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Towards Citizen Forensics: Improving Citizen-Police Collaboration

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Abstract

Pervasive digital technologies are increasingly used to record different aspects of citizens' lives, from activity and location tracking, to social interactions and video recordings of life experiences. However, effective use of these technologies to strengthen collaborations between citizens and police requires a fresh examination of the creation and use of evidence. We extend the concept of *Citizen Forensics* to denote this new model of citizen-police collaboration. By drawing on the literature on citizen science and community policing, we identify the challenges that must be addressed to meet the important societal need of improving citizen-police collaborations.

Author Keywords

Forensics; crime; citizen participation; citizen forensics; community policing; citizen-police collaboration.

CSS Concepts

•**Human-centered computing**~**Human computer interaction (HCI)**~HCI theory, concepts and models

Introduction

Due to the fear of becoming a victim, crime is of continuing concern to the general public. With the proliferation of information and communication technologies (ICTs), citizens are exposed to more

Community Policing

The most popular definition of community policing is coined by Myhill [33]: "*Community policing is the process of enabling the participation of citizens and communities in policing at their chosen level*". For this research, we view community policing as a collaboration between police (professional) and citizens in which citizens implement tasks which have traditionally been conducted by the police.

There has been a growth of work for encouraging citizen engagement in policing practice, such as citizen patrol, Neighborhood Watch program, 'If You See Something, Say Something' campaign, and the anonymous crime reporting system Crime Stoppers, etc.

information than ever; meanwhile, both the level and nature of crime is changing [30]. Although the overall level of crime has decreased in recent decades in England and Wales [34], people's perception tends to be that the level of crime is increasing [10].

Technological advances in data collection and communication have the potential to dramatically transform conventional models of governance, public service and civic engagement [11,25]. The high penetration rate of smartphones and social media can catalyze the creation of 'smarter' interactive systems that are more responsive to the needs of diverse stakeholders. These shifts reflect the possible rise of the 'digital citizen' who is able to draw upon such technology to directly participate and influence the institutions and services that most impact their life [32]. One area where the role of the digital citizen is becoming increasingly important is that of policing.

We believe the emergence of the digital citizen provides an opportunity to explore how citizen-police collaboration can contribute to safer communities. There is increasing interest in adopting community policing [33] among law enforcement agencies around the world, where citizens can get involved in policing at different levels, with the aim of reducing crime and the fear of crime [29]. Due to limitations in policing capacity and resources [8], it is unrealistic to expect the police to be present 24/7 and to know crimes and neighborhood issues occurring at every corner. Citizens can play the role of an extension of the 'eyes and ears' of the police [33]. Prior research has shown that collective actions from the community have positive effects, such as the reduction in crimes [23,37] and citizen's fear of crimes [20].

This paper presents a new model of citizen-police collaboration, adopting the term *Citizen Forensics* and extending its scope beyond the context of missing persons investigations considered previously [13]. By drawing on previous research on citizen science and community policing, we identify several challenges and design opportunities to improve citizen-police collaboration. With this work, we hope to inspire designers to consider supporting citizen participation in community policing. Moreover, we hope to call for more HCI research contributing to addressing issues of crime in society.

Related Work
There is relevant previous research on HCI in community policing [7,27], citizen science [2,22], and the role of technology designed to promote citizen participation [16,18,28].

HCI researchers are increasingly working on designing technology that supports citizen's participation in policing. Kadar et al. [27] designed a crime prevention system allowing people to report crimes in real-time. *CityWatch* [26] notifies users about the safety of their territory through other community members' reporting. Brush et al. [7] integrated home surveillance cameras to build the digital neighborhood watch network. Another strand of research is related to alleviating the personal safety concerns of residents [5], especially for vulnerable people. For example, hate crime reporting for LGBTs [19] and transgenders [36], and location-based crowdsourcing solutions against street sexual harassment for women [1].

Other research has focused on exploring the use of existing technology for online community policing.

Citizen Science

There is no definitive description of citizen science, but in general the term refers to the involvement of non-specialist volunteers in scientific activities. The level and nature of citizen participation can vary significantly, where at the most basic level, individuals provide data or knowledge, donate resources such as computing capacity, or fund scientific research.

Citizen participation offers scientists access to new resources that would be otherwise inaccessible without this collective practice.

Pridmore et al. [35] investigated the *WhatsApp* neighborhood crime prevention (WNCP) groups initiated by citizens in the Netherlands, and found that WNCPs empower social control and collective efficacy. South African citizens initiated the Community Policing Forum on *Facebook* which increased community cohesion [24]. Similarly, Erete [15] found that community's online participation can improve their community engagement in the real world.

However, citizen participations in the above examples tend to be either reporting suspicious activities via mobile applications/websites, or getting notifications and raising awareness; rather than the development of models and methods to support effective collaborations between citizens and the police.

