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Research Article

Child Rescue Application using Blockchain

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ABSTRACT

In recent years, in our country many child kidnapping cases have been identified to be happened. Mostly target of the kidnappers is the abandoned child which may happen due to poverty or they lose their parents in some natural disasters. Even due to this current covid situation, many children are abandoned by their parents. We are in an urge to identify such children and extend a helping hand for them before they are kidnapped by social enemies. The complication in rescuing the abandoned child has many different aspects which comprises of legal issues and also the emotions of the relatives who are missing them. There is no proper rescue systems for finding and helping such children. Even though many of us want to assist such children, due to lack of facilities and legal problems, many people's are afraid to involve in such cases. Due to such lack of facilities and awareness, many children have lost their lives or they have been forced to involve in many illegal business. To overcome such situations, In this paper, we have proposed a new child rescue application through which volunteers can help the abandoned child using their mobile phone itself. Through their mobile phone, the user can send the photo and the location of the abandoned child directly to the government officials. This application will helps to reduce the delay in identifying and reporting the abandoned child case. An automated mail will be sent to the government officials which can be used as the proof by the volunteers so that they can also tract the case. The information about the abandoned child is stored securely using the Block chain technology.

Keywords—*Child Rescue, Block chain, Android Mobile Application*

I. INTRODUCTION

The term missing child is interpreted in many ways. Now a days, there are lot of reasons for this child missing case. Some of this case may occur due to the parents inability to raise the child because of their poverties.

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This case extends especially to the girl child because still in our country raising girl child is considered as a big burden to the parents. In some cases, Children themselves may came out of the house due to some problem with their parents. They might have taken such decisions unknowingly but after that they may not know the way to return to their parents and got struck with some terrorist

gangs and end up in doing illegal business for their survival. Other cases may be due to some natural disaster, they may lost their parents and they may don't have any idea how to survive. Those there may be many reasons, such children have to be identified and the report should be sent to the respective higher officials. There should not be any delay in taking the action once such cases are identifies. There are many social volunteers doing such activities. But sometimes they may end up in some legal problems due to lack of knowledge. So many people's are afraid to involve in children related cases. To avoid such situations, our application will provide the volunteers with some acknowledgement and also they will be relieved from the legal problems. They can also track the information about the actions taken by the officials. The rescue team can also be rewarded because the whereabouts of the rescue team is also recorded by the system. This will act as an encouragement for the others to involve in such activities.

II. RELATED WORK

A. Enhancing Mobile App User Understanding and Marketing with Heterogeneous Crowd sourced Data [1]

Now a days, mobile has become an unavoidable and indispensable item in our day to day life. Even many of us are using more than one mobile phones. The demand for mobile application is also growing tremendously. Lot of mobile applications are existing to fulfil our needs. It is very difficult for users to identify the correct one and use it. It is also difficult for mobile application developers to develop an application so that it can be used by all the corresponding end users. There are research challenges existing in developing such mobile application. Before developing an mobile application, we need to analyse many things such as app user profiling, usage pattern understanding the popularity predication and mining the requirement of the users and mining their feedback. This will help the mobile app developers to develop a right application for the end users. In this paper they have reviewed the crow App and also they have presented the key research challenges to be considered before developing an application. The algorithm to monitor the usage of the mobile application are generally running in the background in the mobiles. This will help the users to update their application based on the user requirement and also helps them to fix any defects and helps the application to run longer. It is helps to forecast the popularity of the mobile application among the users.

B. Visual Mobile Computing for Mobile End-Users [10]

Now a day's developing an mobile application had become an indispensable thing in almost all areas. There are numerous ways existing to develop an mobile application. In this paper, the authors have introduced an new method to develop mobile apps called micro apps. Using this method, user can easily create an application using incremental and iterative development process. Using this method, user can directly create an application in their smart phone itself. He no needs to worry about the user interface which will get created automatically. This method of using smart phone to develop application instead of personal computer is effectively improves the development time of the application and also reduces the editing errors even though the screen size for the application development is reduced.

C. Implementation of a Child Rescue System from Borewell using Zigbee for Long Range Applications [12]

In recent days, Children getting trapped in the borewell has been increasing tremendously. Though government is taking effective measures to rescue the children, in many cases it results in a failure.

In this paper, they have proposed a model which will helps in the rescue of the children from the borewell. Here they have used sensors and micro controllers for the rescue process which improves the efficiency of the rescue process. The picture of the child will be sent to the smart phone using the camera installed in the transmitter. Different sensors are also used to track the temperature and the oxygen level inside the borewell based on that we can regulate them and make the condition favourable to health condition of the child.

D. A study on Smart and safe child Rescue system using Internet of Things(IOT) [13]

In recent years, children getting trapped in the borewell has been increasing tremendously. In these paper they have analysed advantages and disadvantages in the current method which is digging a hole near by the borewell and then rescuing the child. They have also compared the pros and cons of different technologies using IOT.

