



**HAL**  
open science

## Distribution model: an approach to facilitate the distribution of agent-based model

Lucas Grosjean, Alexis Drogoul, Bénédicte Herrmann, Nghi Quang Huynh, Christophe Lang, Nicolas Marilleau, Laurent Philippe

► **To cite this version:**

Lucas Grosjean, Alexis Drogoul, Bénédicte Herrmann, Nghi Quang Huynh, Christophe Lang, et al.. Distribution model: an approach to facilitate the distribution of agent-based model. GAMA Days 2024, Nov 2024, Online, France. ird-04889463

**HAL Id: ird-04889463**

**<https://ird.hal.science/ird-04889463v1>**

Submitted on 15 Jan 2025

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Distribution model: an approach to facilitate the distribution of agent-based model

Lucas Grosjean<sup>1,2</sup>, Alexis Drogoul<sup>1,4</sup>, Bénédicte Herrmann<sup>2</sup>  
Nghi Quang Huynh<sup>3</sup>, Christophe Lang<sup>2</sup>, Nicolas Marilleau<sup>1,2</sup>, Laurent Philippe<sup>2</sup>

<sup>1</sup> UMI 209 UMMISCO, IRD, Sorbonne Université

<sup>2</sup> Université de Franche-Comté, CNRS, institut FEMTO-ST

<sup>3</sup> Can Tho University

<sup>4</sup> LMI ACROSS, Thuyloi University, Hanoi, Vietnam

lucas.grosjean@ird.fr

## Keywords

Distribution, Modeling, HPC, Agent-Based Model

## Abstract

Agent-based modeling is a powerful tool for understanding complex systems. Some models require large amounts of agents and data. Most agent simulation platforms run models sequentially and cannot run large models in a reasonable time, or at all. To solve these problems, Agent-Based Models can use distributed computing to spread the load and/or the data over multiple computing processor. The distribution of ABM execution however raises complex issues that require advanced skills to be addressed. This paper presents the concept of distribution model that aims at simplifying the distribution of ABMs. Following the separation of concerns approach, we propose a flexible framework to separate the thematic modeling of the model from the modeling of its distribution. We describe the implementation of a model-based agent distribution model using agent to solve distribution issues. We illustrate the capacity of this approach with the GAMA platform, on how we can make it easier for modelers to efficiently distribute their models.

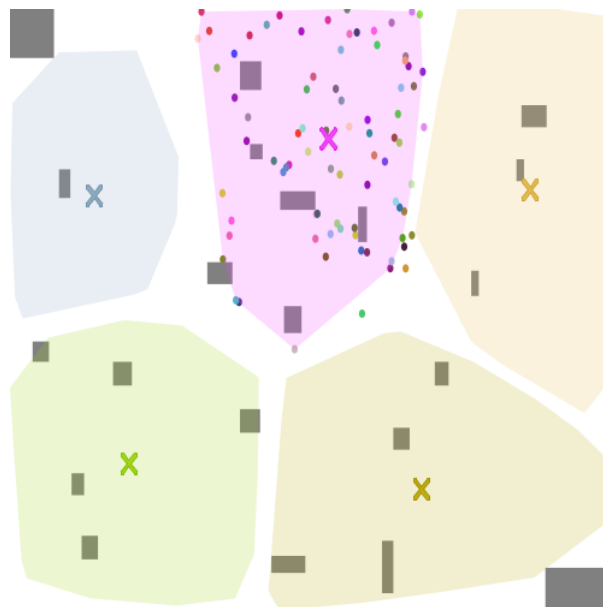


Figure 1: Distribution model implementing a KMEAN algorithm to generate partitions to distribute a GAMA evacuation model

## Additional material

Github repository : <https://github.com/LucasGrjs/DistributionModel>