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## Urban logistics as a Complex Adaptive System: Understanding the emergence of dynamics

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# Urban logistics as a Complex Adaptive System:

## Understanding the emergence of dynamics

### Introduction

In this study, we view urban logistics as a Complex Adaptive System (CAS), characterized by dynamic interactions between various components. Our approach involves three critical stages. Firstly, we simplify the intricate simulation into a focused 'meta game,' providing a clearer perspective. Next, we scrutinize this simplified model to reveal strategic patterns within logistics operations. Finally, through continuous adjustments to simulation parameters, we gain insights into their impact on the dynamic nature of urban logistics.

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### Stakeholders

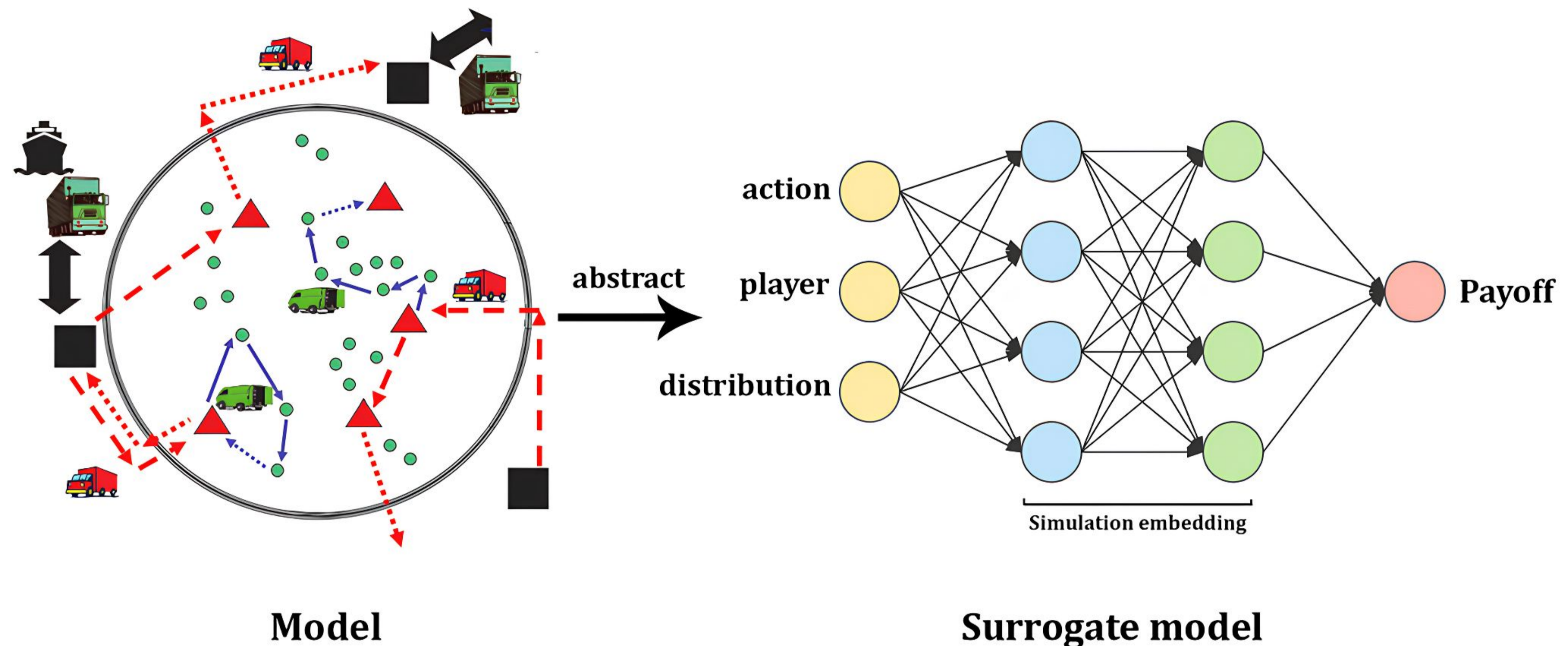


