

Presented by

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Understanding Segregation Dynamics with Schelling's Model

Exploring Agent-Based Modeling in Urban Studies



Schelling's Model

- Schelling's Segregation Model illustrates how people can build segregated societies even if they just have a little preference for having neighbors who are similar to them.
- Key components:
 - Grid setup (size, vacant ratio)
 - Agent attributes (tolerance, group preferences)
 - Model dynamics (agent satisfaction, movement)
- The objective: Simulating patterns of residential segregation based on individual preferences

Agenda

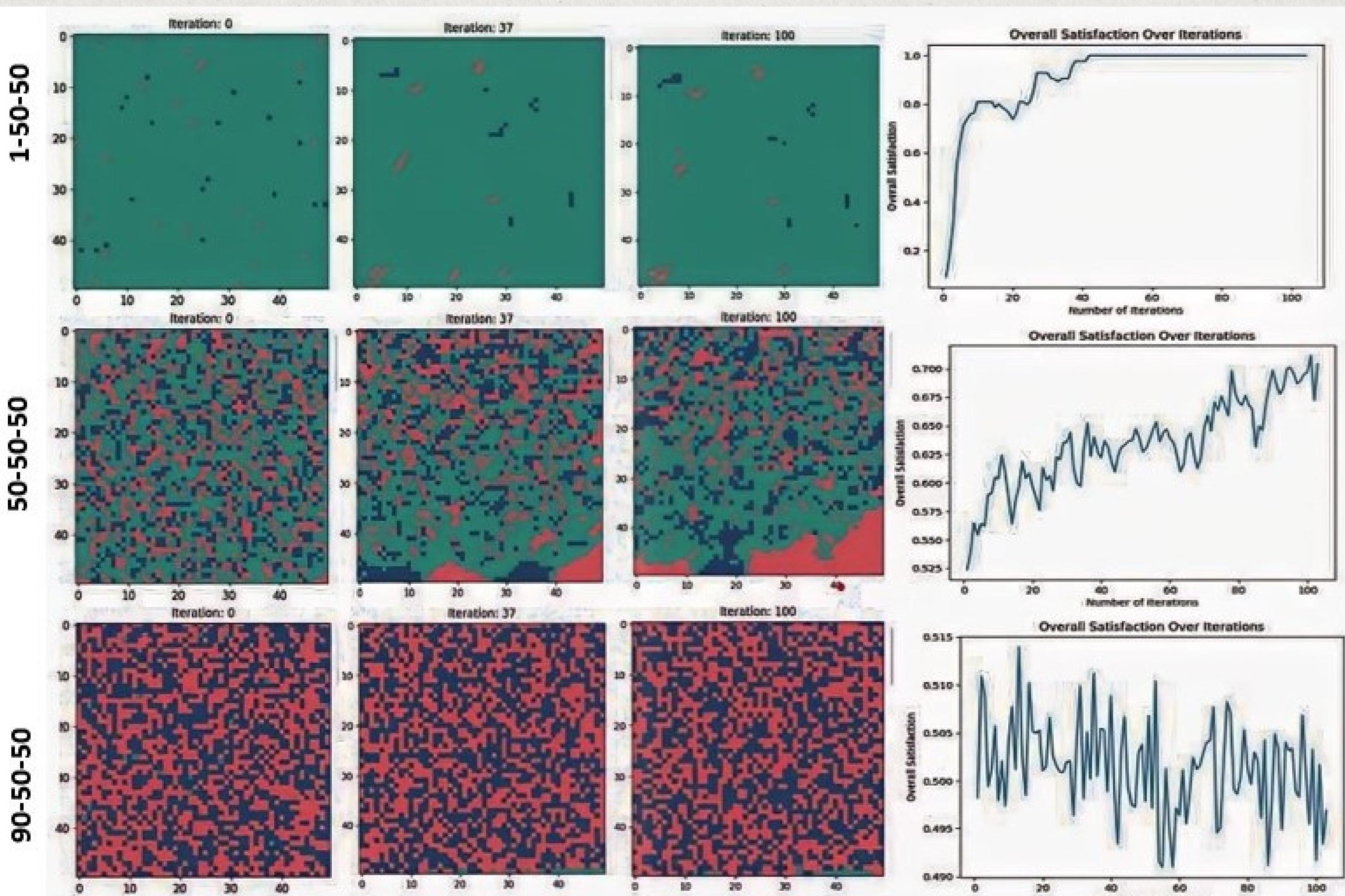
Explore the intricacies of urban systems and the challenges they pose for understanding segregation dynamics.

