Summary
Caught in the Act: Investigating Crime by Agent-Based Simulation

Criminal behaviour is an important aspect of life. Nowadays it is commonly believed that in principle anyone can be an offender and anyone can become a victim of delinquent behaviour. This makes research into crime and criminal behaviour relevant for society. Questions on why we behave in a certain way and what we can do to prevent this behaviour are important guidelines in this research.

Research into this phenomenon can have different points of departure. Both biological, psychological, and social causes can play an important role in this. It is important to note here that crime is usually considered to be the result of an interaction between the different aspects. For example, someone may temporarily have a high level of testosterone, which can cause aggressive behaviour (biological component), but there also has to be an opportunity to act (social component). To be able to understand, explain and possibly predict deviant behaviour, one needs to gain more insight in both biological, psychological, and social aspects of human behaviour. Fortunately, over the last decades, there have been rapid developments in various scientific disciplines related to these aspects of human behaviour. For instance, within the area of social sciences, more and more sophisticated models on human behaviour are being developed. As an example, more knowledge becomes available on the influence of social networks on the level of delinquency among adolescents. The area of neurosciences is another example of a discipline which has quickly developed during the last couple of years. The possibility to perform brain scans and observe what happens in the brain under different circumstances is part of recent accomplishments, and may be useful in understanding (deviant) behaviour.

The growing insight in such processes that play a role in the emergence of criminal behaviour opens up the possibility to formalise these processes and to study them by means of techniques from Computer Science. This is the main challenge of the current thesis. Increasing the insight in why and when certain criminal acts are performed is important to develop approaches to prevent or at least reduce such actions in the future. Therefore, this thesis addresses the question how processes related to criminal behaviour can be studied using approaches from Computer Science, and more specifically Artificial Intelligence, like developing computational models and performing simulations. In order to answer this question, techniques like mathematical modelling, agent-based and population-based modelling, simulation and formal verification are exploited. In addition, this thesis indicates that applying these techniques to criminological theories can be beneficial in understanding the processes that play a role in criminal behaviour.