

Spatial Analysis of Police Open Data as a Part of Community Policing – an example of Pardubice City (Czech Republic)

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Background and motivation

Analysis of spatial data collected by the police can:

- help to improve the performance of police itself
- raise public awareness of local issues
- serve as an input for decision-making process in other organizations

Unfortunately, such data is rarely publically available at sufficient scale.

Using police data form city of Pardubice, we present 2 example use cases:

- impact of gambling sites on crime incidence
- traffic accident prevention

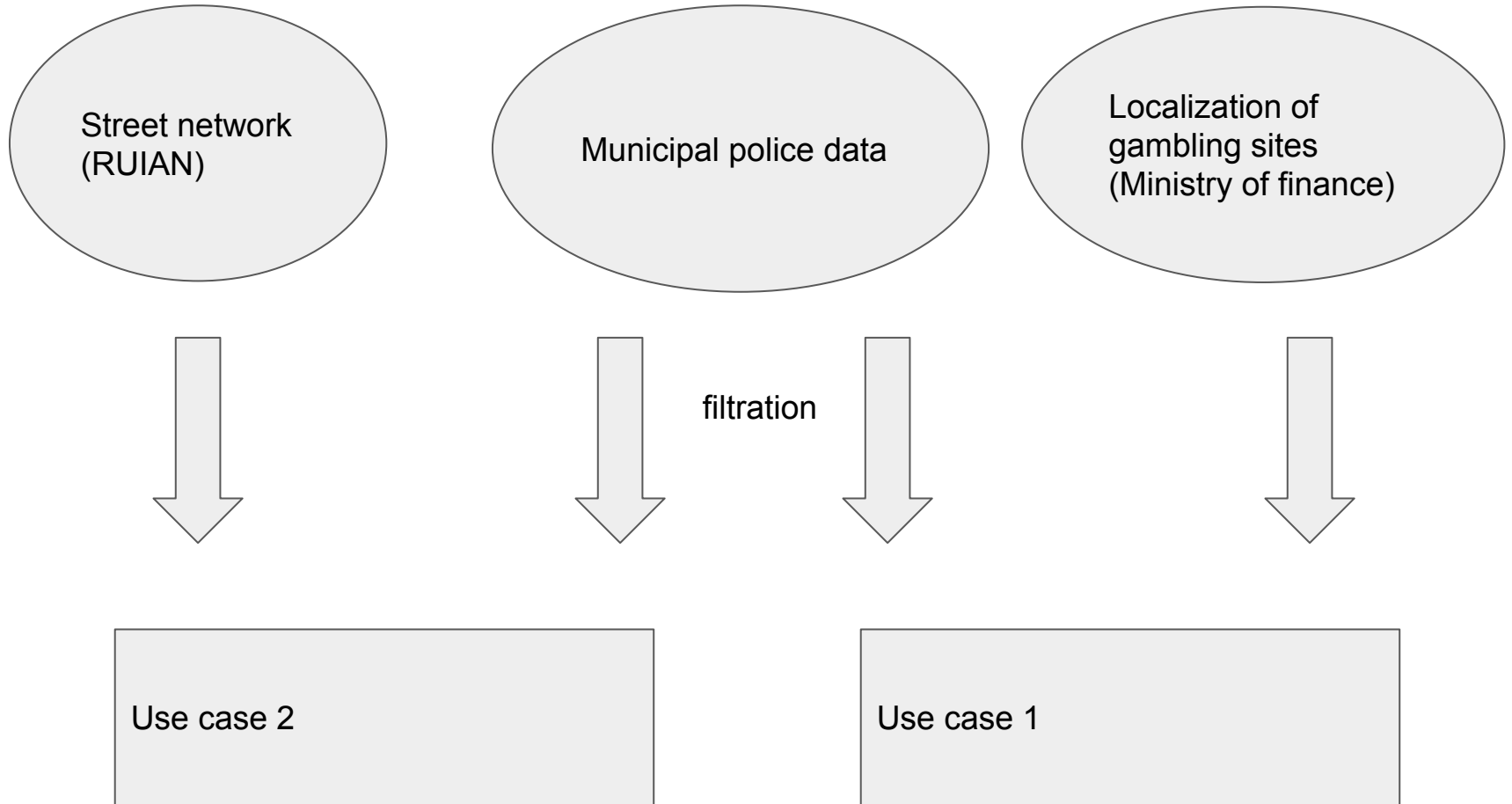
Data

Crime incidence statistics collected by the Municipality police of Pardubice - only offences in year 2014 (spreadsheet).