Introduce the power of agent-based modeling in deciphering the behaviors and interactions shaping urban landscapes.

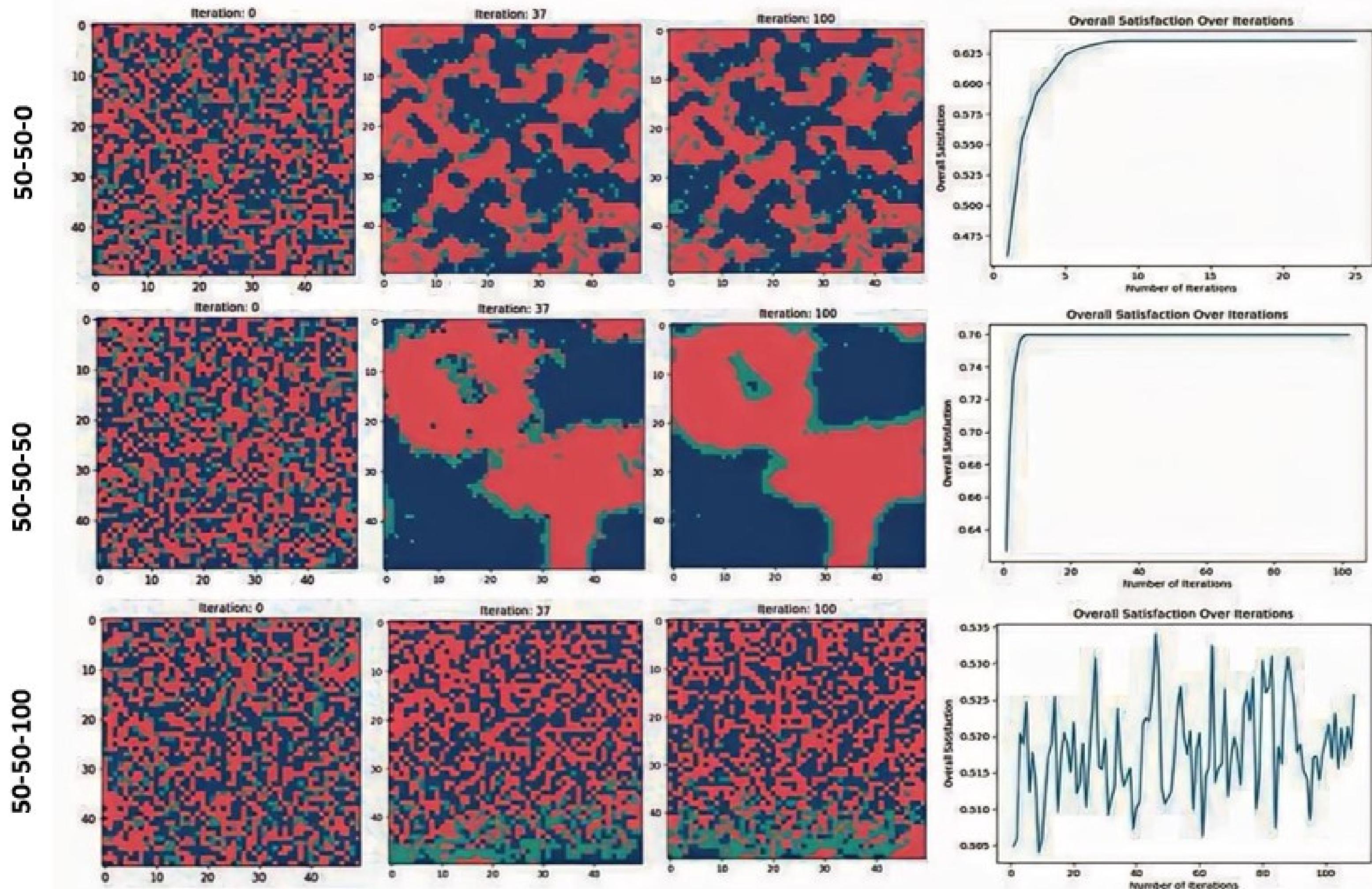
Outline the objectives of our study and its significance in addressing real-world urban challenges.

