A Cloud Based Android System for Reporting Crimes Against Child Sexual Abuse

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Abstract: A cloud based android system for reporting crimes against child sexual abuse is a real time cloud-based system to be used by people to report crimes concerning sexual abuse of children to relevant organizations. Usually, when crimes of this kind happen, the victims or witnesses go to the police, or call related organizations to report crimes. The crimes are then processed through a paper-based system where the cases are recorded and them handled accordingly. This approach is usually slow and in sometimes reads to dissatisfactions to the victims and relatives. With the wide spread of android phones, android system to report the crimes would make the crime management easier and faster as the crimes will be reported in real time using an android phone. Management of the cases will also be fast as the crimes will be directly reported to a cloud database which will make crime tracing and management faster. A global positioning system which is already implemented in all android phones will be used to track the location of the person reporting the crime. Firebase real time database will be used to store the data reported. All the users of the system will be authenticated to make sure they are not eligible to use the application and for privacy of user information. Thus, a cloud based android system will be beneficial to both the public and the acting organizations and there by improve measures to reduce sex crimes against children.

Keywords: Cloud, Global positioning System, Real Time Database, Firebase, Authentication.

Introduction

In the recent years, there have been a rampant increase of abuse cases in terms of sex as far as minors are concerned. Child sexual abuse, mostly of concern, Child molestation, is a form of child abuse in which an adult or older adolescent uses a child for sexual stimulation [1].

Types of child sexual abuse include engaging in sexual activities with a child, indecent exposure (of the genitals, female nipples, etc.), child grooming [2], and child sexual exploitation, including using a child to produce child pornography [1].

The legal definition of child generally refers to a minor, otherwise known as a person younger than the age of majority [2]

Different solutions have been brought forward by different concerned organisations and people in order to fight against these issues. This project aims to propose a better solution in trying to combat child sexual abuse issues using an android application. Here, a cloud based android system will be developed where the victims or even anyone surrounding the crime incedent place or who has knowledge of the developed situation will be able to report the case to the concerned organization which deals with issues of child sexual abuse cases directly through an android phone. Two applications will be developed, one for the reporting side while one will be for the concerned organization side for them to retrieve the reported data. The two applications will be connected through a cloud database and hence data will be reported and be retrieved in real time which will prompt the organization to act in time.

Related Work

In this survey systematic literature review process is issued. First of all, we tried to search for recent relevant papers, presentations, research report and policy documents that were broadly related to crime reporting and child sexual abuse as whole. For this project, 8 papers were taken into account, in additional to the base paper or the whole project.

No	Paper Name and Techniques.	Discription	Advantage	Disadvantage
1	Godlin Jesil, Rajat Basant, Pratishvir Crime Reporting System Using Android Application	A new area where mobile integrated with technology is useful for crime reporting since readily accessible information is not available at any point in investigation this is a key drawback for communication in police department. Thus, using cloud, we will try to make all the information related to the criminals available on the Android Application to the police during their investigation which would speed-up the entire process of tracking down the criminals.	1.It is more reliable when the internet is working and easy detect. 2. Real time processing	1.It is expensive. 2.It need more hardware and software management 3.It need internet

2	Mark Phil B. Pacot Mobile Based Crime Mapping and Event Geography Analysis for CARAGA	Mobile Based Crime Mapping and Event Geography Analysis for Caraga Region play a significant role in ensuring peaceas well as security of lives and properties of its citizenry. To address this goal, the researcher designed an innovative way through web and mobile technology to predict would be incident and crime commission for analysis and preventive actions. It also has a participatory community in terms of crime reporting using mobile application for the immediate response of local government authorities.	1. It is fast and more reliable	1.it requires internet access. 2.there is need to purchase some hardware
3	Junhua Chen, Theodoros Spyridopoulos, Panagiotis Andriotis, Robert Ludwiniak, Gordon Russell January 2015 Real-Time Monitoring of Privacy Abuses and Intrusion Detection in Android System	In this paper, they investigated the definition of privacy, privacy abuse behavior, and the privacy abuse in Android systems, which may be very useful for identifying the malicious apps from 'normal' apps. They also investigated the injection technology, service binding, and service proxy in Android system, which are widely used by normal apps to steal privacy information. A real-time monitoring system (app) is developed on Android system to monitor potential privacy data abuse. The app is able to monitor permission requests for all installed apps as well as analyze the potential privacy abuse behaviors.	1. The issues of data privacy and security was analysed and implemented successfully	1.The need use of internet wasn't properly addressed
4	Mary Ann E. Ignaco September 2019 Development of Mobile Application for Incident Reporting	The study entitled "Development of Mobile Application for Incident Reporting" is an application that aimed to report and respond to crime incidents that may occur in the Philippines community. It includes two	1.Helped to reduce the crime rate in Philippines	1.Need internet connection 2.Supports only up to version 6.0 android phones

