Crime prediction with Big data tools & algorithms

ETH Zürich
Mobiliar Lab for Analytics

Motivation: Make Switzerland Safer

Social
- Increasing trend in number of incidents, peaked in 2012 (444.039)
- Up to 53% of them are household burglaries

Legend: Total offence against property — Household burglary — Linear (Total offence against property) — Linear (Household burglary)

Source: BFS - Polizeiliche Kriminalstatistik (PKS) 2013

Commercial
- Increase in number of household claims (below)
- This leads to higher premiums and higher churn rate

Percent of household insurance claims expenses

2009	2010	2011	2012	2013
41.5%	43.2%	46.8%	50.5%	47.5%

Household insurance claims expenses causes

- Private liability 26%
- Fire 9%
- Natural hazard 6%
- Pet insurance 1%
- Water 5%
- Glass 2%
- Valuables 3%
- Theft / damage 48%

Source: Die Mobiliar

Approach: Prevention Through Technology

Research Questions:

1. How to design an IS which supports crime prevention?
2. How to motivate individuals to undertake preventive measures?
3. How to support collective actions?
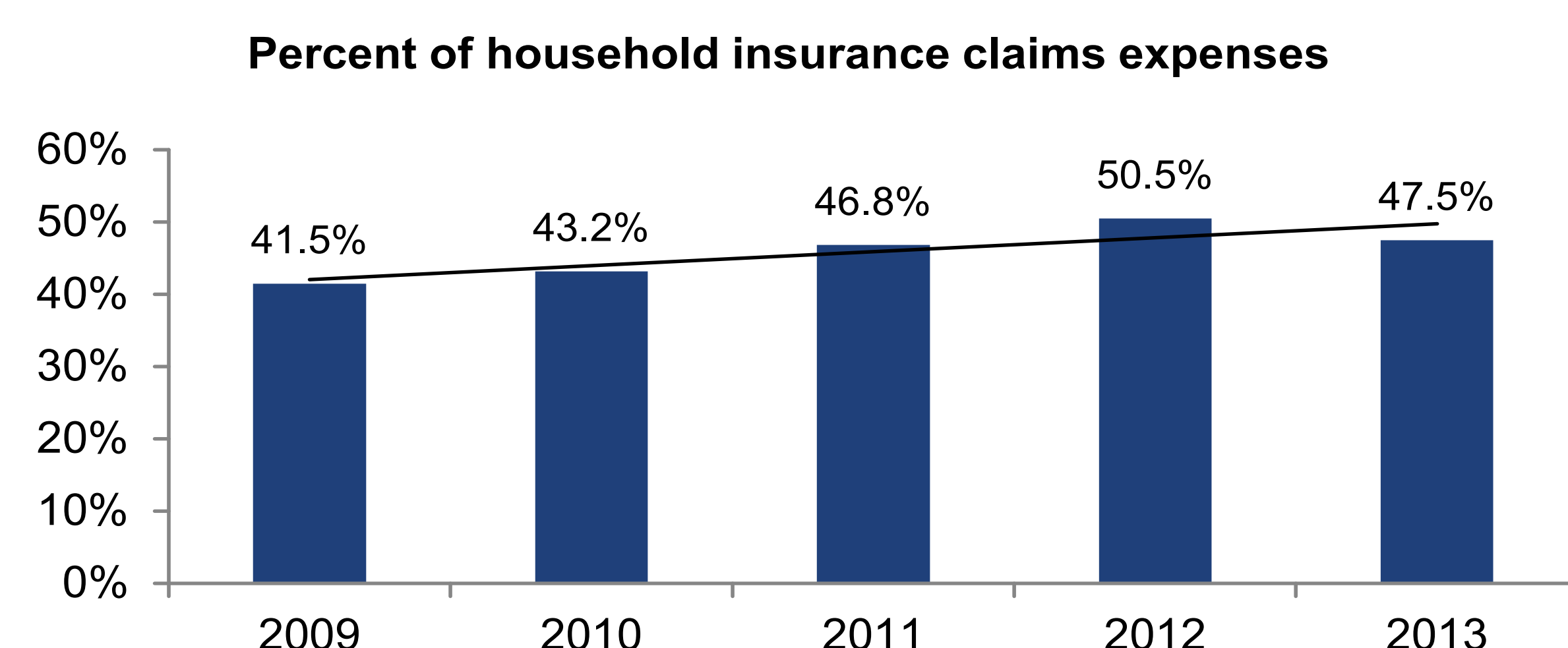4. How to take advantage of advanced analytics to predict and prevent future crimes?

