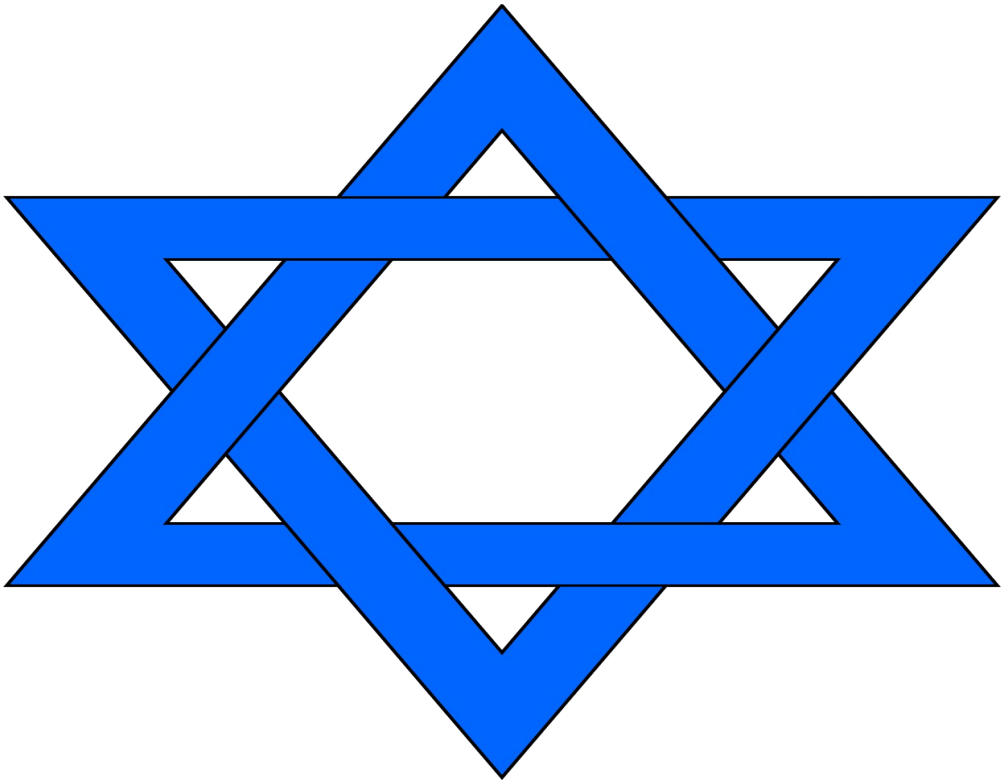


Josephy IT Rechtsinformatiker GbR: Technical Notes – Forensics

23.06.2019

Ihr Name
Josephy IT Rechtsinformatiker Gbr.
Am Herrengarten

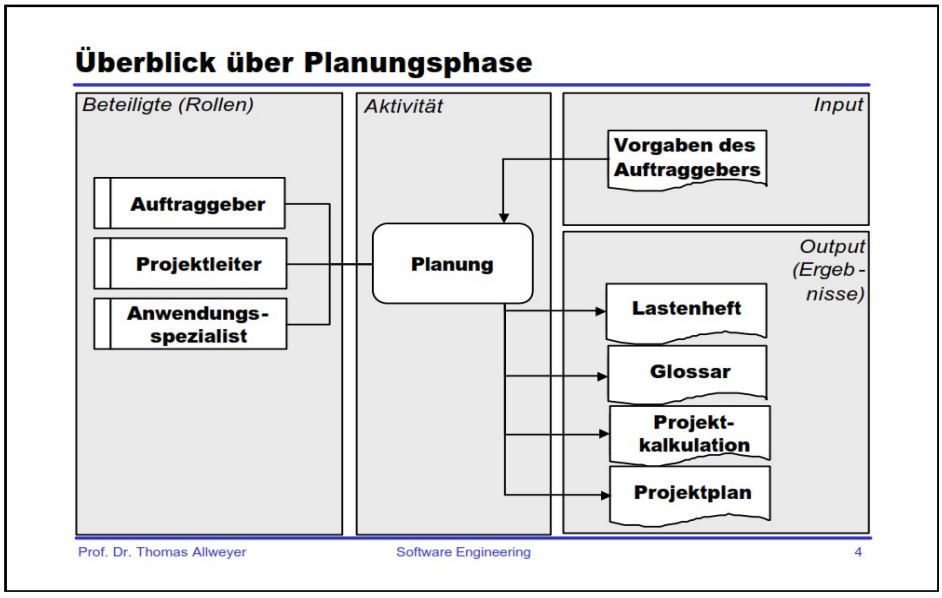
53721 Siegburg

Historie

Anlegen des Dokuments: Siegburg, 23.06.2019

Stakeholder	Requirements	Datum
Ralf Josephy, Taner Korkonkorkmaz, Marko Klein, Thomas Bietenbeck und Ulf Beck	Anlegen einer ersten Gliederung, Generierung von Browserpassworten, Siegburg Biertrinkerclub "König Ludwig"/"Osborne Veterano", Hausverbot HIT – Gespräch mit Naim Arsaln von der Geschäftsleitung verboten (Hauptschule Bocholt und Öbel) in Anwesenheit von Stefan Tacke (HUK Coburg Bocholt) und spätere Gespräch mit dem La Luna, Marko Klein und Thomas Biedassek	22.01.2019
Ralf Josephy, Oliver Runge, Micka Gökel	redaktionelle Überarbeitung der Gliederung und Inhatsangabe Spatial Analysis of Mobile Traffic Hot Spots	23.01.2019
Ralf Josephy	I	

Das Projekt wurde der Kreisverwaltung vorgestellt und auch dem Bundeskriminalamt und zwar 2008 in meiner Eigenschaft als Vertretungsprofessor der FH – jetzt H-BRS (Hochschule Rhein – Sieg).

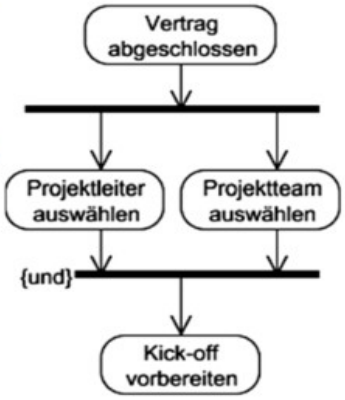


Machbarkeit prüfen

- **Prüfung der fachlichen Durchführbarkeit**
  - Softwaretechnische Realisierbarkeit
  - Verfügbarkeit geeigneter Ressourcen (Hardware, Software)
