

Android based School Safety Application for Safety of School

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ABSTRACT

In today's world, people using smart phones have increased rapidly and hence, a smart phone is used efficiently for security purposes. The heinous incident that outraged the entire nation have waken us to go for the safety issues and so a host of new apps have been developed to provide Safety of school children via their phones. This paper has focused on the application developed for the safety of school children. Safety of school children has always been of utmost priority for GeoHazards Society (GHS). GHS has conducted many training programs for school safety advocates in partnership with State governments including several states. As a part of the project, GHS has also developed a School Safety App with support from Thales Foundation. App consist of several modules including detailed school profile, hazard profile of the school, School hazards identification, the formation of disaster management teams, development of evacuation plans, Guidance for conducting drills, preparing drill reports etc.

1. Introduction

Protection of school kids has invariably been of utmost concern for GeoHazards Society (GHS). GHS is important in producing comprehensive safe schools in Delhi which have become models for school security projects nationally. GHS even conducts education programs for school security advocates in partnership with State governments like Orissa, Assam, Delhi, Training and etc. of Trainers plans just for the National Disaster Response Force (NDRF) of the National Disaster Management Authority (NDMA). GHS has been effective with different corporates on encouraging comprehensive school security and also have a continuing project with Thales Foundation in Dharamshala in which we do School safety tasks in different Tibetan schools. As a component of the task, GHS has additionally created a School Safety App with assistance from Thales Foundation. The app has different modules which includes detailed school profile, hazard profile of the college, School hazards identification, the development of disaster management teams, development of evacuation plans, Guidance for doing drills, preparing drill reports etc. The app will be the first-of-its-kind and was formally introduced in National Institute of Disaster Management on 6.6.2017 by Shri Kamal Kishor, Member NDMA, and Dr. Santosh Kumar, ED, NIDM.

2. Geohazards Society (GHS)

GeoHazards Society (GHS) is a not-for-profit organization working towards making the country's most vulnerable communities safer from other and natural threats, through mitigation and preparedness. Along with its overseas partner organisation, GeoHazards International (www.geohaz.org), the organisation is working hard in partnership with Corporate Sectors and federal groups in doing programmes on Community Preparedness, School Safety, Hospital Safety, engineers training programmes, business continuity planning etc.

3. Need of application

Schools have a selection of risks which can impact kids and therefore it's vital for us to plan the facilities for a variety of threats to guarantee safety of all of the passengers. This app is going to help you recognize dangers in schools, form disaster management teams and also make a simple disaster preparedness plan. School Safety by GHS is an android based app to assist schools make for numerous hazards. The app is intended for facilities to make a simple disaster preparedness plan which could be utilized for disaster risk reduction.

4. Challenges faced during application development

Android devices typically often differs dependant on the mobile hardware characteristics when driven by similar model of the Android OS. This's the reason it's crucial that when developing apps for Android, developers create mobile apps able to focusing on a diverse selection of mobile devices operating on various variations of Android OS.

During the different phases of planning, building and testing, developers have to concentrate comprehensively on the apps performance, performance, usability, accessibility, and protection therefore owners are usually interested despite the choice of theirs of device. Additionally, they also have to search for methods to make the apps provide a far more personalized user experience across the different products an operating system. Moreover, developers have to recognize and look for answers to the typical problems concerned in android app development.

5. Common challenges android app developers face

1. Hardware Features

The Android OS is unlike every other mobile operating system. For one thing, it's an open source program. Alphabet gives producers the leeway to personalize the operating system to the unique needs of theirs. Furthermore, there are no laws on the products being issued by the different

companies. As an outcome, you are able to find different Android devices with various hardware features operating on similar Android version. 2 smartphones operating on Android latest ver, for instance, might have various display resolutions, screen size, camera, along with additional hardware structures. During android app development, developers have to account for every one of this to make certain the software provides a personalized experience to every person.

2. Lack of Uniform User Interface Design Rules

Since Google is still to give off some regular UI (user interface) design rules or maybe approach for mobile app developers, many designers do not comply with some standard UI development rules and procedure. Because designers are creating custom UI interfaces in the ideal method of theirs, a great deal of apps often run or even appears different across various devices. This variety and also incompatibility of the UI typically impacts the user experience which the Android app specifically delivers. Smart developers would rather aim for a responsive format that'll hold UI consistent across various devices. Additionally, developers have to evaluate the UI on the app extensively by mixing emulators and also real mobile devices. Designing a UI which makes the app provide similar user experience across different Android devices is among the more challenging challenges developers face.

