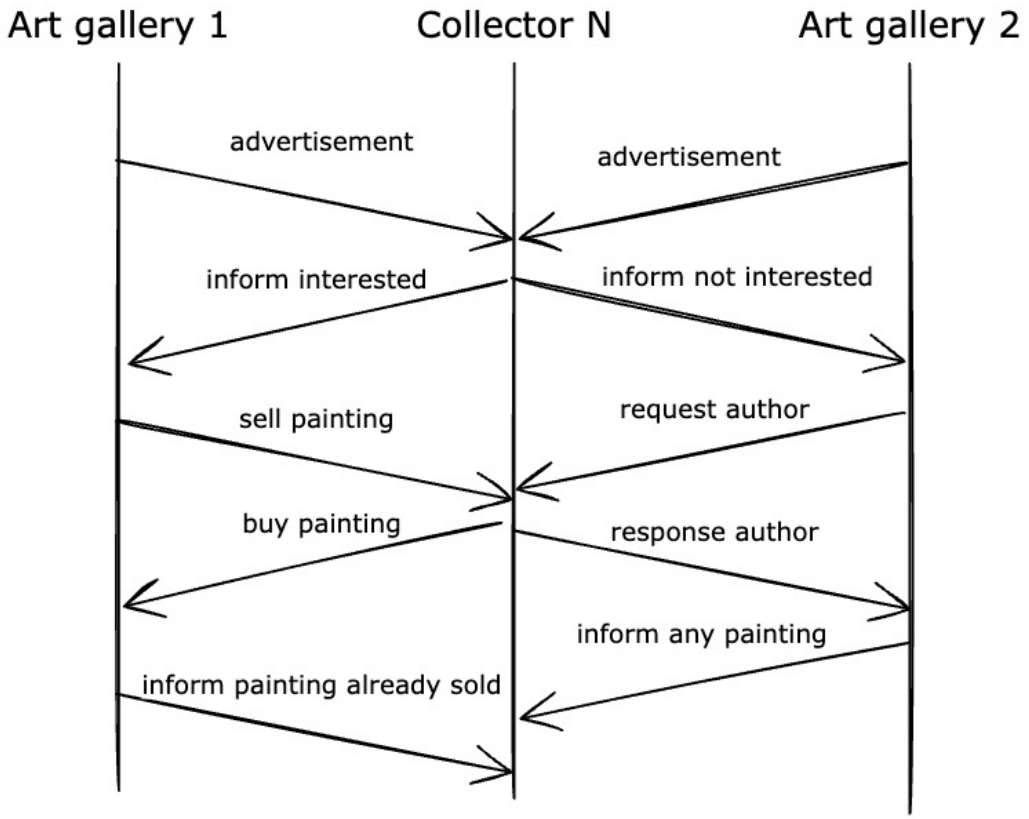


Interaction protocols. *Worst cases*

This diagram represents the worst cases of our communication protocol.

One art gallery will not sell the painting because it has already been sold and the other because the collector's author preference does not match any of the authors of the paintings held by the gallery.

In these cases, each agent is unsatisfied.