- **Prüfung alternativer Lösungsvorschläge**
  - Z. B. Kauf von Standardsoftware, externe Vergabe
- **Prüfung der personellen Durchführbarkeit**
  - Verfügbarkeit der entsprechend qualifizierten Mitarbeiter
- **Prüfen der Risiken**
- **Aufwands- und Terminschätzung** (siehe folgende Folien)
- **Wirtschaftlichkeitsbetrachtung**
  - Interne Projekte: z. B. Gegenüberstellung von Einsparungen und Projektkosten/laufenden Kosten
  - Erstellung von Produkten: Gegenüberstellung von voraussichtlichen Einnahmen und Kosten

Parallelität in Prozessen

- **Waagerechter oder senkrechter Strich steht für mögliche Prozessteilung (ein Pfeil rein, mehrere raus) oder Zusammenführung (mehrere Pfeile rein, ein Pfeil raus)**
- **Am zusammenführenden Strich steht Vereinigungsbedingung, z. B.**
  - **{und}: alle Aktionen abgeschlossen**
  - **{oder}: (mindestens) eine Aktion abgeschlossen**
- **UML 1.1 hatte andere Restriktionen**



Content

Basic Understanding of Technical Notes

Technical Notes schreibe ich für virtuelle Organisationen z.B. die geplante GbR als Mehrpersonengesellschaft – 2012 als Ltd. gedacht. Die Nomenklatur folgt einer Empfehlung von Grandon Hill[1]: TechnicalNotes enthalten technische Beschreibungen zu einer definierten Baseline – die mit verschiedenen kleineren Unternehmen vordefiniert werden, um größere Unternehmen – wie die IBM zu adressieren.