The approach that we are taking is to take advantage of existing solutions and approaches and bring them together on one platform. Data used for the first iteration is represented by claims data from a Swiss insurance company. The aim is to be able to predict future incidents based on past data. For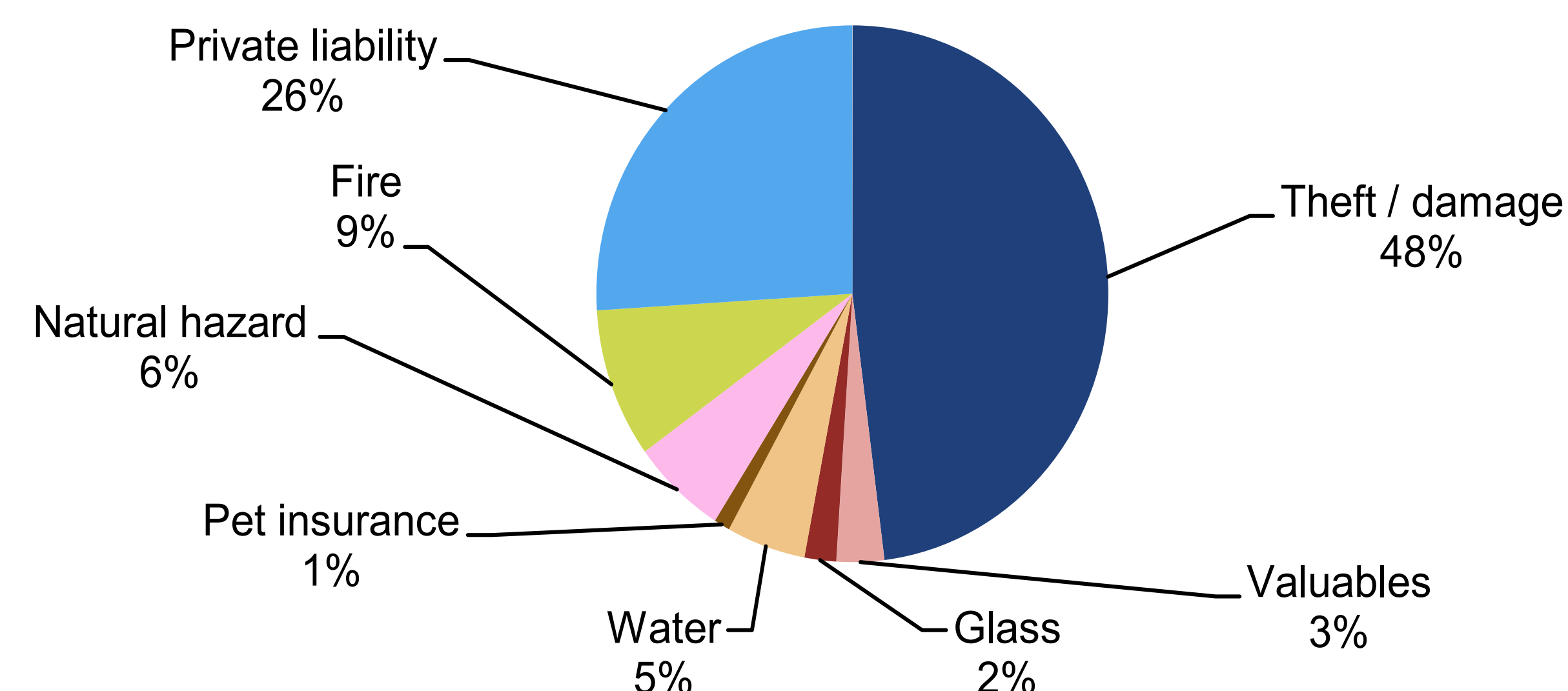 this we are planning to use time series prediction algorithms. In addition to this, work will be extended to supervised machine learning algorithms to predict the person's likelihood to be a