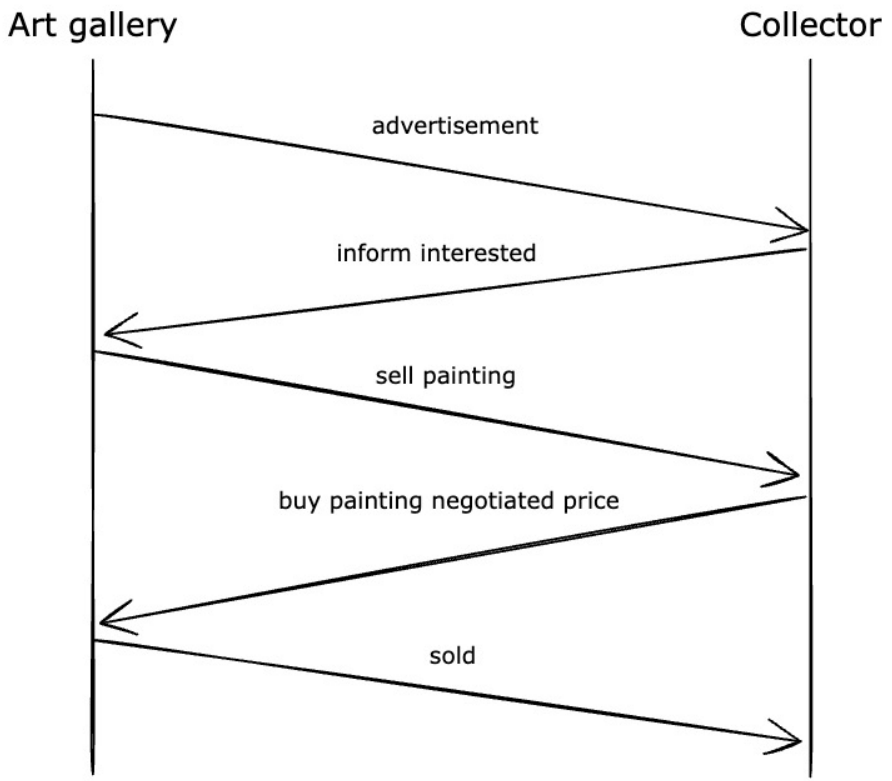
Interaction protocols. *Negotiation*

This diagram represents the negotiation between the art gallery and the collector:

The collector is interested and the art tries to sell the painting, but the price is higher than the collector prefers.

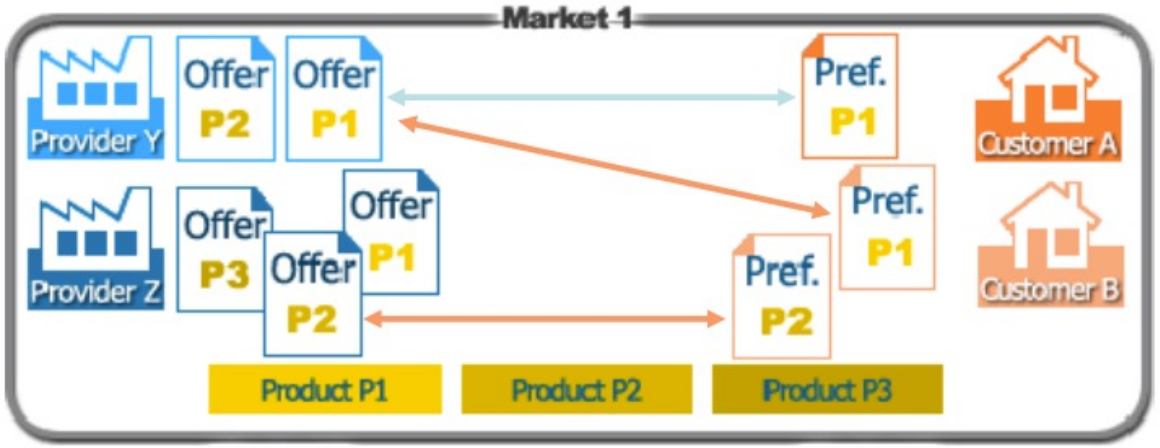
The collector then sends a buy request with the average of the prices.

Finally, the painting is sold at the negotiated price.