3. API Incompatibility

A great deal of designers makes use of third party APIs to improve the performance and also interoperability associated with a mobile device. Regrettably, only a few third party APIs readily available for Android app development are of top quality.. Some APIs had been developed for a specific Android version and won't perform on products operating on an alternative model of the operating system. Developers generally need to think of methods to create one API function on all Android versions, a process they frequently find being extremely demanding.

4. Security Flaws

As previously mentioned, Android is an open source software program, and also due to that, manufacturers think it is painless to modify Android for their ideal specifications. Nevertheless, this particular openness and the substantial industry size makes Android a regular target for security attacks. We have seen a few situations in which the security of countless Android mobile devices was impacted by security flaws and insects as mRST, ' Certifi-gate, FakeID, Stagefright,' TowelRoot and Installer Hijacking. Designers have to incorporate strong security features in the uses of theirs and use the current encryption mechanisms to maintain user info protected and outside of the hands of hackers.

5. Search Engine Visibility

The newest details from Statista suggest that Google Play Store has a greater amount of mobile apps. Furthermore, a lot of Android users prefer apps that are free than paid apps that is why developers have to advertise their mobile applications to improve their download numbers and use application monetization options. The most effective way to advertise the app to reach the readership of theirs is using comprehensive

digital marketing strategies. Most developers use electronic advertising professionals to market their apps aggressively.

6. Patent Issues

Google does not implement some standards for the analysis of the caliber of new apps which are getting posted on the Play Store. This absence of an excellent assessment guideline will cause a great deal of patent related problems for developers. Several developers, to stay away from patent problems, have to alter and redesign the apps of theirs in the future.

As per the personal experience of mine, I've attempted to deal with common problems experienced by Android app developers. I am certain keeping leery of those difficulties will help developers to create successful apps in probably the most hassle free way

6. Related Research

As a part of literature survey, some applications are investigated that offer safety for user. In today's world smart phones play an important role for safety of a person. Some apps for security purpose are as follows

Hollaback[1], this application was developed to avoid street harassment. It takes the snapshot of harasser and uploads it in —ihollaback.orgll. The tag line of this app is "Hollaback! You have the power to end street harassment". The disadvantage is that immediate help is not provided, hence no self-protection. In case of danger the victim may not have time to capture the harasser photo. VithU[2], this application runs when the power button is pressed twice and every 2 minutes user's location link will be tracked. This information is sent to the registered contacts. It sends a alert to one of the registered contacts if there is too much trouble. The disadvantage is that it doesn't provide features like abstracting information about Police Stations & Hospitals.

Fight Back [3], this app is technologically advanced by Mahindra group. In prior days, it was an payable app. Later Mahindra group made it free .this app sends a message that —user is in troublell to dear ones (registered contacts) through E-mail and SMS.

Guardly [4], this application provides facility for user to put a call by your name and location to selected friends. It collects prior information from the user such as date of birth tallness, weight, blood-group, hair-color, etc.

Life 360 [5], this app informs friends and family at times of emergency. This app helps to recognize about your family on a personal map whether they are safe or not. And shows recorded crimes and sex offenders in that location.

Vanitha Alert [6], this app has a button HELP, when clicked sends distress text message to registered mobile number, E-mail, face book id seeking help along with user's location.

Raksha [7], this app sends location of user to registered contacts. At times of distress just by pressing single key it sends a loud buzzer to dear ones and also when there is no data connection this app alerts by sending SMS.

Street Safe [8], this app will call a community for help. An alarm and call must be initiated by pressing buttons. It updates location on face book and sends SMS to registered contacts.

Women's Security [9], this app records environmental voice for 45 seconds and then sends a text message containing user's location co-ordinates and recorded voice to addressee mobile number. B-safe personal safety [10], this app is based on slogan Never walk alone. It helps user to choose guardians in prior and sends a SOS message to the guardians and makes a call to one of the guardian in dangerous situation.

Safetipin [11], this app has GPS tracker, emergency key contacts and directions for safe house. It distinguishes between safe and unsafe Zone. Hence user can get prior information about the menaces in area he/she is wishing to go and take possible safety measures.

Scream Alarm [12], this app provides very loud volume of Scream (women's voice with agony). Whenever the user touches or pushes the app, the phone screams with loud noise which disheartens the attacker or strong trouble maker.