		main applications such as Crime Reporting, Crime Responder and the website. The Crime Reporting application used by the victim or witness, to submit an incident report with photos that are then coordinated to either the nearest barangay or police station.		
5	Paul M. Wambugu Application of Mobile Phone in Crime Prevention Within Central Division, Nairobi City County	The study sought to establish application of mobile phones applications by police officers in crime prevention in Central Police Division, Nairobi City County. Application of mobile phone in the police service is underutilized making the organization not to fully benefit from its usage. Understanding use of mobile phone applications by the police officers may assist the organization in crime prevention efforts. Due to its ability to engage consumers in a timely and direct manner at low costs, mobile phone applications are relevant for the police organization.	1. it fasten the process of crime reporting and recording	1.The application need internet connection
6	William P. Rey, Neil Anne S. Balderama, Sebastianne L. Hipolan, Arney Azzih C. Salayon MELDEN: An Android Based Mobile Crime Reporting Applicatio Using Crowd sourcing	Melden is an Android Based mobile crime reporting application that uses crowdsourcing to allow individuals to report various street crime with the reports directing to barangay officials.	1.Fast, easy and Reliable	2.It needs an internet connection
7	Pranjal Gupta, Danish Ahmad Khan, Pankaj Agarwal Live Crime Reporting	Application that gives add-on advantages over Reporting the live crime along with the e-logging of complaints from within the application.	1. providing the assistance in case of locating the nearest hospitals to broad the victim to.	1.Requires hardware and software management and purchase
8	R.Dhinakaran;R. Ambikapathy June 22, 2020 Android Based Crime Reporting System Using	Android based Crime Reporting System is an online crime reporting system to engage public. In our society,	1.it can benefit the public as well as the police	2. It requires an internet connection

	Firebase	usually people have to go to police station to complain about their reports, however here we design an online crime reporting system for the benefit of public.	2.it encourages fast and formal communication	

Problem Statement

In as far as many applications have been developed to help in the process of fighting crimes as perceived in the literature review in the table, there is in no application that has been directly developed to deal with crimes concerning child sexual abuse. Child sexual abuse cases are increasing each and every day in the world and hence combating this through technology is now a necessity.

Objectives and Contribution

The main objective of this project is to develop a user-friendly system for reporting crimes specifically concerning child sexual abuse. The other objectives include:

➢ Make management of child sexual abuse crimes easy and fast

➢ Fast response to child sexual abuse crimes

➢ Fight child sexual abuse

The system will be able to help in the fight against child sexual abuse which is on the rampant now in the world.

Methodology

In order to achieve the outlined objectives, the project will be deployed through the following detailed models will be used.

1. The application will contain two main modules, one for the Admin and one for the users to report the crimes.
2. Registration for users: every user whether admin or general user has to be registered in the system to allow him/ her to access the application. A security code will be used to allow the user to register as an admin and the codes will be uploaded in the admin database and stored by the organization. Using firebase authentication each user has to be registered.
3. Storage service: since the crimes will be uploaded and the user information will also be uploaded to a cloud database, Firebase/ Microsoft azure storage service will be employed to offer storage for the crimes and the whole database of users.
4. Location: A Global Positioning System (GPS) module will also be used in order to keep track of where a user is reporting the crime from.

