

**EDITORIAL
CRIME MAPPING & MODELLING**

For the first time the SAGEO (Spatial Analysis and Geomatics) conference – supported by the GDR MAGIS (CNRS) – was held out of France in 2012. On this occasion, the hosting University of Liege (Belgium) organized a full week of events dedicated to all geomatics professionals between the 5th and 9th November 2012. While SAGEO conference took place during the last three days of the week, three parallel workshops were first held on Tuesday 6, respectively on “urban GIS”, “geo -marketing” and “crime mapping & modelling”.

Several hundred participants from various public gathered throughout the week: faculty members, graduate and PhD students, professionals from the public and private sectors. It was obviously a good opportunity to make participants aware of innovative fields of research that are still underdeveloped outside the Anglo-sphere. This is precisely the case of crime mapping to which was dedicated a complete one-day workshop.

Crime mapping is not strictly speaking a recent discipline (cf. Guerry’s and Quetelet’s pioneering works in the nineteenth century). However, it was, for a long time, restricted to location of crime events on a map thanks to pins (pin mapping). As the development of any discipline needs to be rooted in a robust theoretical framework, the decade of the eighties saw the emergence of environmental criminology: “*the scientific study of spatial patterns in crime, the perception and awareness of space potential criminals, criminal mobility patterns, and the process of target selection and decision to commit the crime*” (Brantingham & Brantingham, 1981, p.7). The environmental criminology, part of the positive school of criminology, generated new questions and challenges about the modelling of relationships between offences and the places where they take place.

For example: are there general laws to explain offender’s spatial choices? What is the relationship between the offender’s activity space and the offence locations? How can we model such relationships? Are there specific built-up environments that favour the concentration of criminal activities? Digital mapping and geographic information systems allowed answering to such questions thanks to the access to large databases describing the environment features and statistics, interactive geo-visualization of several sources of information and genuine algorithms in spatial analysis.

The workshop in Liège successfully brought together researchers from the most specialized European centres in the domain: the Jill Dando Institute (University College London), the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR), the Institute Forensics of Lausanne (University of Lausanne), the Criminal Intelligence Service of Austria, several representatives of the Strategic Analysis and Operational Analysis Services of the Belgian Federal Police, and of course representatives of several departments concerned in the University of Liege.

The workshop showed that researches from those centres are strongly diversified with applications such as detection of hot spots, geographical profiling or crime prevention through environmental design. In order to share good practices, a round table was also organized during the workshop with two recurrent issues: the integration of the temporal dimension in crime mapping and the collaborations between the operational and strategic aspects of the discipline.

Five authors agreed to draft a paper about their contribution. They are gathered in this special issue of the Bulletin of the Geographical Society of Liege.

Two authors focus on the detection of hot spots in order to identify places concentrating the offences. Spencer Chainey is the principal research associate at the University College London, department of Security and Crime Science. He examines the influence that resolution and bandwidth size have on hotspot maps built with a Kernel density

estimation. David Dabin, Christiane Dickens and Paul Wouters are strategic analysts for the federal police of Belgium. They propose a methodology to evaluate hotspots of car accidents restricted to the road network.

In addition to the spatial distribution of crimes, the issue of crime temporality arises. Do the patterns change according to the chosen temporal granularity and resolution? As criminal activities involve mobile offenders and/or mobile victims, the distribution of criminal opportunities presents varying attractiveness across both time and space (Ratcliffe, 2010). The temporal dimension can be integrated through many granularities: hour of the day, week/weekend, seasons and processes: evolution, diffusion, periodicity, etc.

The contribution of Quentin Rossy, lecturer and senior researcher at the school of forensic sciences of the University of Lausanne, precisely proposes a visualization methodology for the spatiotemporal analysis of crime data. He illustrates his method with two analytical tasks frequently applied: the analysis of traces left by digital devices like mobile phone or GPS devices and the detection of crime series.

The spatiotemporal pattern is also used in geographical profiling, where the series of crime locations – potentially attributed to a same unknown offender – are operated to delineate a prior search area. Marie Trotta is research fellow for the National Fund for Scientific Research. Together with her colleagues, André Lemaître and Jean-Paul Donnay respectively from the criminology and geomatics departments of the University of Liège, she brings a theoretical reflexion about the constraints and factors enabling the computation of an effective geographic profile, especially in the spatiotemporal aspects of the crime series.

In the previous contributions, crime mapping is mainly used to identify and act on risky areas. But it is also helpful to study evolutions, by comparing for example crime patterns before and after the implementation of crime reduction policies. Christian Kreis is a post-doc researcher at the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR). In his paper, he uses geospatial data mining to enhance the validity of an observational design in order to evaluate community policing in major Swiss urban areas.

These contributions reflect the multifaceted aspect of crime mapping but also the degree of scientific and technical sophistication achieved by the discipline to answer a fundamentally geographical question: “*why do crimes happen there, and not elsewhere?*”

BRANTINGHAM, P. & BRANTINGHAM, P. 1981. *Environmental Criminology*. Prospect Heights (IL): Waveland Press.

RATCLIFFE, J. 2010. Crime Mapping: Spatial and Temporal Challenges. In: PIQUERO, A. R. & WEISBURD, D. (eds.) *Handbook of Quantitative Criminology*. New York : Springer.

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