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**Utilizarea datelor etnografice în crearea de medii și agenți
pentru simularea comportamentului criminal real.**

Teză de master

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ABSTRACT

On the master's thesis on the topic "USE OF ETHNOGRAPHY DATA TO CREATE ENVIRONMENTS AND AGENTS CAPABLE OF SIMULATING REAL CRIMINAL BEHAVIOR"

The thesis consists of an introduction, two chapters, conclusion, bibliography and annexes.

Key words: Agent-based modeling, criminal, ml-agents, environments, public transport.

The present study aims to use ethnographic data to create environments and agents capable of simulating real criminal behavior. To do this, the agent-based modeling method was used using the Unity platform and the ML-Agents library, which is a set of tools for training intelligent agents in Unity. The created environment consists of passenger agents and criminal agents in a bus and the behaviors of both are based on our understanding and interpretation of behavior of people in public transportation and how criminals choose their victim, so differences from the real world can be encountered.

During the research, different types of agent-based modeling were analyzed, and comparisons were made with system dynamics modeling. The study examined the advantages and disadvantages of each type of modeling in the context of its application in simulating a criminal behavior. It was found that agent-based modeling offers greater flexibility in representing individual behaviors and allows for better adaptation to changes in the modeled environment. It was also observed that agent-based modeling can provide a better representation of interactions between agents. Although system dynamics modeling may be more suitable when it is desired to pay more attention to long-term changes in the system, it was decided that agent-based modeling would be used for this study as its goal was not to focus on long-term changes.

As a result of the research, a virtual environment was created that is consisting of a bus and two types of agents: passengers and criminals. This environment was used to simulate the behavior of passengers and how they choose their seat in transportation, and interactions between agents under different conditions. The aim was to examine how criminal behavior can be influenced by different factors

REZUMAT

La teza de master cu titlu “UTILIZAREA DATELOR ETNOGRAFICE ÎN CREAREA DE MEDII ȘI AGENȚI PENTRU SIMULAREA COMPORTAMENTULUI CRIMINAL REAL.”

Teza este compusă din introducere, două capitole, concluzie bibliografie și anexă

Cuvinte cheie: Modelare pe bază de agenți, criminal, ml-agents, mediu, transport public.

Studiul prezent își propune să utilizeze datele etnografice pentru a crea medii și agenți capabili să simuleze comportamentul criminal real. Pentru a realiza acest lucru, a fost folosit metoda de modelarea bazată pe agenți folosind platforma Unity și librăria ML-Agents, care reprezintă un set de instrumente pentru a instrui agenți inteligenți în Unity. Mediul modelat constă în agenți pasageri și agenți criminali, în mediul unui autobuz iar comportamentele ambilor din cauza lipsei unui set de date referitor la comportamentul oamenilor în transportul public și modul în care criminalii își aleg victima sunt influențate de experiența proprie deci pot fi întâlnite divergențe de la lumea reală.

În timpul cercetării, au fost analizate diferite tipuri de modelare bazată pe agenți și au fost făcute comparații cu modelarea bazată pe sisteme dinamice. Studiul a examinat avantajele și dezavantajele fiecărui tip de modelare în contextul aplicației sale în simularea comportamentului criminal. S-a constatat că modelarea bazată pe agenți oferă o flexibilitate mai mare în ceea ce privește reprezentarea comportamentelor indivizilor și permite o mai bună adaptare la schimbările din mediul modelat. De asemenea, s-a observat că modelarea bazată pe agenți poate oferi o mai bună reprezentare a interacțiunilor între agenți. Deși, modelarea bazată pe sisteme dinamice poate fi mai adecvată în cazul în care se dorește să se acorde o atenție mai mare schimbărilor de lungă durată în sistem, dar această nu fiind ca scop a acestui studio a fost decis să fie utilizată modelarea bazată pe agenți.

În urma cercetării, a fost creat un mediu virtual care constă dintr-un autobuz și două tipuri de agenți: pasageri și criminali. Acest mediu a fost utilizat pentru a simula comportamentul pasagerilor modul în care ei își aleg locul în transport, și interacțiunile dintre agenți în diferite condiții. Scopul fiind examinarea modului în care comportamentul criminal poate fi influențat de diferiți factori

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INTRODUCTION

Simulating a situation is often considered the best way to combat it in the future because it allows researchers to test different strategies and interventions in a controlled setting before implementing them in the real world. This can help to identify the most effective and efficient solutions to a problem and avoid unintended consequences.

In the field of criminology, simulating criminal behavior can be particularly useful for understanding the complex social and cultural factors that influence it and identifying potential interventions to prevent or reduce it. By creating realistic simulations of criminal behavior using ethnography data and agent-based modeling, researchers can test different strategies and interventions in a virtual environment and observe their effects on the simulated system. This can provide valuable insights into the most effective ways to address and prevent criminal behavior and help to inform the development of more effective policies and interventions in the real world.

Simulating criminal behavior can also provide a way to control for variables that might be challenging or impossible to manipulate in real-world settings. By doing so, researchers can better isolate specific factors and their effects on the system, leading to a more thorough understanding of the underlying causes of criminal behavior. This ability to control variables makes simulating criminal behavior a valuable tool for identifying the most effective strategies and interventions to prevent or reduce it. Through these simulations, researchers can test different approaches and observe their impacts on the simulated system, helping to inform the development of policies and interventions that will be effective in the real world.

Agent-based simulation (ABM) is a computational modeling approach that uses software agents to represent individual agents or entities in a system and their interactions with one another. ABM is often used to simulate complex systems, such as social networks, economic systems, and biological systems. In the field of criminology, ABM has been used to simulate and analyze criminal networks and the spread of criminal behavior.

One of the primary advantages of ABM is that it allows researchers to model the behavior of individual agents and their interactions with each other and their environment. This makes it possible to simulate complex systems in a more realistic and accurate way than other modeling approaches, such as traditional mathematical models.

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