- Industry studies
- Dieses Papier zielt darauf ab, eine Marktbeobachtung für Eskalationswege für EMF Produkte vorzunehmen und zwar Produktideen, die für große Netzwerk (VPN) relevant sind.
- Technology descriptions
- EMF Architekturen, vgl. Kick Off: – Josephy IT Rechtsinformatiker GbR Approach
- Nardas STS DPS Telecom Ansatz, SPOC Integration
- Blockchain Integration against Policeradarattacks
- Summaries of research findings or theories
    - Event Correlation
    - GPS analysis
        - probalistic call structures (traffic)
        - versus non-probalistic (Facillty Mgmt.) measurement structure
    - Root Cause
- Zweckbindung – Untersuchung der TechnicalNotes zu DPSTelecom und BlockchainEthereum, Abdeckung der Use Cases, Vorgaben für Analysemethoden im Bereich Data Mining Blockchain und CCTV
- Virtual Library, Virtual Gallery
- Abdeckung der Use Cases ursprünglich als Stichting Amsterdam gedacht, als Gegenentwurf zum Kunstraub von Hermann Göring in den Niederlanden.
- IT Forensics and Sociology unter Beachtung jüdischer Beteiligung an kriminologischen Fragen an den Universität von Aarhus und Nijmwegen
- properties, proprietors and intellectual properties
- Unterstützung der Fagemethoden VHS Landschaft, Stadtbibliotheken, Orchesterverwaltungen, Gartenbau und Landschaftsgartenbau, ...
- Patentschutz
- Software Delevopment
- Agrarwissenschaft

1 Informing Faculty Case Template, Muma Case Review, A NOTE ON WRITING A MUMA CASE REVIEW TECHNICAL NOTE, Copyright © 2015, Ralf Josephy. This technical note was developed to provide background information in support of one or more case studies published by the Muma Case Review. It may be freely copied and shared for non-commercial purposes

IT Forensics Use Cases

Virtual Library, Virtual Gallery

Abdeckung der Use Cases ursprünglich als Stichting Amsterdam gedacht, als Gegenentwurf zum Kunstraub von Hermann Göring in den Niederlanden. In diesem Falll ist die Philharmonien in Frankfurt und Hamburg zu nennen, die durch zahreiche Einspielungen dem entgegenwirken. Ähnliche Vergleiche lassen sich mit Gidon Kremer in Köln und Riga für das Baltikum ziehen.

IT Forensics and Sociology

Properties, Proprietors and Intellectual Properties

Einführung - Kriminalistische Fragestellungen

Ein typische eo ipso ist die Erfindung des persönlichen Passorts. Das Passwort selbst sollte in der Öffentlichkeit nicht angesprochen werden, auch der Zeitpunkt des Rücksetzens nicht. Es sollte aber möglich sein ein möglichst gutes Passwortgenerierungsverfahren anzusprechen. Alles andere und auch Gruppenpassworten führen zum Phänomen des "identity theft".

Rücksetzverfahren mit Browserpasswort – Eintrag in ein Portal – Rücksendung eines temporäre Passwort – Veränderung des tempörären Passwort an mehreren Stellen und Verwendung des neuen Passwort in einem anderen System und löschen der Email des temporären Passworts.

Ein Browserpasswort sollte nur unter Sichtschutzbedingungen im Internet erstellt werden.

Intellectual Properties

VHS, EMF, DPS-Telecom and Blockchain Surveys

VHS Landschaft, Stadtbibliotheken, Orchesterverwaltungen, Gartenbau und Landschaftsgartenbau, IHK's, Unternehmen und die Städte und Gemeinden

ILTV Projekt

Umgebung ILTV

- IP Radio
- Verlagswesen
- Funk und Fernsehen
- terrestrischer Zugang zu ILTV

Patentschutz

Software Delevopment

Compositions Classic, Jazz, Blues versus Pop

Argrarwissenschaft

Crime Analysis

Hot Spots

Introduction Hot Spots

Algorithm of Dection of Hot Spots

Violent Crime

Chronic and Temporary Crime Hot Spots

Antisemitism

Policing Crime and Disorder

Homicide

Defining piracy hot spots

Foot patrol in violent crime hot spots

Spatial Analysis of Mobile Traffic Hot Spots

"An enormous increase in data traffic demanded by mobile users calls for efficient deployment strategies such as multilayer heterogeneous networks. However, placing small cells at the desired locations to offload as much traffic as possible from overlaying macro cells is a crucial task. In this regard, geo-location and user equipment positioning techniques help obtain spatial distributions of user locations and their respective traffic volumes[2]."

The Analyis of spatial traffic distributions based on EDGE/GPRS traffic volumes per cell recorded by the base stations is the main task of this projects.