Embark on a journey of inquiry, exploring pivotal questions and hypotheses in our quest to understand segregation dynamics.

Results: Vacancy Ratio

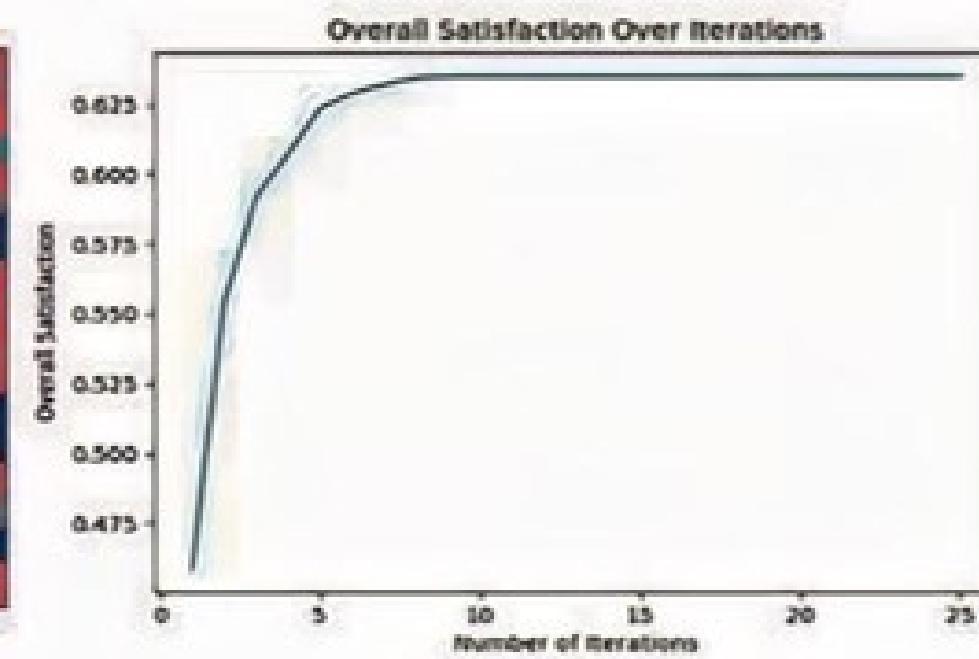
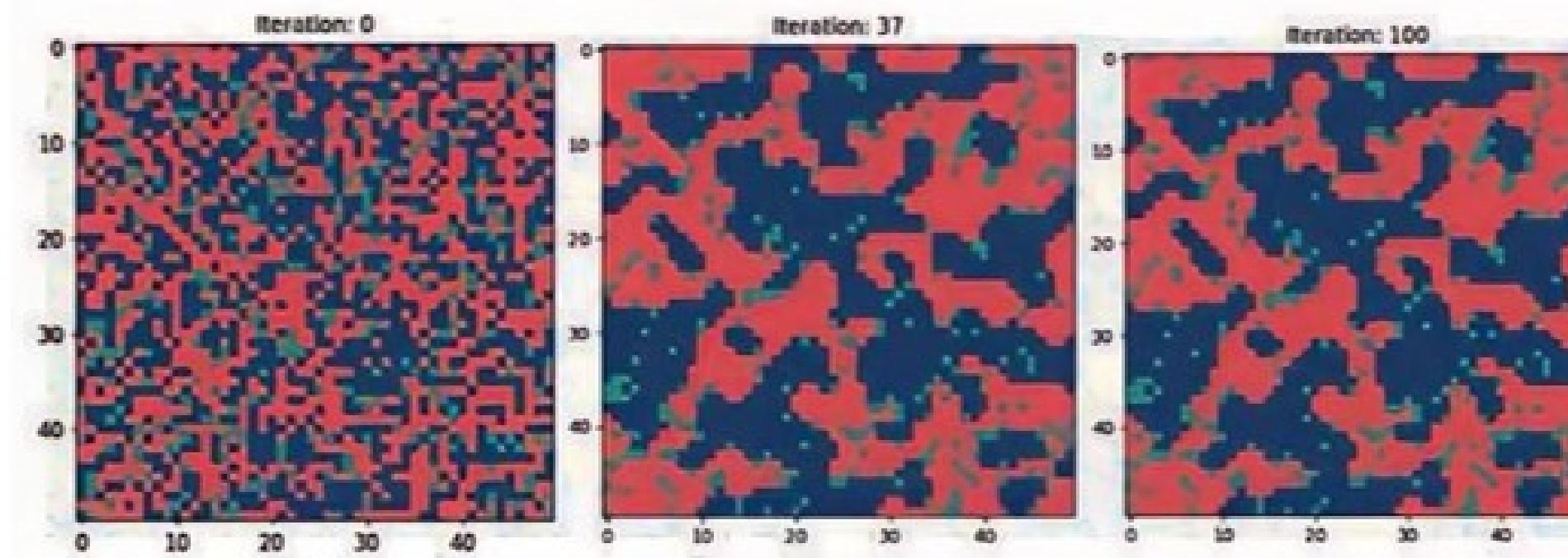


