Dynamic Perception Map of Urban Area for Social Surveillance

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Summary

• Goal
• Fear of Crime
• Social Surveillance
• Dynamic Perception Map
• Conclusions
Goal

• A new social platform for surveillance purposes
  – reduce the citizens’ fear of crime
  – through interactions with the other members of a social surveillance network (SoS)

• Dynamic Perception Map
  – Estimated by the SoS
  – Measure the citizens’ sense of safety
  – Highlight “hot area”
Fear of Crime

• Crime as a social problem has always been a field of academic interest
  – criminology, sociology, anthropology, geography and psychology
  – EU project
• “fear of crime”
  – physical response to immediate signs of danger (*risk as analysis*),
  – anxiety about risks (*risk as feeling*)
• People’s perceptions of their neighbourhood mostly depend on the social and physical cues in the local environment:
  – drunk people, noise, trash and litter, graffiti, etc.
European Social Survey outcomes in different Countries to the question: "How often worry about becoming a victim of violent crime (Often/Sometimes/Occasionally vs Never)" (2011)
Fear of crime

A = "Respondent or household member victim of burglary/assault last 5 years" (Yes vs No)
B = "Worry about becoming victim of violent crime has effect on quality of life" (Serious Effect/Some Effect vs No Real Effect on Quality of Life)
C = "Worry about home burgled has effect on quality of life" (Serious Effect/Some Effect vs No Real Effect on Quality of Life)
D = "How often worry about becoming a victim of violent crime" (Often/Sometimes/Occasionally vs Never)
E = "How often worry about your home being burgled" (Often/Sometimes/Occasionally vs Never)
Social Surveillance

• the pervasive presence of sensors
  – as surveillance cameras, smart-phones’ cameras, tablets’ cameras, microphones, etc.

• the possibility to share and exchange information through mobile networks
  → novel opportunities for the development of systems to improve the protection of:
  – citizens, society, economy, etc.
Social Surveillance

- Images or videos provided by the citizens have been useful in many cases to the local police in detecting illegal activities
  - the citizens’ contribution may be determinant for the success of LEA investigations
- Citizens-owned sensors will be used to collect data about the urban area:
  - Image, videos, streaming data, text messages
  - GIS information
Social Surveillance

- The collected data will be analyzed to enhance people to manage their own sense of risk
- Our system may have a strong impact on the security perception of the citizens
  - they would feel part of the community
  - would increase their sense of responsibility towards the public safety
Dynamic Perception Map

• We aim to estimate a dynamic perception map to represent the citizens’ safety feeling of the whole urban area.

• The map is shared among the citizens and built in a collaborative way by using:
  – prior information about the urban area
  – all data uploaded by the citizens

• The citizens’ fear of crime is influenced by
  – social aspects (e.g., drunk in public, noise)
  – physical incivilities (e.g., trash and litter, graffiti)
Dynamic Perception Map

PRIOR INFORMATION
Street View, LEA

DINAMYC INFORMATION
User Collected Data

MAP
Dynamic Information
Static Information

http://streetscore.media.mit.edu/
Application
safer perceived routes

Negative Feedbacks:
• Narrow/poorly lit/empty streets
• Suspicious persons or situations
• Car accidents
• Garbage

Positive Feedbacks
• Large/well lit/crowded streets
• Presence of security cameras
If the number of negative feedbacks is above a threshold → the citizens’ level of perceived danger is high

LEA may be informed by the system to intervene:
• in order to understand the causes of the feedbacks
• to try decrease the high risk level of that area
Conclusions

• We propose a novel framework for social surveillance
  – an interdisciplinary approach including psychological, legal, social and technological aspects
  – help citizens to cope with emotional states associated to crime

• A dynamic perception map to represent the current citizens’ safety perception across the urban area
  – Citizens, LEA

• Novel data analysis techniques will be required for analyzing the data collected by the users
  – audio, video and image processing techniques

• Metrics to evaluate obtained results