In [13], Kavita Sharma et al. describes about safety and security of women by using electronic device to both detect the problem & alert Authorities. The authors suggest a new perspective to use technology to protect women that is GPS and GSM based —Women Security System—app that provides the combination of GPS devices as-well-as provides alerts and message with an emergency button trigger. At times of danger the user has to press volume key button after which an alert message is sent to register contacts and a voice call to the first registered contact. The alert message is —I AM IN TROUBLE PLEASE HELP ME. The project was developed in Android which provides the level of reliability, availability and compatibility. In [14], Arsha Saini et al. dealt with security of human beings and proposed Android Attack Application, an intelligent alert system that protect people from any kind of attack. If victims feels unsafe and helpless at any time then by pressing any key of mobile the alert message is send to friends, family members, police control room, ambulance which are in emergency list. The alert message will contain victim's entire location, place, images and video of that location which are taken by camera of her mobile.

In [15], Saleem Pasha et al. have developed bSecure a personal safety app. This application was developed with a focus on women safety. Whenever the user feels insecure they can use this application to be safe. When the user clicks the power button 3 times, the app activates and for every 30 seconds it sends the user's current location to the registered contact number in the form of SMS. If the helper's mobile is in silent mode, it automatically changes to general mode with a notification message —I'M IN DANGER... to the address of the user repeatedly. Another feature is that it captures the surrounding environmental images by a single shake of the mobile. This captured image will be sent to the Email of the receiver. The registered contact and GPS location are updated and saved in a database.

In [16], Akshata V.S. et al. have proposed an application called B'Safe&B'Secure which ensures both safety and security for women. Android application was developed to provide safety for women. The unique feature of this app is that if the user is in trouble and doesn't have internet connection at that time, the user's current location will be sent to the

registered contacts as text message using SOS technique and in case of emergency, the user can trace the location and contacts of nearby police stations using GPRS.

In this paper [17], Akshay Moorth et al. have proposed an idea to create an Android application that uses GPS to find people nearby (helpers). It allows helpers to track the user, using real time GPS tracking. It also alerts the police to provide assistance for user, while in danger.

7. Area of application

Such applications are useful to provide safety from Natural hazard such as earthquakes. It has been noted that large damaging earthquakes are rare while less powerful earthquakes are more frequent. Even in damaging earthquakes, many buildings of the region do not collapse completely. However, objects inside buildings may fall down in large, moderate or even mild earthquake shaking and may cause loss of life or injuries, loss (blockage) of exits, loss of functionality and economic losses. Are there many such hazards in your school? Let us look for objects that can move in earthquake shaking, and use our imagination and think of how the objects will be affected by earthquake shaking. Could they injure someone, or block an exit? If so, school disaster preparedness plans could be rendered useless in the minutes following an earthquake, leading to further losses.

8. Proposed model

The proposed system will be implemented with the help of android application. There are eight different modules which have been listed below:

- I. **School profile:** Basic information about the school like school name, address, contact, building details etc
- II. **Know Your Hazards:** Please use this section to note what all hazards can affect your school. You can refer to the Earthquake, Cyclone (Wind) and Landslide hazard zoning maps at to understand the zonation of the district in which your school is located. Fire is a hazard that can affect almost any building anywhere. Coastal districts can be affected by the effects of tsunamis. Once you have a clearer idea about the hazards that can affect your school, use the drop-down menu to choose the hazard and the rating for each hazard. The table that will be generated will help you in planning for each hazard.
- III. **Falling Hazards:** Use the dropdown menu to choose the item that you consider to be a hazard and the number of such items that are present in your school. This will help you generate the list of falling hazards in your school and plan to prioritize for mitigation. Further guidance for mitigating falling hazards is available at www.geohaz.in.

During an earthquake it is not just the building and the people that are moving/shaking. The content of the building also move along. Contents and utilities such as tables, cupboards, pipes, wires etc. are also displaced along with the building and the occupants. These contents which are mostly in stationary position can either topple, slip or fall and can cause injuries to

the occupants and may also block exits. A comprehensive disaster preparedness plan will include identification and mitigation of all such falling hazards which can be found inside the building. Note: You can update a particular falling hazard by choosing the same falling hazard and entering a new value.

iv. Awareness Generation: Awareness about hazards, disasters, vulnerabilities and risk is essential for disaster prevention, mitigation and preparedness. Awareness generation programmes are an important part of the school safety programmes where all the members of the school, the teachers, non-teaching staff, students and even parents are sensitized.

As a part of the disaster preparedness activities in schools, such awareness generation activities need to be conducted from time to time to ensure that the staff is prepared to handle various hazards that may disrupt day to day functioning of the school. Such programmes can be of few hours to a two-day program where schools hold detailed discussion on various hazards and school disaster preparedness.

v. Drills: Every school should have detailed evacuation plans, as detailed in the guidance note for evacuation planning. Though the development of the plan is an important first step, this alone will not be enough to improve preparedness in the school. It is essential that the plan is known to every person in the school and that the plan is tested by conducting preparedness (mock) drills. These drills serve a variety of purposes, including testing the evacuation plans, training and testing students and staff members, and identifying where a plan needs improvement.