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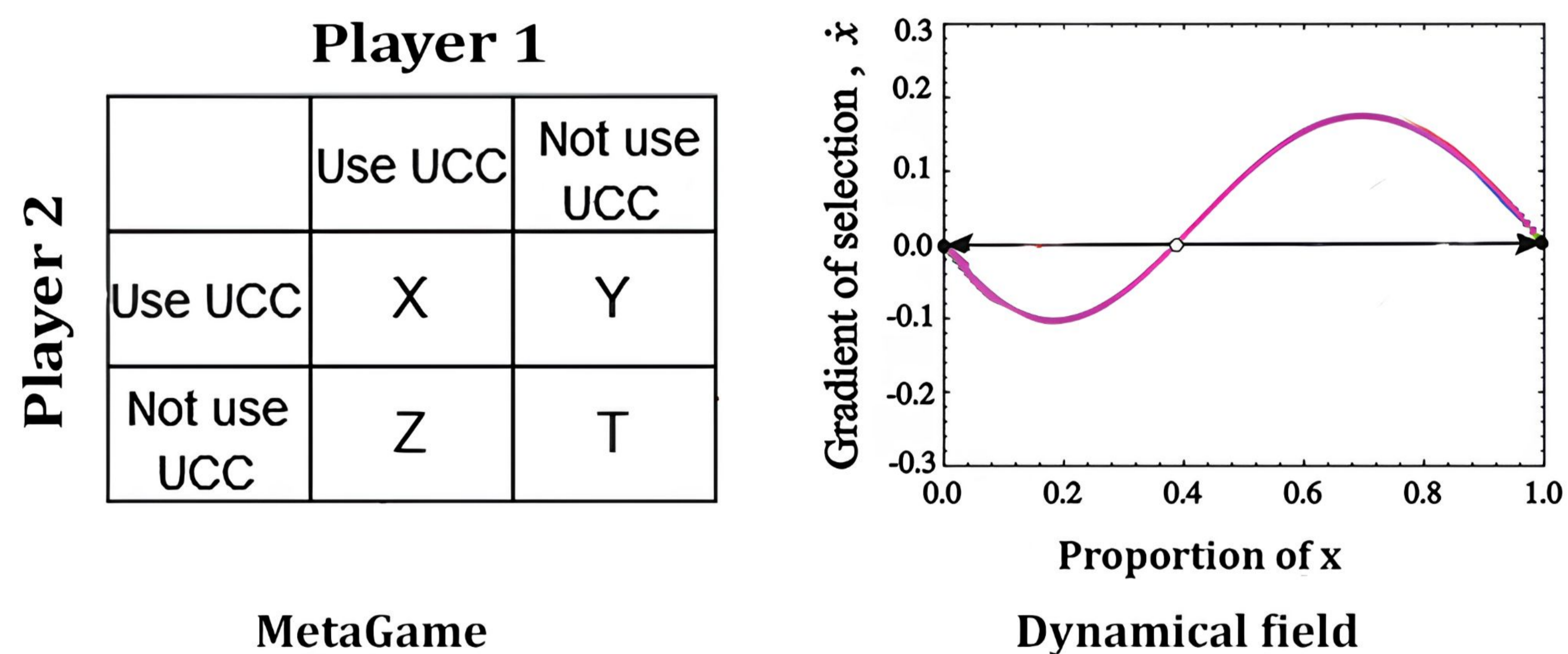
## Abstracting the simulation into a "Meta Game"

- ▶ **Turning Complexity into a Game:** We simplify the complex urban logistics simulation by representing it as a game. This helps us focus on the strategic aspects. It is an appropriate representation for comprehending the emergence of strategies and behaviors.



## Analysing the game by computing a dynamical field

- ▶ **Analyzing the Meta Game with a Dynamical Field:** We use a dynamic field to scrutinize the interactions and strategies within the simplified representation (meta game). It enhances our comprehension of interaction patterns among the players.



## Assessing the impact of the simulation parameters

- ▶ **Assessing Simulation Parameters' Impact through Open-Ended Evolution:** We continuously modify simulation parameters to understand their effects on urban logistics dynamics, providing insights into system behavior under various conditions.