Attributes: offence type, date and time, on-the-spot fine fees, as well as notes on actions taken by the police and the resolution of the event.

Geolocation is provided by the address or GPS coordinates in WGS84 georeferencing system stated in decimal form.

Open data fusion



Use case 1

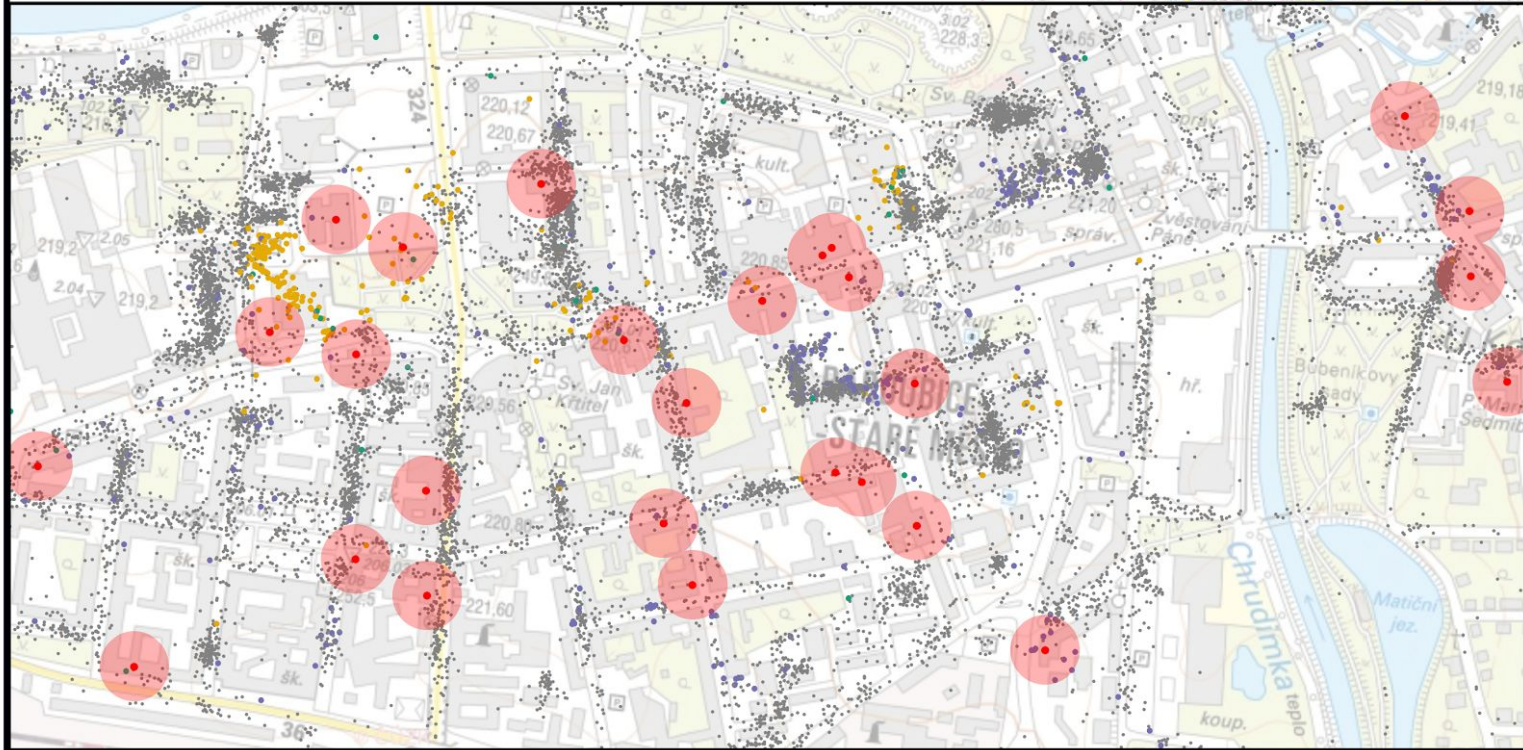
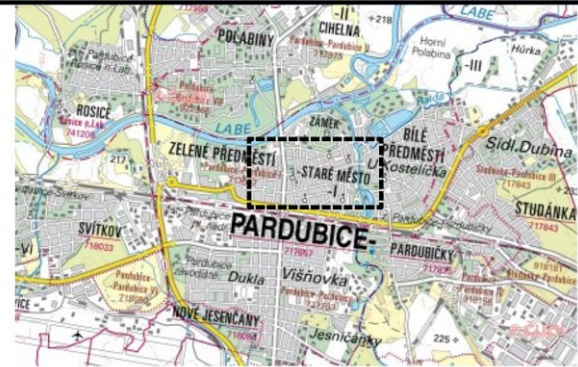
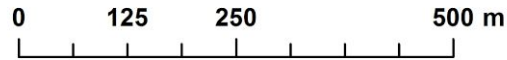
Motivation: To assess the impact of gambling sites on the distribution of offences.