1) We develop a methodology that allows generating mobile data traffic maps from data sets provided by a fully operational cellular network and is capable of reducing errors that stem from data collection.
2) We apply an image processing technique to autonomously detect *hot spots* and *hot zones*, i.e., locations where the density of data volumes transmitted is high compared to the rest of the area, based on specific values of thresholds. Though the definition of the thresholds can be customized, we provide a recommendation for the best method of defining thresholds as well.
3) We analyze traffic maps that result from the data processing steps and an example data set from a 3G network and mainly focus on the statistical traffic distribution, the density and size of hot spots, as well as, the traffic therein.

1

2 Henrik Klessig, Vinay Suryaprakash,OliverBlume,Member, Albrecht Fehske, Member, and Gerhard Fettweis: A Framework Enabling Spatial Analysis of Mobile Traffic Hot Spots, IEEE WIRELESS COMMUNICATIONS LETTERS, VOL. 3, NO. 5, OCTOBER 2014

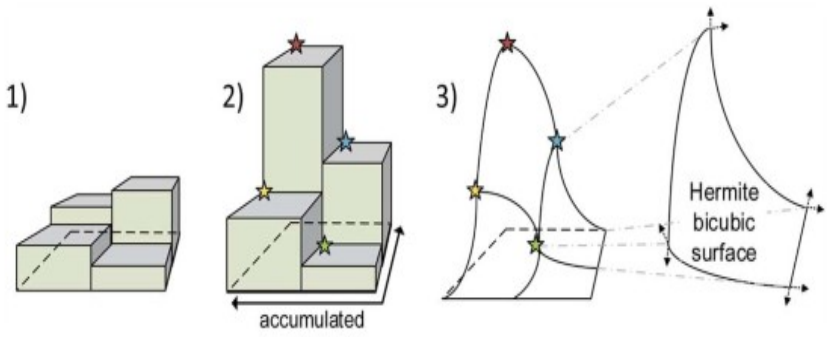


Fig. 1. (1) Binned traffic density as a p.m.f. (with 4 bins); (2) cumulative sum; (3) cumulative traffic after Hermite bicubic interpolation.

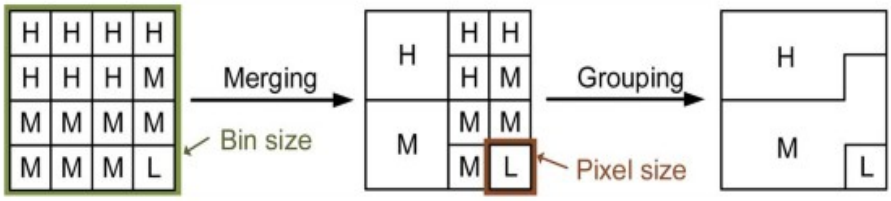


Fig. 2. (Left) Traffic density map with categories *high* (H, e.g., hot spots), *medium* (M, e.g., hot zones), and *low* (L) traffic; (center) after merging; (right) after merging and grouping.

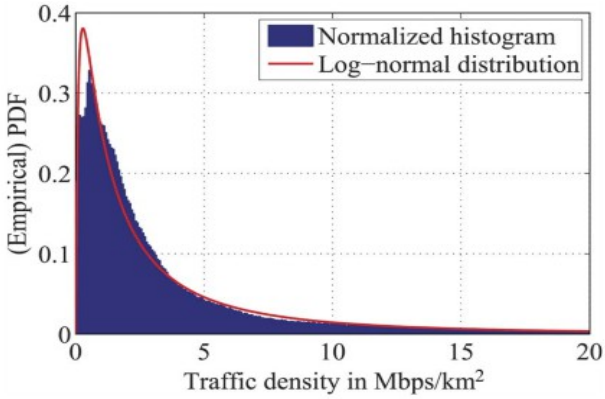


Fig. 4. Normalized histograms of the hot spot areas with Weibull fit for a threshold of (a) 5 times and (b) 10 times the mean traffic.

