

Agent-Based Modelling - Coursework 1

Hot Spots Policing and Street Crime in London

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1 Proposed research question

This paper conducts simulations based on policing strategies and the characteristics of criminals. Under the premise of controlling variables, research whether hot policing can effectively manage the crime rate. To achieve a practical simulation, it is necessary to conduct a control group experiment on the police hotspot supervision; and generate crime hotspots and the action routes of ordinary citizens.

2 Brief description of inspirational academic paper

1. This paper [1] proposes that general movement patterns to and from activity nodes such as work or school locations, major shopping areas, entertainment areas, or bedroom suburbs provide a very public image of where crime is concentrated. This illustrates that the average citizen is more vulnerable to street robbery during their day-to-day activities and daily commute. Under the spatial distribution, the infrastructure is divided into Shopping Centre; Neighbourhood Pub; Fast Food Restaurant; Motel Auto Court; SkyTrain; Schools, Universities and Colleges; Recreational and Cultural Buildings. The article does not specify which infrastructure will generate the most significant crime rate, but it can be seen that there is a greater probability of crime in shopping malls and schools.
2. Through this paper [2], it can be found that the essential characteristics of policing hotspots are positioning and patrolling. That is, police officers will stay in a particular place or conduct periodic patrols in a specific space. Although not statistically significant, an increase in policing hotspots can be observed to be associated with a decrease in violent and property crime rates.

3 Explanation of value of research question with reference to paper

It is mentioned in the paper [1] that judging the crime generator by the environment (infrastructure) can predict the occurrence of crime. And the location of the crime can be reconfirmed based on the distribution data of the victims.

While the second paper [2] provides some evidence models to explain the effectiveness of hot spot policing, it does not have the rigour of the data. By studying the relationship between policing hotspots and crime distribution, it is possible to observe why crimes occur in some areas more clearly; and how to maximise the effectiveness and reduce crime rates as soon as possible when distributing policing hotspot strategies.

4 Explanation of why ABM is an appropriate tool for this question

ABMs are unique in that they can integrate heterogeneous agents making decisions in environments with dynamic contextual characteristics. In this way, ABM represents a bottom-up approach that more closely approximates crime patterns that arise from real-world human-human interactions and human-infrastructure interactions.

The model covers agents, rules and environments. So under this topic, agents include citizens and police. Citizens with different criminal motive scores will be divided into crime makers and ordinary citizens. The environment distinguishes grid clusters based on different infrastructure, and the corresponding clusters generate the probability of possible crime makers. The police officers will be distributed in various grids, some patrolling and some parking.

References

- [1] Nick Malleon and Martin A Andresen. Exploring the impact of ambient population measures on london crime hotspots. *Journal of Criminal Justice*, 46:52–63, 2016.
- [2] Bruce Taylor, Christopher S Koper, and Daniel J Woods. A randomized controlled trial of different policing strategies at hot spots of violent crime. *Journal of experimental criminology*, 7(2):149–181, 2011.