- Is the presence of a gambling site an aggravating factor?
- What offence types are affected?
- What is the range of impact?

OVERVIEW: THE IMPACT OF GAMBLING ON SPATIAL DISTRIBUTION OF CRIME INCIDENTS IN THE TOWN OF PARDUBICE

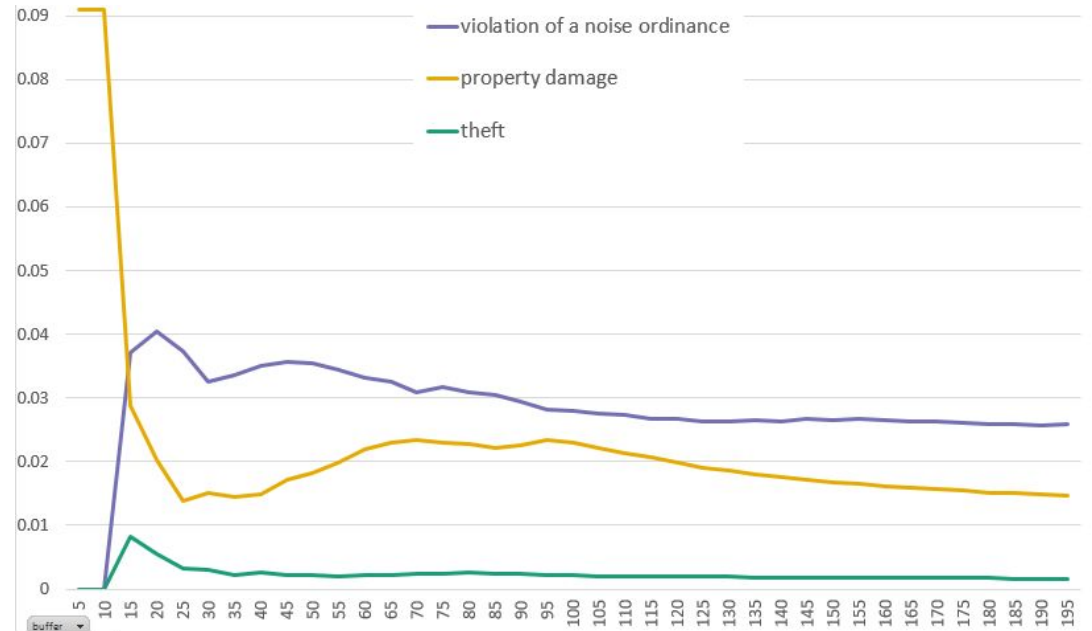
- Theft
- Violation of a noise ordinance
- Property damage
- Other types of crime
- Gambling sites with 50 meters radius

Sources:
@ČÚZK 2014,
Ministry of Finance 2014,
Police of the Czech Republic 2014



Use case 1 - Methodology

- concentric buffer zones around gambling sites (increased by 5 meters)
- cumulative number of instances for each offence type



Use case 1 - Findings

3 offence types appear to be influenced:

- property damage
- violation of a noise ordinance
- theft

The threshold where the impact ceases is 80 - 100 m which agrees with Czech legislation.