Results: Base Neighbor Satisfaction

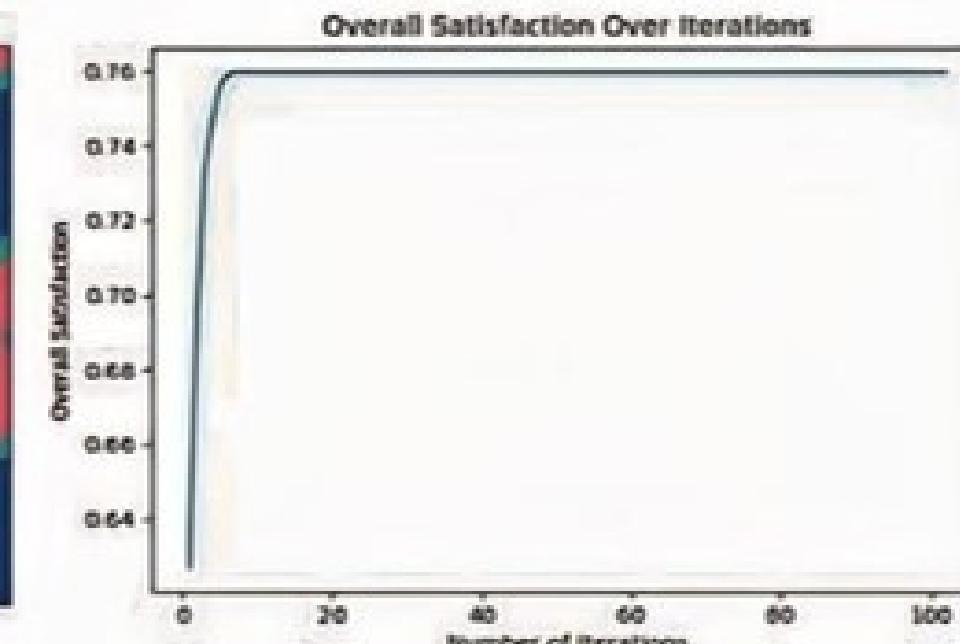
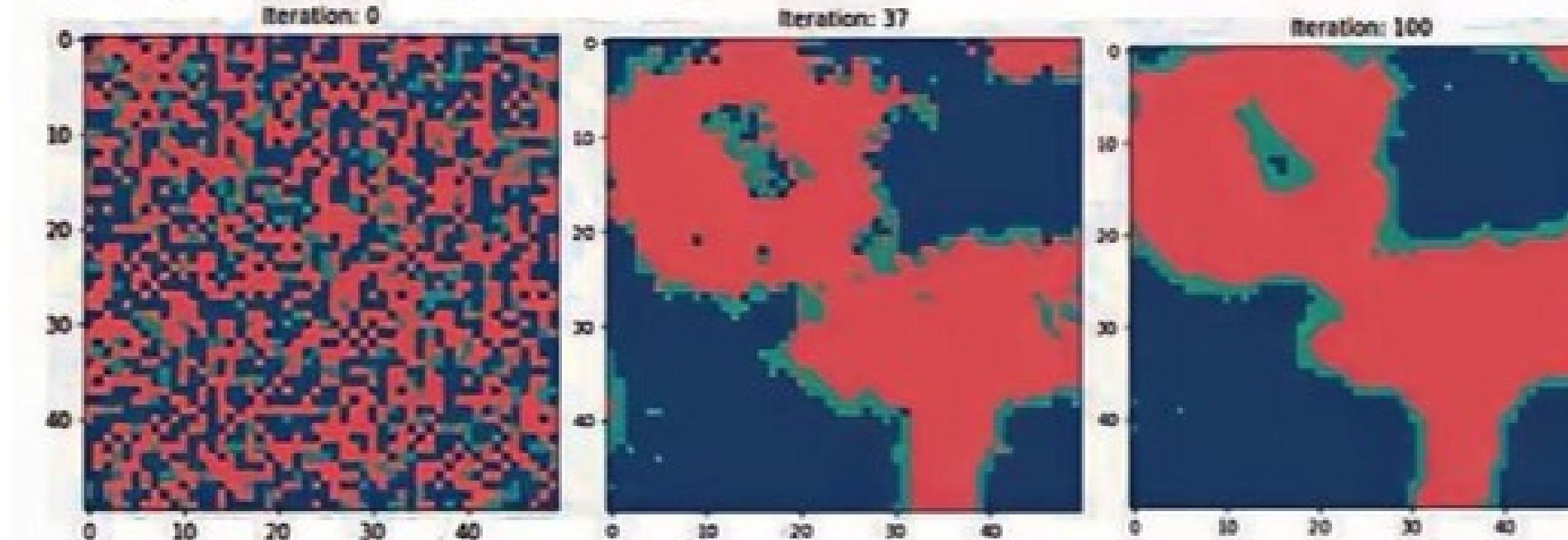