The Objective is to develop a user-friendly crime reporting application the general public will be able to report crimes concerning sexual abuse against children. Here anyone can register and report crimes to concerned organizations in real time and the admins at the organizations will access the reported crime and act on them accordingly. A centralized real time cloud database will be used to serve the whole system {user application and Admin application} for data storage and processing. User's data can be maintained in a confidential way for validity and integrity.

The system design includes multiple diagrams such as the architecture diagram which emphasizes on the overall design of the system operations that describes the structure, behavior and more views and analysis of performance. In logical design the input and output of data in the system pertains an abstract representation of how data flows. It includes entity-relationship diagrams (E-R diagrams). While physical design dwells much on how input and output are explained relating to the data is feed to the system for verifications/authentication, and how it is processed and displayed. Divided into many parts systems design gives a glimpse of how the project will look like to the user's point of view. In this system, we use system architecture just to show how the system coordinates.

System Architecture

System architecture is the process of defining the components, modules, interfaces and data for a system to satisfy specified requirements. The following is the architecture for the system.
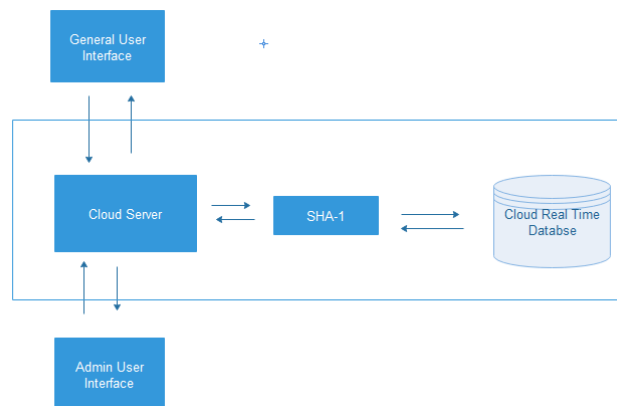

Figure 1. Overall System Architecture

Algorithm and Techniques

Model View Controller (Mvc)

Model–view–controller is a software design pattern commonly used for developing user interfaces that divides the related program logic into three interconnected elements. This is done

to separate internal representations of information from the way's information is presented to and accepted from the user [4].

In taking user details, crime details, we have used the MVC technique in which a special java class {Helper class} implemented to act as the model to allow processing of details for many users. The XML files are used as the VIEW to display the details to the user interface. Firebase real time database is used for the backend processing and storing of data for the whole application [4-8].

The diagram below depicts an MVC model
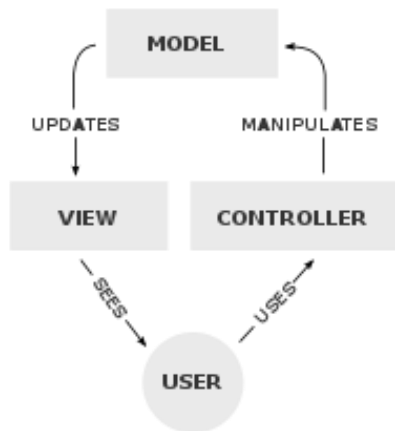
Multi Factor Authentication

Two-factor authentication (2FA) is a way to add additional security to your account. The first "factor" is your usual password that is standard for any account. The second "factor" is a verification code retrieved from an app on a mobile device or computer. 2FA is conceptually similar to a security token device that banks in some countries require for online banking. Other names for 2FA systems include OTP (one-time password) and TOTP (Time-based One-time Password algorithm).