Use case 2

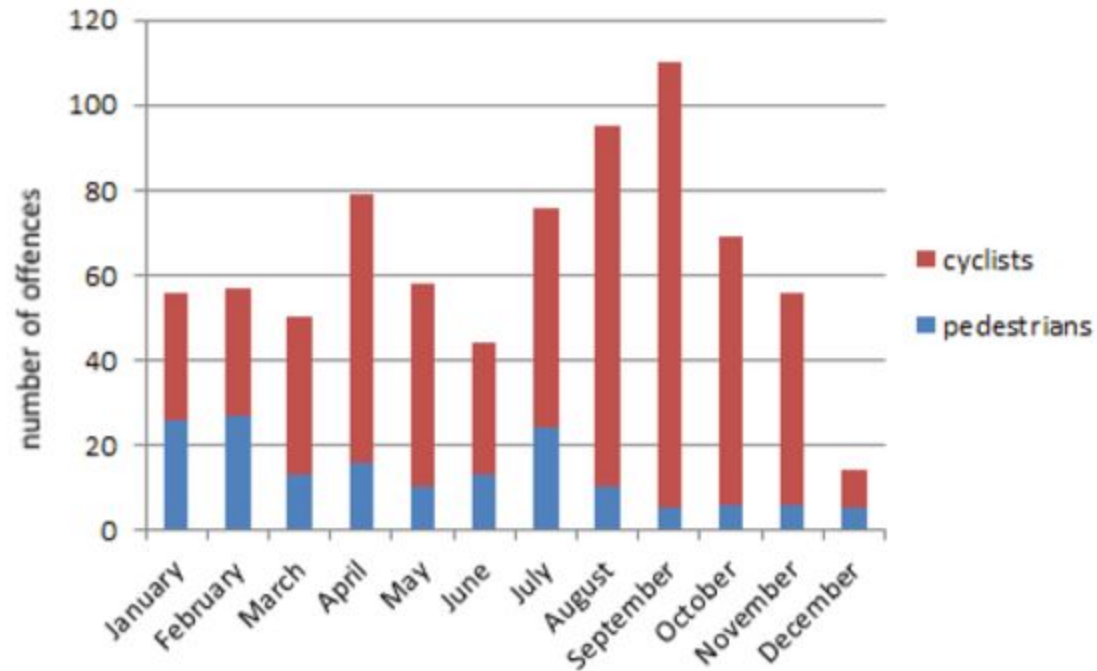
Motivation: accident prevention and enhancing urban transportation by using data of committed offences.

Traffic offences have been extracted from source data and they have been devised in two parts: offences caused by pedestrians and cyclists

Temporal analysis and spatial distribution (hot-spots = kernel density)

Use case 2 - Temporal analysis

Made on different levels (days in weeks, months in year, ...)



Monthly distribution of offences committed by pedestrians and cyclists.

Use case 2 - Spatial distribution - finding hot-spots

- Kernel density calculation
- Thresholding
- Threshold values are different for offences caused by pedestrians (0.003) and cyclists (0.002)
- Overview of the offence clusters in the city centre (blue – pedestrians; red - cyclists).



Conclusion - towards community policing

Community policing is a strategy of policing that focuses on police working closely with members of the communities.

Analysis of data collected by the police can positively affect not only the safety but generally the quality of life and urban transport.

For this reason we believe that police data should be distributed as open data (at least to a certain extent). This would allow to fully take advantage of the analytical potential of this data.

Thank you for your attention



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