Drills are also a way of training the minds of the participants to respond better in a real event because they have thought through the actions and done it before. Schools should have developed plans for each hazard the school is prone to and also test each of these plans with drills.

Schools should have a separate siren/hooter/ bell for emergency evacuations. This should be distinct from the normal bell used in the school. If the drill scenario is that of an earthquake, (at the first bell/siren) everyone will do DROP, COVER, and HOLD before evacuating (at the second bell). If the Drill scenario is that of a fire, there will only be one bell and the teacher in the class will ascertain the source of the 'fire' before evacuating through safe staircases.

Once everyone has assembled at the safe assembly area, teachers and student leaders will ascertain everyone has come out safely through headcounts or roll calls. If a student or staff member is found missing, the information will immediately be passed on to the Principal/ in charge. The school disaster management teams such as Awareness team, Evacuation team, First Aid Team, Fire Safety team, and Search and Rescue Team will play important roles in emergencies or preparedness drills.

Once everyone is accounted for, the Principal/ in charge will ask students for suggestions on ways to improve the drill to enable students to think and lead DRR efforts in future drills. A debriefing session with teachers and student leaders will also discuss the mistakes that happened during the drill and discuss possible changes to the evacuation plan based on the experience of this drill.

The School Safety Committee will make necessary changes in the evacuation plan and disseminate the revised plan to everyone in the school.

vi. Evacuation Plan: A key part of school disaster preparedness is to ensure that all students and staff members evacuate to a safe and protected area. For this, it is important to understand what can happen and how everyone in every room in the school can evacuate to the safe assembly area. The key steps to developing evacuation plans are \n \n

- a) Identifying open and safe assembly areas for assembling after the evacuation and marking them,
- b) Identifying safe and clear exit routes for each classroom to the safe assembly area
- c) In multistoried buildings, identifying stair cases to be used by each classroom line and which side of the stairs each class line stays in
- d) Informing everyone in the school about these evacuation routes

Schools will display emergency evacuation drawings of each floor, with staircases and exits clearly marked in every classroom and in common areas such as corridors, libraries, labs etc. These plans can help in ensuring all students and staff members, especially those with disabilities, can safely leave buildings and assemble at the safe assembly area.

Once all students and staff have evacuated, the next step is to do a head count (or roll call) to ensure that everyone has reached the safe assembly area. If someone is missing, it must be reported to the school principal/ in charge for further action.

Evacuation plans should be reviewed and updated as needed at least annually, and certainly any time there is a physical change in the building that may affect the evacuation routes or the safe assembly area. Please see the sample evacuation plan that shows how each floor should be marked with different coloured arrows for easily identifying the occupants that will be using an exit way.

vii. Teams: implement school disaster management plan on various themes of disaster management plan (Awareness, evacuation, fire safety, first aid, search and rescue). It has members as per school strength. School safety committee and teams should meet at least twice a year to prepare disaster management plan.

viii. Family Preparedness: Family preparedness is a very important part of school preparedness. A teacher can help the school handle emergencies when s/he knows that her own family is prepared to handle emergencies on their own. Try to mitigate these hazards as much as possible using the guidance in the falling hazards part. Sit down with every member

of your family and discuss where they would be if a disastrous event such as an earthquake happens during the day. Plan each person's role in getting all family members together. They will need to decide who will do what, when and decide on a meeting place within your neighborhood or, outside it. However, the teacher will have no role in her/his family preparedness plan as s/he will have to remain in school to assist with the evacuation etc. In the days following an event such as an earthquake, there will be disruption in the regular supply of water, electricity,

food etc. Hence each family will need to survive on their own till help arrives a few days later (at least 72 hours). For such situations, please prepare a family emergency kit containing water, non-perishable food, torch, first aid, prescription medicine etc. that will help your family survive those days

9. Implementation

When the app is run then the following screen appears.



10. Conclusion

This paper describes an android application for personal security application that is designed with recent improvements in android and mobile technology for personal safety. Thus it can be used in emergency situations providing confidence to user and effective solution. For future development emotions and pressure sensor can be used to detect dangerous situations.

11. Scope of research

This paper has focused on the application developed for the safety of school children. Safety of school children has always been of utmost priority for GeoHazards Society (GHS). Such system would be proven beneficial for the safety of children.

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