As a cooperative approach already well established in natural science [4], citizen science offers insightful opportunities for creating strong collaborations between the police and citizens. Researchers have proposed several potential models of citizen science. Arnstein's influential "ladder of participation" [3] was developed in the context of participatory urban planning, which was later expanded into three levels of collaboration between professionals and citizens – *contributory*, *collaborative*, and *co-created* [6]. Haklay [21] has focused on the level of participation, which was categorized into *crowdsourcing*, *distributed intelligence*, *participatory science*, and *extreme science* (see Figure 2a). We propose a similar typology of citizen participation in the context of policing, *Citizen Forensics* model, which we have identified analogous concepts of investigation, evidence collection, and analysis.

Citizen Forensics Model

In this section, we first propose *Citizen Forensics* model. We then demonstrate the expected benefits of adopting *Citizen Forensics* model with a hypothetical crime scenario (see the side note below Figure 1).

There are four levels of participation in *Citizen Forensics* model (as illustrated in Figure 2b), from 'Crowdsourcing' information at Level 1 to 'Self-investigation' at Level 4. We describe each of these below:

- **Level 1 *Crowdsourcing***: is where citizens provide information to the police, either through direct reporting, such as responding to appeals or sharing their data (e.g., video footage, photographs, etc.). Many digital policing technologies currently deployed by the police fall into this level.
- **Level 2 *Distributed Analysis***: involves asking citizens to help analyze information to help police draw meaningful conclusions from it. A common example of this is where citizens are asked to help to identify individuals from photographs or video footage.
- **Level 3 *Co-investigation*** engages citizens at a deeper level in investigations, such as allowing them to propose potential lines of inquiry or defining priorities for policing activities.
- **Level 4 *Self-investigation***: provides citizens with the tools to define their own policing or public safety problems 'on their own terms' [14], which they can then work among themselves to investigate these problems collaboratively with the police.
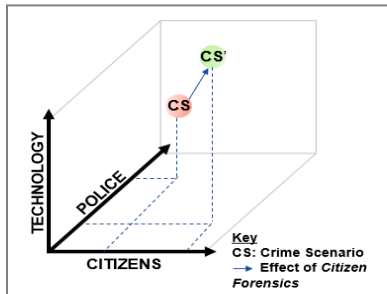
Figure 1: Police, technology, community interaction space.

Consider a crime scenario involving vehicle thefts, which the police would investigate by interacting with citizens directly involved in the incident and a range of technologies (e.g., vehicle tracking data, CCTV footage, etc). As illustrated in Figure 1, the crime scenario (CS) is placed in a position that involves high levels of police and technology interactions with minimal community involvement. With the *Citizen Forensics* model, we hope to transform the position of the CS to an optimal point (CS') in the police-citizens-technology interaction space, by increasing the involvement of citizens in the investigation process of this type of crime.
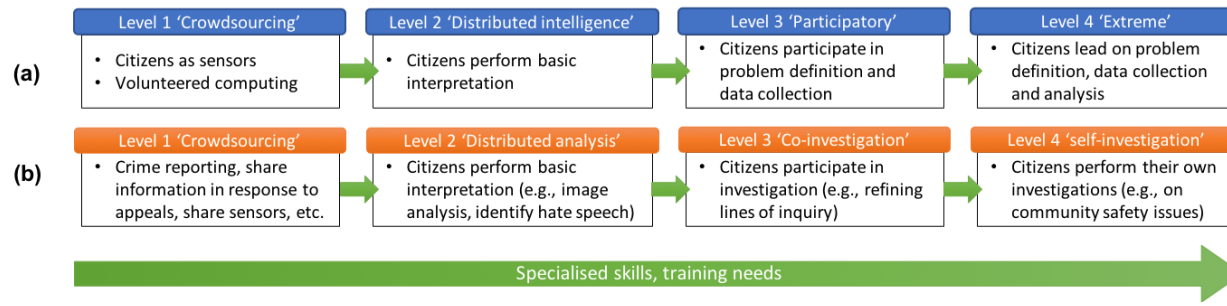

Figure 2: Taxonomy of (a) citizen science [21]; and (b) *Citizen Forensics*.

Discussion
The success of community policing depends on citizens' active participatory involvement to make their communities safe and secure. We list some challenges for realizing the vision of *Citizen Forensics.*

The capacity to engage citizens in the long-term is a big challenge. Trust is vital to citizen participation and continuous engagement in policing. HCI researchers have investigated trust-building between the community and government officials [12,31]. The policing practitioners and researchers need to explore how to make citizen-police collaboration more attractive, especially for low-income, high-crime rate communities [17] who tend to be less participatory.

Another challenging issue regards data quality [38]. As we move up the levels of *Citizen Forensics*, more specialized skills and training are needed to ensure that data is valid and correctly supports the investigation. This is necessary to support empowerment, inclusion, and engagement in citizen-police collaborations, and avoid negative effects like information overload, privacy breaches or vigilante activities [9].

With different types of stakeholders involving in community policing, future work needs to examine the design of multi-directional channels of collaboration between citizens and police, rather than solely one-way communication model.

Conclusions
From previous work on community policing and citizen science, we propose *Citizen Forensics* model to improve citizen-police collaboration. We also identify several challenges for deploying *Citizen Forensics*. We believe that with appropriate design considerations, *Citizen Forensics* could be a step towards safer communities via effective citizen-police collaboration.

Acknowledgements

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