Results: Neighborhood Preference

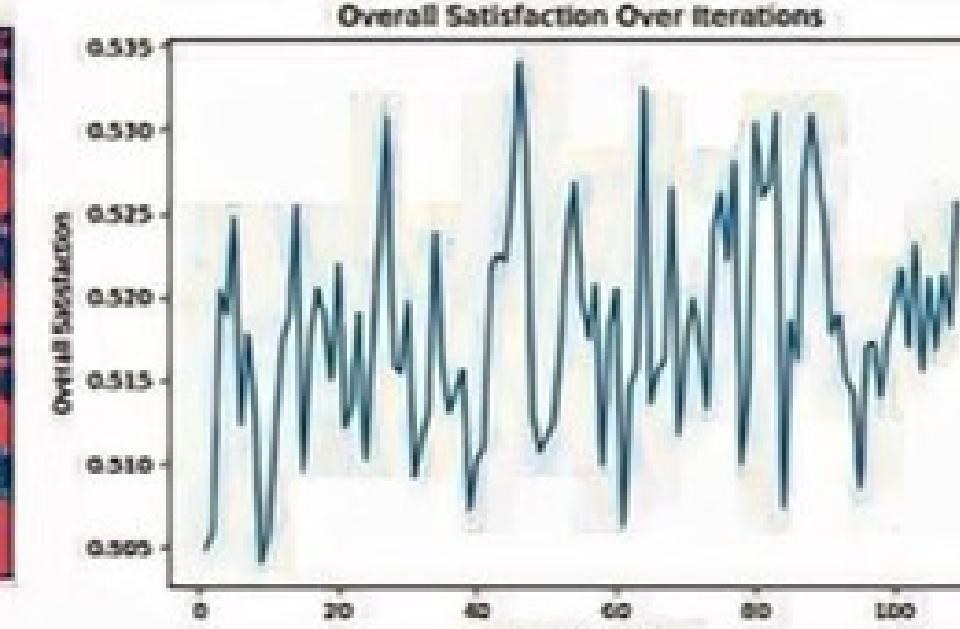
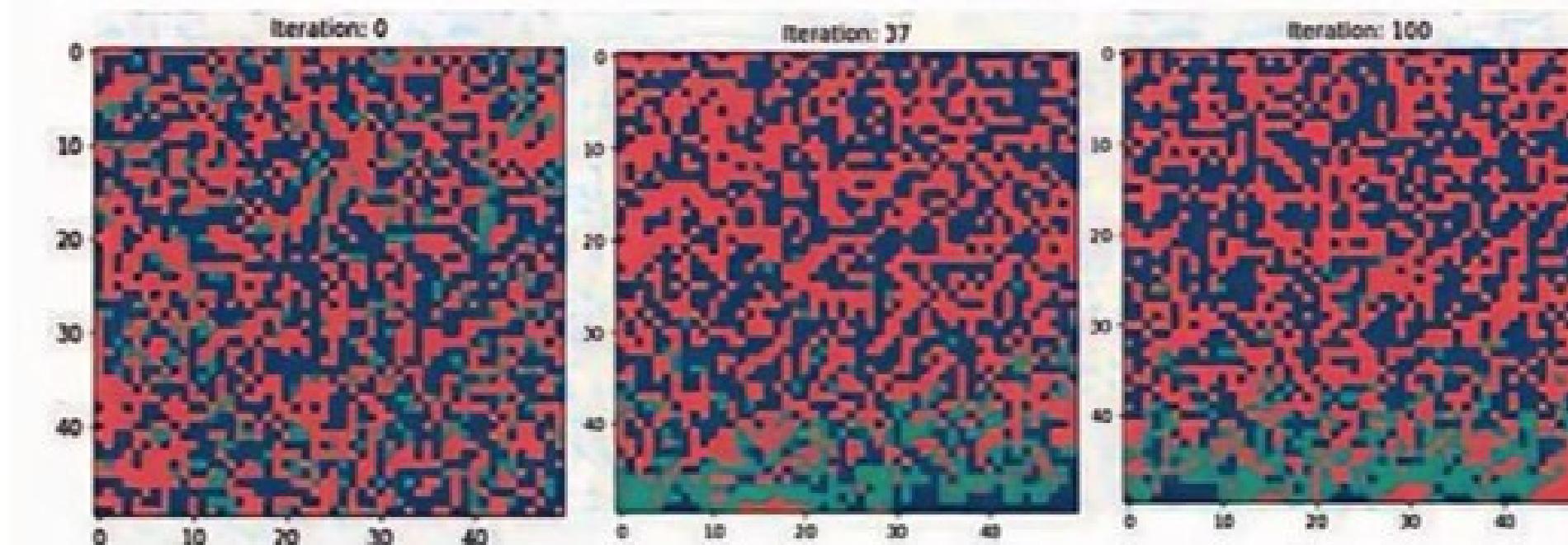
90-20-10



90-40-10



90-50-10



Results and Comparative Analysis

while the model provides valuable insights into the emergence of segregation dynamics from simple individual behaviors, its simplifications and assumptions highlight the need for further refinement and validation against empirical data.

01.

When the Vacancy Ratio rises, segregation and stability decline. To maintain segregation and stability, agents must possess a stronger preference for their own group.