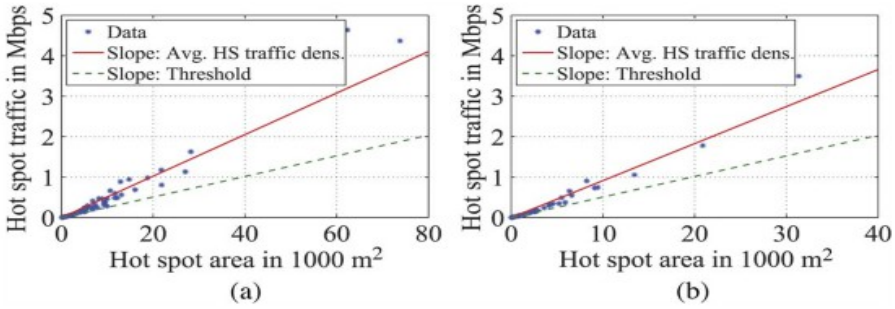


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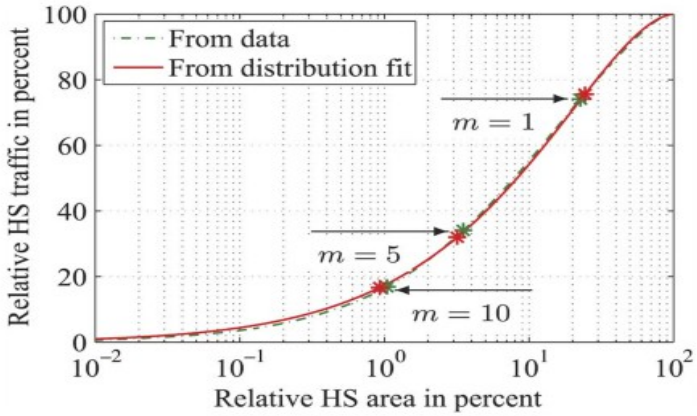
Fig. 5. Hot spot areas versus hot spot traffic volume for a threshold of (a) 5 times and (b) 10 times the mean traffic.



A. *Distribution of the Traffic in the Area*

Analyzing the traffic density over the entire area of interest, we find that the amplitude X of the traffic density (meaning the values associated to the pixels) approximately follows a log-normal distribution (similar to the finding in [8]) with p.d.f.

$$f_X(x;\mu,\sigma) = \frac{1}{x\sigma\sqrt{2\pi}} e^{\frac{(\ln x-\mu)^2}{2\sigma^2}}, \qquad (1)$$

C. Distribution of Hot Spot Sizes

Fig. 4 depicts the histograms for the hot spot areas found for the two thresholds considered. We find that the probability distribution of the area sizes A of the hot spots (in units of 1000 m^2) can be approximated by a Weibull with p.d.f.

$$f_A(a;\lambda,k) = \frac{k}{\lambda}\left(\frac{a}{\lambda}\right)^{(k-1)} e^{(a/\lambda)^k}, \qquad (2)$$

E. Correlation Between the Share of Hot Spot Traffic and Area

Based on the result that the traffic is log-normally distributed with p.d.f. $f_X(x;\mu,\sigma)$ (1) and given two thresholds t_1 and t_2 $(t_2 > t_1)$, we can compute the fraction of the area with a traffic density between t_1 and t_2, and the fraction of total traffic covered as

$$P(t_1,t_2) = \int_{x=t_1}^{t_2} f_X(x)\,\mathrm{d}x \text{ and } T(t_1,t_2) = \frac{\int_{x=t_1}^{t_2} x f_X(x)\,\mathrm{d}x}{\int_{x=0}^{\infty} x f_X(x)\,\mathrm{d}x}, \qquad (3)$$

respectively. The mean traffic density at these locations would be given by

$$T_{\text{mean}}(t_1,t_2) = \frac{\int_{x=t_1}^{t_2} x f_X(x;\mu,\sigma)\,\mathrm{d}x}{\int_{x=t_1}^{t_2} f_X(x;\mu,\sigma)\,\mathrm{d}x}. \qquad (4)$$

Simulation

Analyzing Schemes

- does the location of hot spots change over time?
- how can the emergence of hot spots be predicted?
- how can the emergence of hot spots be prevented?
- what is the relation between the emergence of hot spots and the geography of a city?
- what is the relation between the emergence of hot spots
- and the demographics of the population?

