

# Literature Review on Crime Reporting Interface Design using Mobile Technology

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## Abstract

Crime, abuse and fear are darker elements of human society. The transformation of existing mobile technology into tools that help deter these types of human interaction, proactively and reactively is not a new concept; however by highlighting the existing security these devices offer, a new solution could be grown than stems more naturally from the concept of a mobile telecommunication device and that is more likely to be adopted, with less resistance, by the general public.

## Introduction

In the last few years the general use of IT in Africa has more specifically become the use of mobile devices, which have penetrated the continent at a substantial rate with more than a 40 fold increase since 2000 [15]. With the very nature of a mobile device it is highly likely to be found one on an individual for most hours of the day, throughout their activities for both their instrumental and non-instrumental attributes [5].

Crime is not a foreign concept to any populous of people world over, no matter the background rural to urban, ethnic group or culture [3]. However the inherent problem we seek to address is not just crime per say but the reporting of crime with respect to key factors to be discussed – prevention, alerting and privacy.

The concept of digitizing crime preventative measures is not a new one, it is being explored with varying levels of success under numerous principles such as functionality, feasibility and privacy for different target groups such as the old aged[4]. Numerous devices are designed for this specific purpose and often mobile devices

are not used due to their multi-functionality and the numerous applications they have installed on them [3][4]. However our implementation seeks to employ mobile devices primarily due to their great African penetration and versatile situational applicability. We shall argue in fact, by being a well-known and multi-use device a cellphone is in actuality ideal in helping deter crime

## Motivation

It can be argued that the perception of crime is often higher than the actual statistical amount of crime; influence of written and digital media and word of mouth ultimately affect the general populations' view of crime [16]. However it cannot be denied that crime is still strife in society [15] with actual values of crime often exceeding the statistically collected values found in police reports. This can be due to numerous factors, such as the police themselves attempting to dampen rising figures to appear more effective, or, in more likelihood it is the fact that often crime goes unreported [7][3] creating an unknown disparity between statistics and reality.

With regards to mobile devices, perceived crime rates or perceived threat of danger plays a large role in use. Foremost it appears that the higher the threat of danger the more likely an individual is to carry their mobile device[5] seeing it as a source of security to be able to contact near-by individuals they know, to come to their aid[7][9]. However the nature of this occurrence varies dependent on the individual as studied in [12] due to the way users perceive the value of the security offered by their mobile device with some classification of users publicly utilizing the mobile device to express their connectivity as a means to ward off potential

attackers while others see value in utilizing the device only after they have been attacked

Numerous experiments have been done to collect data relating to criminal activity and their effect on communities [4][8]. Digital solutions have been suggested and found to be very effective [8] in increasing awareness. Solutions such as these aggregate numerous crime reports that otherwise never have been mentioned via conventional crime reporting techniques [7] and this is largely due to the automated nature (little human interaction) of the reports.

## Implications

In an effort to reduce crime by increasing crime awareness and crime reports it would be unfortunate to blindside the reality that the authorities (police, guard) will likely not be able to handle the increase in traffic [7][8]. Numerous methods are discussed that help alleviate the pressure that the conventional authorities would face, such as the community policing implemented [8] that splits the police force to small sectors in which they oversee the local residents who by and large manage themselves, aiding in identifying criminals, testimonies and reporting criminal activities. Another concept would be to outsource a portion of the workload, considering a situation in which outsourced employees monitor devices like CCTV camera footage looking for foul play and reporting their findings to the authorities [4]. It is clear however that an increase in reporting and a reduction in the perceived cost of reporting to the individual [7] would only place a larger burden on police forces

## Crime Prevention

Cellphones are primarily a means of communication, that statement means distinct things during the day or at night, in safe areas or a hostile environment [3]. Communication at night can mean that an individual is never alone making them less of a target to would be attackers, there is a distinction here however in that the security offered by the mobile may be fabricated/pretense. The mere illusion of having someone to speak to offers preventative measures something inherent in the nature of a cellphone [12], however this in itself is not useful when eager pursuers actually engage the victim, at this point a cellphone is no longer as useful. At this point, a natural adoption to this preventative technique may be to speak to an individual, such as a police officer or operator who can actually send for help. It is argued however, in [7] that individuals are less likely to use telephone related police services over automated services due to the human element. This is due to having to explain ones situation and having to justify one's concern.