victim based on personal details, mainly demographics data. We are also looking into integrating additional sources of data (i.e. Swiss national statistics office) in order to improve the accuracy of our model.
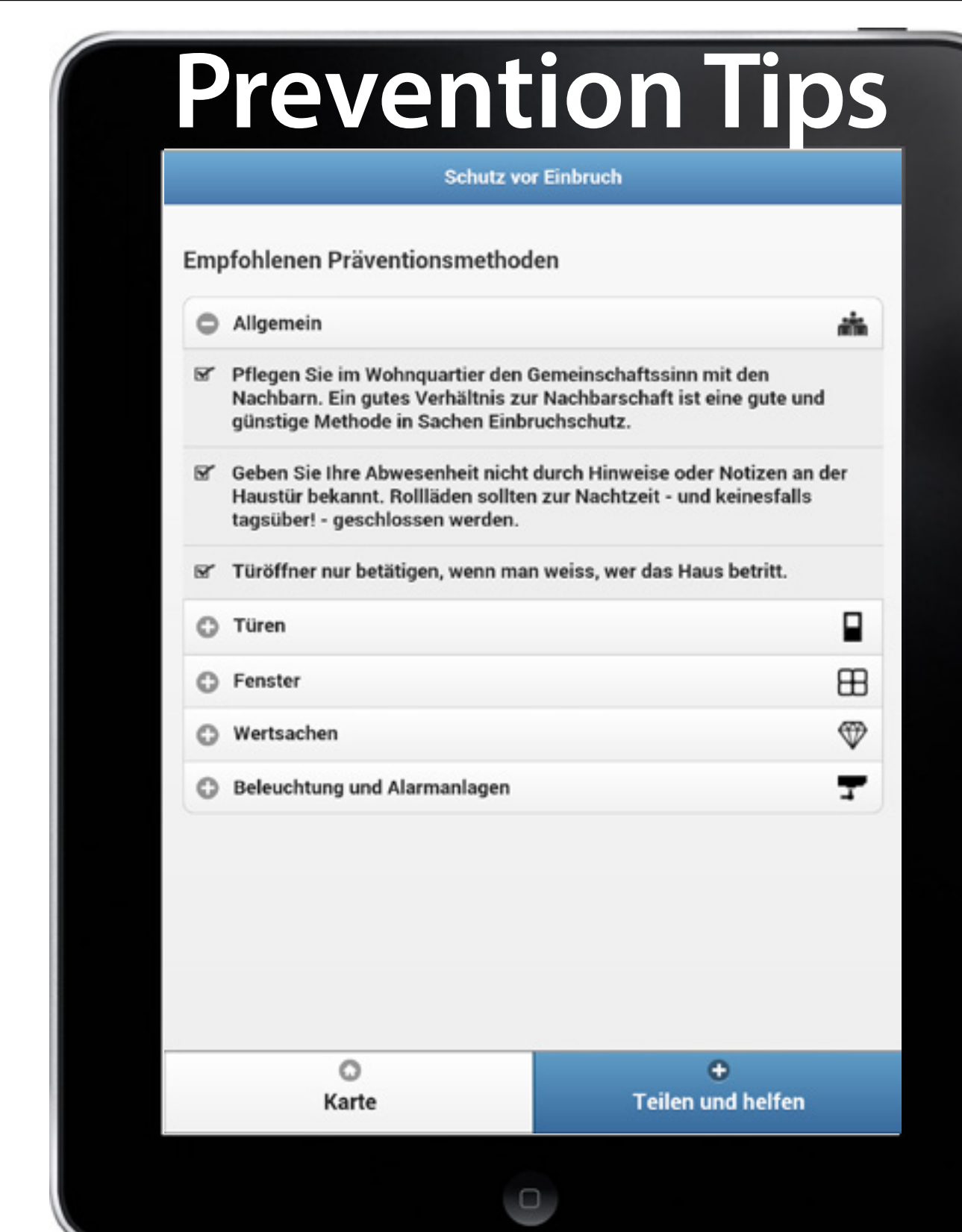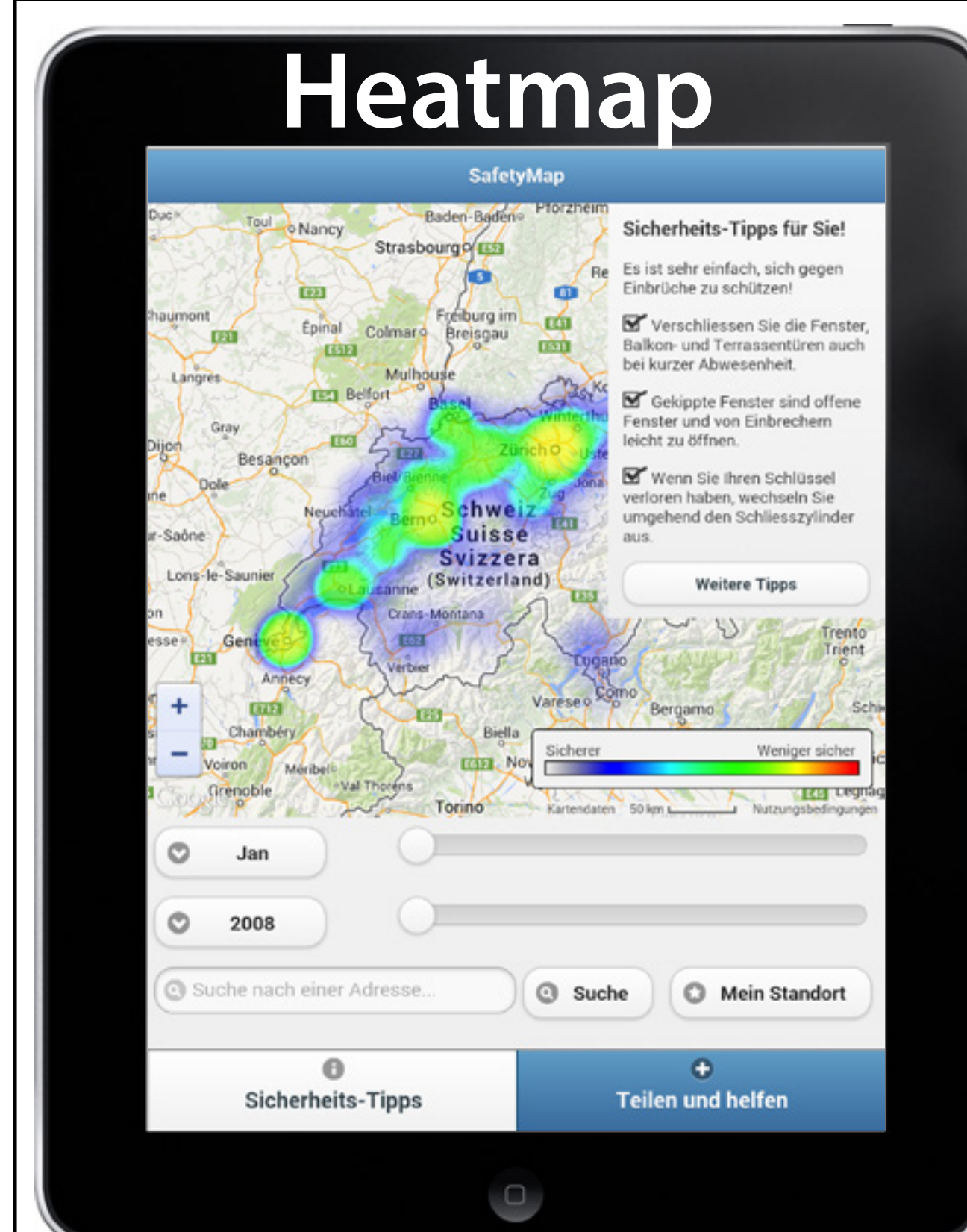
Solution: Mobile Application

Heatmap

Crowdsourcing

Prevention Tips

New Features
Community
Analytics

Our first iteration of the project consisted in a web portal that includes features like heatmap for the historical burglary data visualization, crowdsourcing for the people to share their experiences on the portal, and tips in order to motivate people to take preventive measures. The next version will consist of a native mobile application that will include additional features like data analytics functionality to be able to predict future crime incidents and also provide risk estimation based on personal profile, and also the inclusion of the community concept to bring people together within their neighbourhood.

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