Inference

1) The individual *basic attractiveness* v the agent assigns to that location. This represents the extent to which the agent likes to go to that location, independent of its reputation. For example, some agents are more likely to go to a shopping centre, whereas others are more likely to go to a railway station.
2) The *assault reputation* n1 of the location. The higher this number, the more famous the corresponding location is for assaults taking place there.
3) The *arrest reputation* n2 of the location. The higher this number, the more famous the corresponding location is for arrests taking place there. This calculation is represented by the following executable

Maßnahmen

- Reputation and Displacement

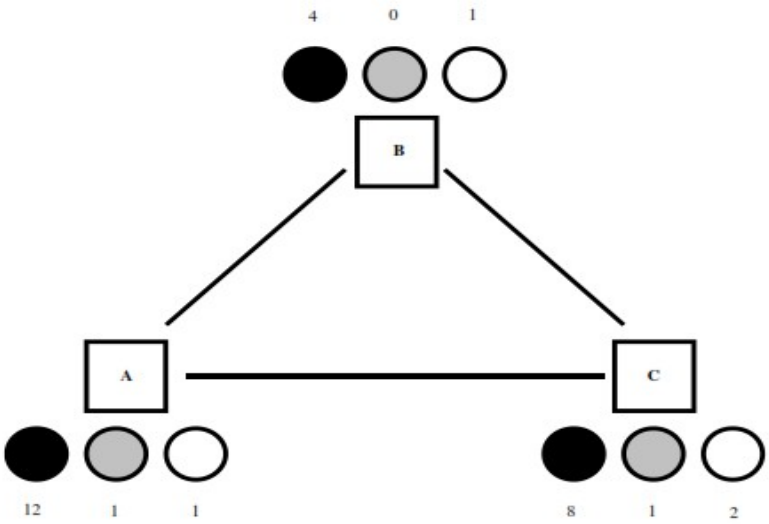


Figure 1: Example geographical environment

Decide Current Location Attractiveness
∀a:AGENT ∀l:LOCATION ∀n1,n2,v,w1:REAL ∀w2,w3:INTEGER
basic_attractiveness_of_agent_for_location(v, l, a) ∧
belief(a, assault_reputation_at_location(n1, l)) ∧
belief(a, arrest_reputation_at_location(n2, l)) ∧
has_weight_factor(a, w1, w2, w3) →
belief(a, current_attractiveness_of_location(l, w1*v+w2*n1+w3*n2))

Perform Assault

$\forall a1,a2:AGENT\ \forall l:LOCATION$
$observes(a1, agent\_of\_type\_at\_location(a1, criminal, l)) \wedge$
$observes(a1, agent\_of\_type\_at\_location(a2, passer\_by, l)) \wedge$
$not\ guardian\_at\_location(l) \rightarrow$
$performed(a1, assault\_at(a2, l))$

Perform_Arrest
∀a1,a2:AGENT ∀l:LOCATION
observes(a1, agent_of_type_at_location(a1, guardian, l)) ∧
observes(a1, agent_of_type_at_location(a2, criminal, l)) ∧
known_criminal(a2) →
performed(a1, arrest_at(a2, l))

Assault_Reputation_Increment
∀l:LOCATION ∀n:REAL
assault_at(l) ∧
belief(all_agents, assault_reputation_at_location(n, l)) →
belief(all_agents, assault_reputation_at_location(n+inc, l))

Assault_Reputation_Decay
∀l:LOCATION ∀n:REAL
belief(all_agents, assault_reputation_at_location(n, l)) ∧
not assault_at(l) →→
belief(all_agents, assault_reputation_at_location(n*dec, l))