Results and Output

This section presents the findings and results regarding the study. The pictures below depict the output of the system images after it is successfully tested and implemented.
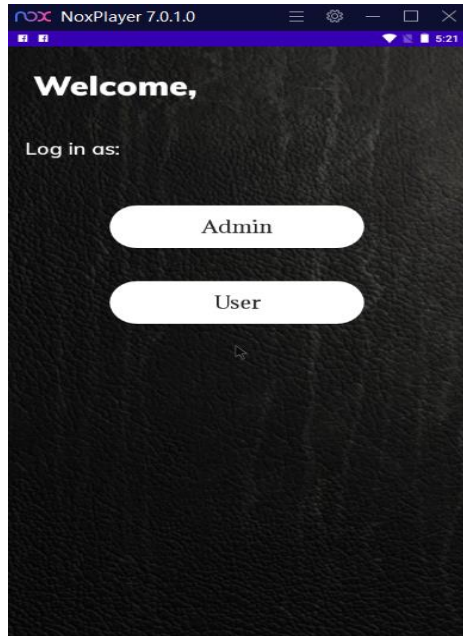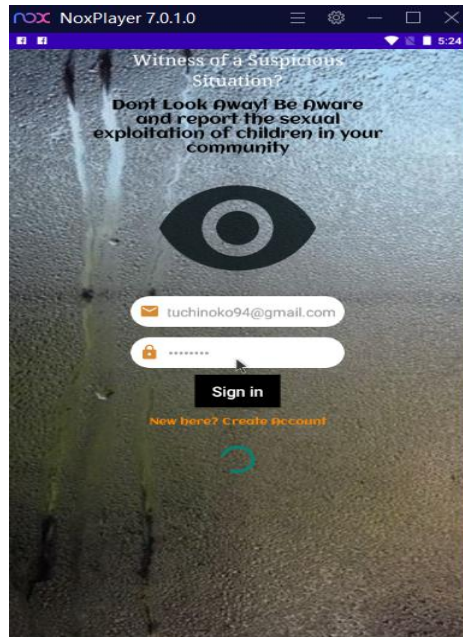
Figure 2. Welcome Page

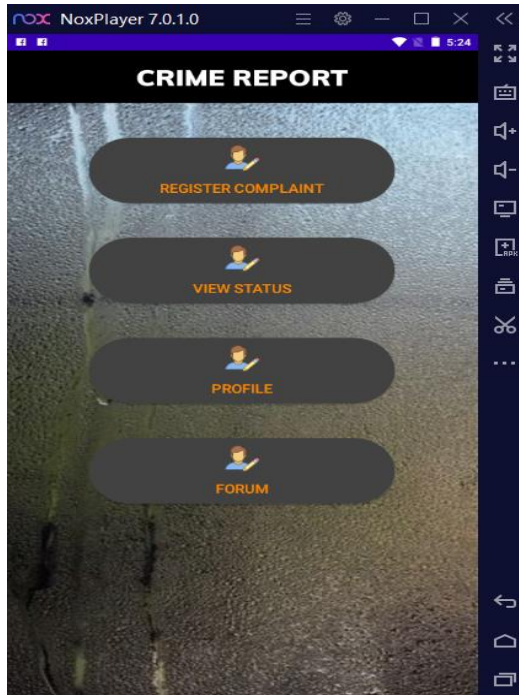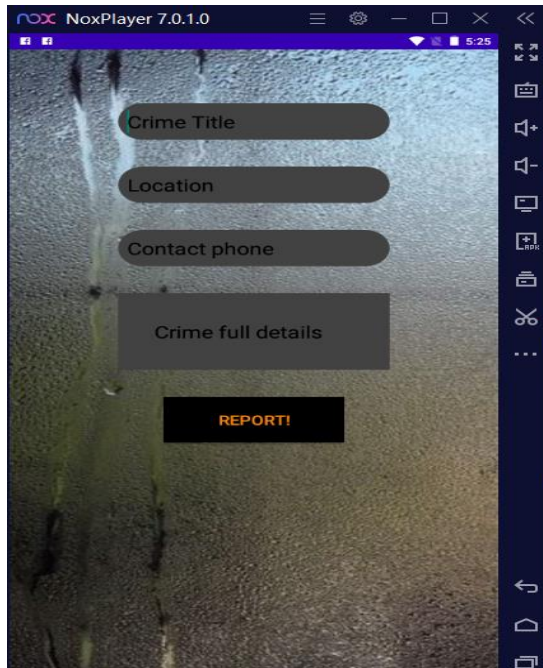**Figure 3:** User Log in page

Figure 4. User Home page

Figure 5. User report crime page

Conclusion

Based on the results we have obtained from the testing of the application; we have managed to increase the speed of reporting and management of crimes against child sexual abuse. However, in the future we still need to implement the system so that it should not need internet connections whenever a person tries to report crimes as it is the only problem which is there so far.

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Conflict of interest :

The Authors have no conflicts of interest to declare that they are relevant to the content of this article.