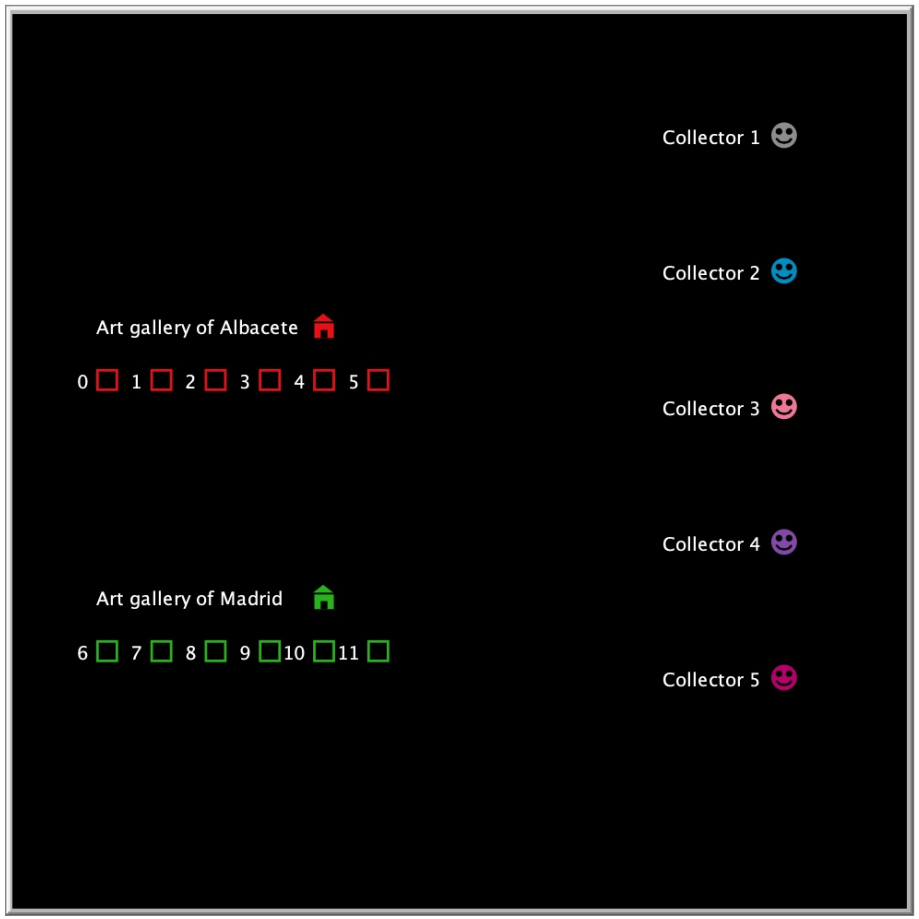


Interface design

We based our interface design on the theory slides of the subject.



Interface design. *Simulating the negotiation*



0. 'The Tree of Life, Stoclet Frieze' by Gustav Klimt
1. 'Jimson Weed' by Georgia O'Keeffe
2. 'Oriental Poppies' by Georgia O'Keeffe
3. 'Dream Caused by the Flight of a Bee Around a Pomegranate a Second Before Awakening' by Salvador Dalí
4. 'The Elephants' by Salvador Dalí
5. 'The Two Fridas' by Frida Kahlo
6. 'The kiss' by Gustav Klimt
7. 'Adoration of the Magi' by Hieronymus Bosch
8. 'The Garden of Earthly Delights' by Hieronymus Bosch
9. 'Black Iris' by Georgia O'Keeffe
10. 'The Persistence of Memory' by Salvador Dalí
11. 'Self-Portrait with Thorn Necklace and Hummingbird' by Frida Kahlo

Setup

number-of-collectors 5

Run

Interface design. *Galleries, paintings and collectors*

Each gallery is represented by a house icon (*red* or *green*) on the left, and their paintings are represented by squares (again, *red* or *green*).

Each collector, which are represented by the smiling faces on the right, moves to the gallery where the painting they're interested in is.

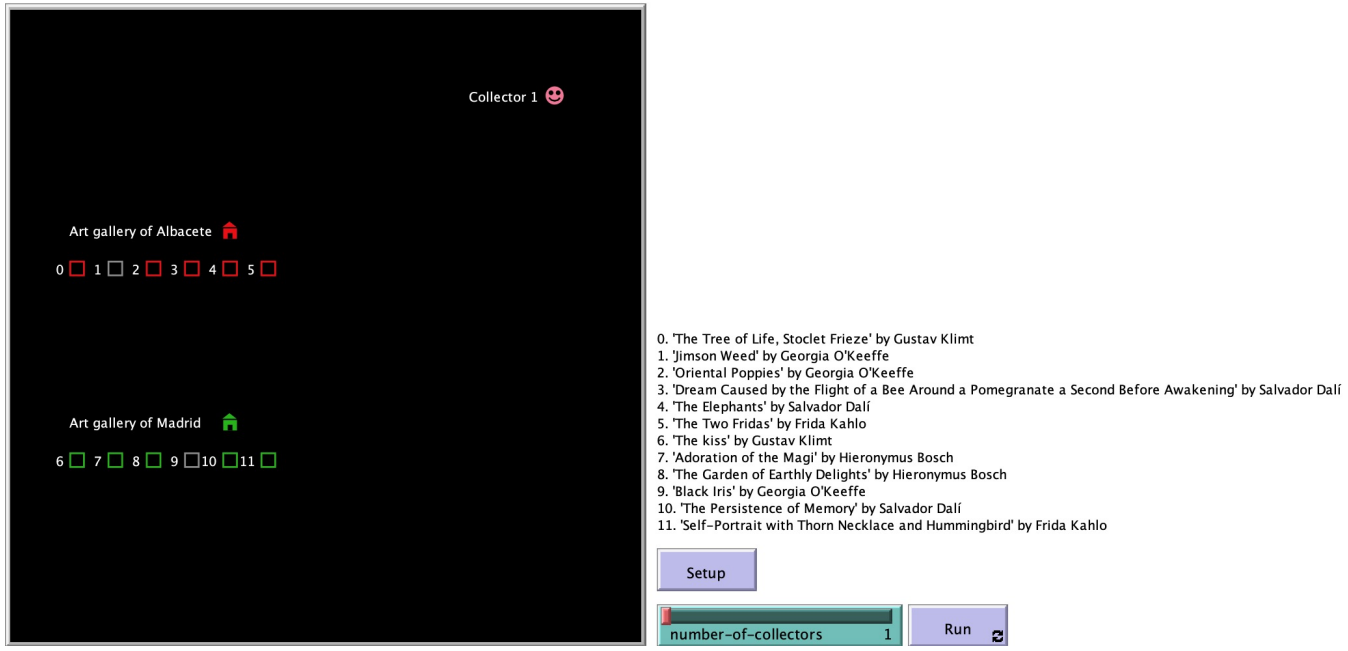
Once they're there, the collector and the gallery start dialoguing in order to make a fair deal. If the result is a sold, the costumer gets the painting (and its corresponding square is turned *grey*).