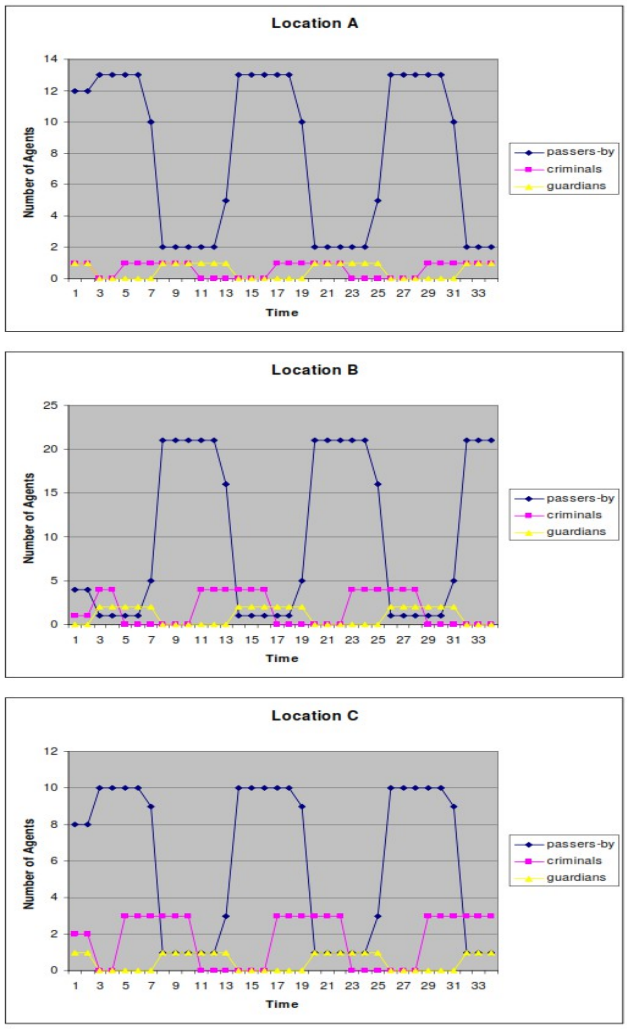


Figure 2: Displacement of the three types of criminals

P1 Continuation of Displacement

For each time point t (except the end of the trace[2]), if at t the largest hot spot is at location x, then there is a later time point at which the largest hot spot is at some other location y.

$\forall\gamma$:TRACES $\forall$t:TIME $\forall$x:LOCATION
[is_largest_hot_spot_at(x, t, γ) & t < last_time-δ]
$\Rightarrow$ [$\exists$t2:TIME $\exists$y:LOCATION is_largest_hot_spot_at(y, t2, γ) &
t<t2 & x$\neq$y]

In this formula, is_largest_hot_spot_at is an abbreviation, which can be determined in multiple ways. For example, by taking the location: 1) with the highest assault reputation, 2) with the highest number of criminals, or 3) with the highest number of crimes. These different possibilities are formalised as follows:

is_largest_hot_spot_at(x,t,γ) $\equiv$
$\exists$r:REAL state(γ, t) |= assault_reputation(x, r) &
$\forall$y:LOCATION $\forall$r2:REAL
[state(γ, t) |= assault_reputation(y, r2) $\Rightarrow$ r2$\leq$r]

is_largest_hot_spot_at(x,t,γ) $\equiv$
$\exists$i:INTEGER state(γ, t) |= number_of_criminals(x, i) &
$\forall$y:LOCATION $\forall$i2:INTEGER
[state(γ, t) |= number_of_criminals(y, i2) $\Rightarrow$ i2$\leq$i]

is_largest_hot_spot_at(x,t,γ) $\equiv$
$\exists$i:INTEGER state(γ, t) |= number_of_crimes(x, i) &
$\forall$y:LOCATION $\forall$i2:INTEGER
[state(γ, t) |= number_of_crimes(y, i2) $\Rightarrow$ i2$\leq$i]

In addition, a combination of the different options can be considered, for example, by calculating the weighted sum of the different numbers. Yet another variant of the dynamic property can be created, for example, by counting the number of criminals or crimes over a longer time period, instead of considering the current time point only.

P2 Criminals follow Passers-by

For each time point t (except the end of the trace), if at t most passers-by are at location x, then within ε time points most criminals will be at location x.

$\forall\gamma$:TRACES $\forall$t:TIME $\forall$x:LOCATION
[most_passers_by_at(x, t, γ) & t < last_time-δ]
$\Rightarrow$ [$\exists$t2:TIME most_criminals_at(x, t2, γ) & t<t2 & t2<t+ε]

Here, most_passers_by_at is defined as follows:

most_passers_by_at(x,t,γ) $\equiv$
$\exists$i:INTEGER state(γ, t) |= number_of_passers_by(x, i) &
$\forall$y:LOCATION $\forall$i2:INTEGER
[state(γ, t) |= number_of_passers_by(y, i2) $\Rightarrow$ i2$\leq$i]

Longitudinal Studies

Crime

Citizens reactions to hot spots policing

Gesture Controlled Speaking

Microfone

Satisfaction with police in violent crime

Convocation

- technisch-wissenschaftlich
- forensisches Gutachten Polizeiausrüstung

Security model for preserving the medical