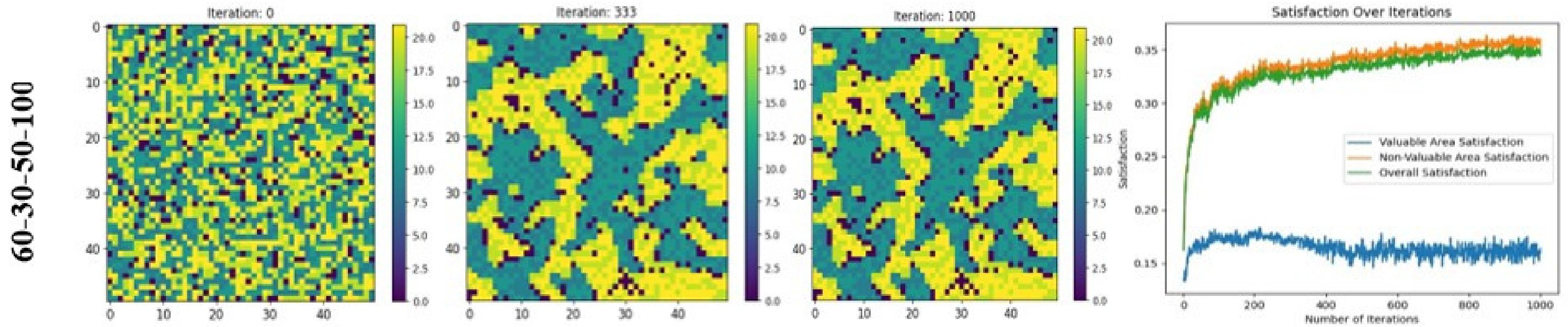
02.

A higher Base Neighbour Satisfaction does not significantly alter segregation. This is because the satisfaction derived from empty spaces offsets any preference for neighbors.

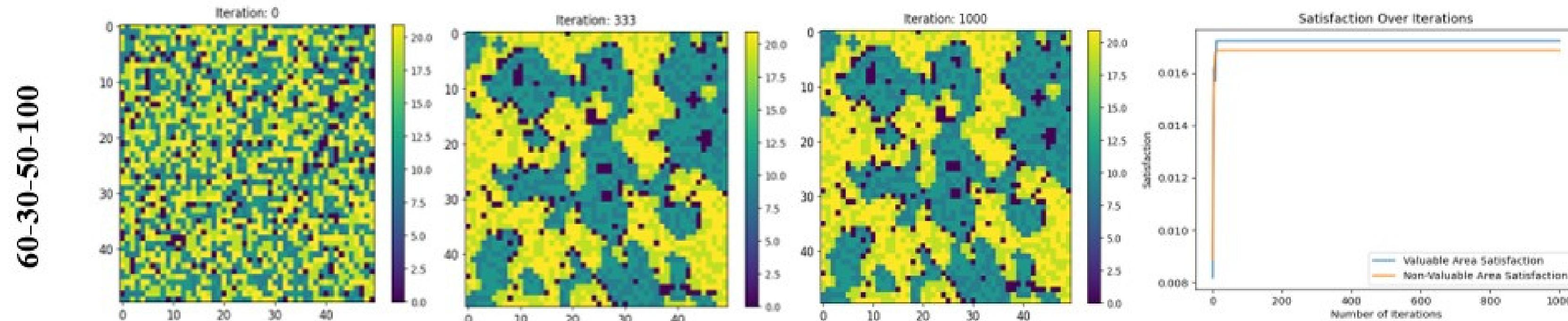
03.

Elevating Neighbour Preference initially heightens segregation until reaching a point where it merely amplifies randomness. This occurs because the desired level of satisfaction becomes unattainable, resulting in increased noise.