Evolving this idea, a means of digitally prerecorded conversations could be created that victims can use to satisfy preventative measures inherent in their phone, and, with a simple press of a button, similar to those of USSD services, a request for help can be sent that realizes the security that was otherwise not inherent.

## Alerting

### 1<sup>st</sup> person

Often however having a cellphone will not help deter some criminals [4] (such as crimes of passion) and at this point it is not prevention

that a mobile device can offer but alerting. Often, violence occurs in a residence or home and not in city streets or poor lit corners [15] with on average 20% of women admitting domestic abuse in some areas of urban South Africa to a staggering 80% in some rural areas. It is clear in these cases, the possession of a cellphone, contacts and communication is irrelevant as often abusers are spousal and aware of the victims' mobile device. In this case it is not the obtrusive but subtle nature of the device that can offer some security.

Devices that use certain aspects already in mobile phones have been employed that offer such security, by recording sound and audio, observers can be alerted of the violent happenings in the home.[4]

We may seek to employ the same methods in our design, by implementing a silent alert SOS request and recording the audio of the crime taking place the mobile device not only alerts authorities but also allows for some level of strategy to be devised by authorities to tackle the situation at hand. This in itself is a third aspect of a mobile device in its relation to crime, in that it can be used to effectively engage the scene.

However observation is a taxing job for authorities.

## 2<sup>nd</sup>/3<sup>rd</sup> person reporting

The application of cellphones as a reporting device can also be taken in the context of an observer of a crime. While it has been seen that people not directly involved in the crime being committed are less likely to report it (true even despite the fact that often public opinion of crime is much worse than its reality [15]), the likelihood of reporting the crime increases

substantially the less the perceived cost of reporting[7]. One of the major factors affecting this cost is credibility when reporting a crime. Described as tension when calling the police, and having to describe the scenario unfolding to an officer.

Again, this would be the conventional use of a mobile device. A suggested technique to develop this concept would be to incorporate a computer interactive approach, which would potentially reduce the perceived cost of crime reporting by removing the element of proving credibility. The study [3] implemented this and proved to have positive results with more crimes reported per given scenario.

## Privacy

The issue of anonymity is a large one with respect to mobile devices. With the advent of the technology more and more applications are designed with the focus of providing relevant information to the individual by means of aggregating data, both from the user and from other individuals, as such compromise to a personal privacy is under question[9]

Personal privacy can be invaded in numerous ways. In order to gain and supply relevant data to users, location based services are often employed by mobile devices. Location data would play a vital role in designing a crime prevention system, allowing relevant authorities to figure out the exact location of victims in order to act swiftly. However intrusion of location data, by unauthorized individuals presents a serious threat, Problems such as spamming and inference arise not to mention personal security risk of strangers knowing the user's patterns.[10]

The concept of gamification was applied to privacy concerns in order to find a balance between giving data and receiving data and a model was created to test this concept [9]. It can be seen however that an important aspect when considering privacy is relevancy of data with respect to proximity. Location data need not be sent to authorities whom are not local to the user of the device.

A concept to consider when attempting achieving optimal anonymity is the amount of delay time that can be expected implementing anonymity techniques [11]. With regard to emergency situations it is imperative that an SOS request reaches relevant authorities in the shortest amount of time possible. Not only must the request be timely but it must also satisfy all the relevant queries that would be made about the emergency. This is in itself a daunting task considering the nature of crime and its unpredictability [4], just how much data should be user input in an emergency? The concept of variable anonymity is discussed [11] in which data sent is relevant to user requests.

## Conclusion

The overall approach to developing digital crime reporting techniques has been experimented with considerable success. Mobile devices are already central in users sense of security and can play an even more pivotal role, given a design solution that caters to the need of the target individuals [7][4].

The paper discussed traditional and modern techniques used by individuals and communities to report and prevent crime in a digital context and the inherent complications of using technology to do so, such as potential Privacy invasion and the increase in report volume made to authorities.

The paper explored numerous applications and motivations for interface design of crime reporting technologies that proved a marked increase in user crime reporting rates.

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