Experiments and results

We have based the tests on the variation in the number of collectors.

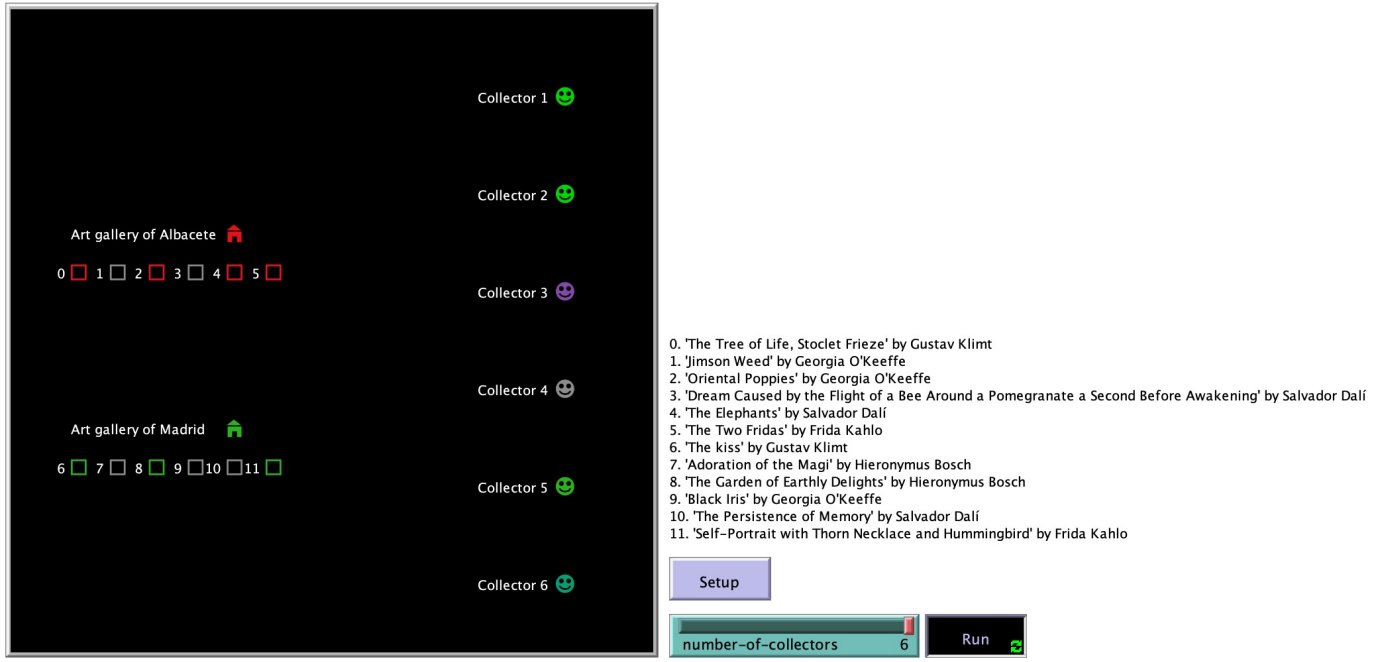
Experiment with *one* collector

Each collector can get a maximum of two paintings, because there are only two art galleries that contact them.



Experiment with *six* collectors

More collectors means more probability to sell paintings, which means better performance of the market.



Analysis and conclusions

- ✓ The global behaviour matches with our expectations.
- ✓ With these simulations, we have learned the importance of reaching the maximum number of clients in a market and matching their preferences with the products a seller has.
- ✓ In conclusion, the performance of our market is higher when there are more collectors.

Future work

The model could be improved by adding the following features:

- Possibility to increase the number of collectors to a much higher value (thousands and thousands), as well as the number of galleries, so the art market would be a bit more realistically represented.
- Add, in some way, an additional value to the paintings, because its value it's not only monetary, but also subjective to the collector or the art gallery.
- Take galleries, collectors and paintings features from a real database, again to represent the market in a fairer way.

The End