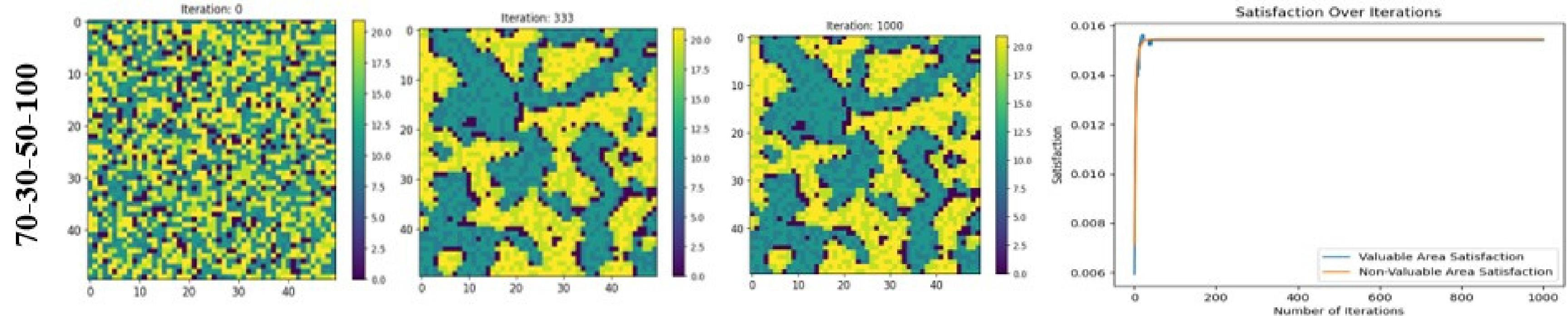
Value of Land



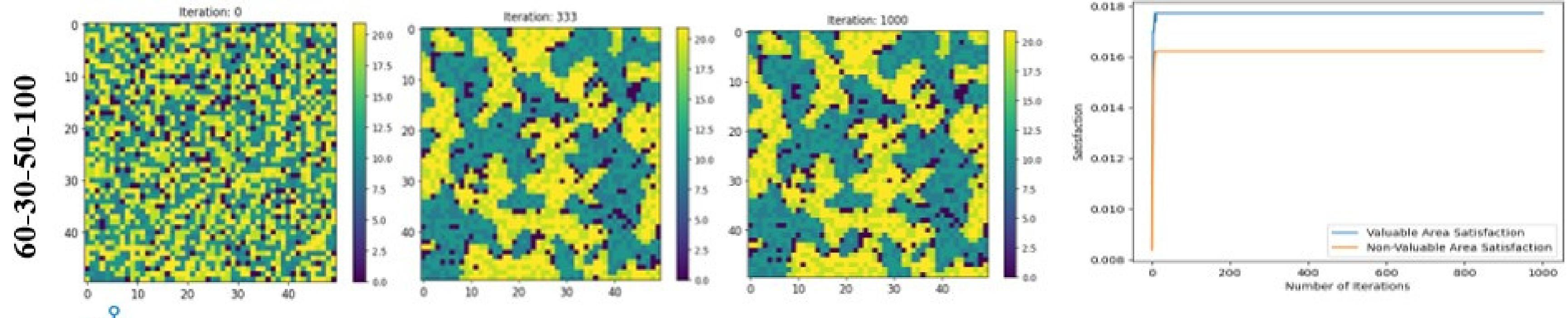
Weight of Land



High Tolerance



Low Tolerance



Motivating Extension for Agent Satisfaction

Schelling's model of segregation provides valuable insights into the dynamics of residential segregation based on individual preferences and behaviors. Within this framework, agents seek to optimize their satisfaction by considering factors such as tolerance thresholds, land value, and the weight they attribute to land versus neighbor characteristics. In this analysis, we delve into the implications of high and low tolerance thresholds, as well as varying land values and weights, on the satisfaction levels of agents within the Schelling model.

01.

High Tolerance

As such, an increase in the tolerance threshold tends to foster greater average satisfaction among these agents. They are more inclined to relocate to areas where satisfaction is prevalent, leading to the formation of cohesive communities.

02.

Low Tolerance

A decrease in the tolerance threshold diminishes average satisfaction among this subgroup, as they are less likely to relocate and instead opt to remain in mixed residential settings.

03.

Value of Land

This counterintuitive effect occurs because decreased land value prompts agents to prioritize neighbor characteristics over the land itself, potentially leading to relocations to areas with more similar neighbors, thus enhancing satisfaction levels.

04.

Weight of Land

Higher land weights typically lead to greater average satisfaction, particularly when agents are encouraged to maintain a mixed residential pattern rather than clustering based solely on land values.

Conclusion

In conclusion, our exploration of urban segregation dynamics through agent-based modeling reveals the intricate interplay between individual preferences and collective outcomes. While our findings offer valuable insights, further refinement and validation against empirical data are necessary. Understanding factors such as tolerance thresholds and land values enhances our ability to address real-world urban challenges, ultimately contributing to the creation of more inclusive and equitable urban landscapes.