E. A collective awareness platform for missing children investigation and rescue [9]

In this paper, they have discussed the challenges faced by the child rescue system and proposed a solution. The proposed methodology have used social media to discover the information about missing child. They have also used location based mobile notification to give information about the abandoned child. The volunteers location who is going to involve in the rescue of the child is used based on their mobile phone location. An mobile application is developed and planned to used based on the needs of volunteering organisation and volunteers.

III. EXSISTING SYSTEM

The currently existing system in finding a missing child is a manual process. It is a very long and tedious task. The volunteer who is rescuing the child has to take the child to the nearest police station. In police station, regular formalities has to be carried out and also the information of the volunteer need to be collected. Sometimes the volunteer cannot track the case of missing child also. So they may not get satisfied with their service. Sometimes it will also be difficult to track the volunteers because many people don't want to disclose their whereabouts.

A. Limitations in Existing System

- The volunteers has to take personal responsibility and they have to take the rescued child to the nearest rescue centre

- All the information has to be recorded manually by the respective department officials which may not be correct

- Lot of personal time has to be spent which may act as hurdle for few volunteers to involve in such process

IV. PROPOSED SYSTEM

In this system, we have developed an android mobile application through which volunteer can give the information regarding the child to the respective department. The user or the volunteer must have android mobile with them and they must have installed the application in their mobile phone. As now most of us are using smart phones, it is assumed that they have basic knowledge in accessing the smart phone and its applications. The users smart phone must also have proper internet

connectivity. The user must have already registered in the mobile application using their basic information like name, mobile number, email id etc. Once they identified any abandoned child they can login into the mobile application and they can take the photograph of the child and upload the information. The information of the child along with the photograph and the location information which is tracked based on the location of the smart phone is also submitted to the web server. The administrator of the system will immediately get the notification in their mobile phone regarding the new information uploaded in the web server. Then the administrator can check the information and can create the block and the information is stored in the block chain, so that the information of the child cannot be tampered.

A. *Advantages of proposed system*

- It is an automated process as the user should have the application installed in their mobile, and then the information submitted by them will automatically reach the respective officials.

- Administrator also immediately gets notification through the mobile so that the delay is communication is avoided and the steps will be taken immediately.

- As the rescued child information is stored using block chain technologies it is highly secure and the child information cannot be accessed by any unauthorized persons.

V. SYSTEM ARCHITECTURE

The development of the system involves development of exclusive mobile application for the child rescue. To ensure that only authorized person is using the application, login into the application is made mandatory by giving the basic user details. This application allows the user to take photograph of the child and upload in the application. While the user submitting the child information automatically the location of the user is fetched using the GPS and the location information is also shared to the web server for further actions. The complaint form is generated and the same can be submitted through mobile application. After the form is submitted, both the user and administrator will get the notification about the same. This helps them in taking immediate action without any further delay. The administrator acknowledges the complaint by creating a block and storing the information in the block chain. The information which are store in each block is latitude and longitude information of the person to detect the location, the filename and the name of the child if available and also the current block hash value and the previous block hash value. The modules involved in the system are New User Registration, Login in Mobile application, Complaint form submission, Block generation and automated email generation.

A. *New User Registration*

This module is used for adding participants to the child rescue application. This step is made mandatory to avoid the unauthorized person from using this application. The User information will be added to the user database. While registration, the users have to enter name, email-id, contact number and password information. One time password will be generated and send to email or mobile to check the details of the person.

B. *Login*

Once registered, the user can log in into the mobile application using the username and password generated in the previous step. With correct credentials, the users can gain access to the portal where they can upload their details and child's photo

C. *Complaint Form Submission*

This module is used for entering lost child picture along with the details such as Name and Phone number of the person who rescued the child. While submitting the form the persons location time and date is also taken which will be send to the respective department by the administrator for further process.

D. *Block Generation*

Immediately after the complaint form is submitted by the user, the administrator will be notified through message in their mobile phone and also the acknowledgement message will be sent to the user. The administrator user can login into the web server using the login and password already provided to them. And then they add the details entered in the complaint form by the user to the block chain. After the block is created, he can also view the generated block reports.

E. *Email Notification*

After successful addition of the blocks, now it is ready to generate the mail. An automated email is generated once the admin clicks on send email where the email contains the information of the missing child's picture and name, phone number, location, date and time of the recue person. This mail which is sent to the respective department will be useful for them to take the action on recuing the lost children. The administrator can also track the lost children cases and set the status of the complaint accordingly and same will be notified to the user who registered the complaint.

VI. IMPLEMENTATION AND RESULTS

The front end was developed using Android studio. Android studio is the official IDE for the android application development. It provides more features that will make the process of application development very easy. Using java with the help of android studio environment we have created an android app that fetches information from the users such as Name ,Phone number and picture of the lost child .we have designed this app in such a way that it fetches the location of the mobile user using GPS system in their mobile phone.

The information's which are retrieved from the users are stored in the database. So, here we are using Microsoft SQL Server Management Studio. Microsoft SQL Server Management is an advanced development environment that enables us to configure, manage and administrate SQL Server database engines. SSMS is very popular and widely used by the database developers and administrators. In our database each set of data is stored with a unique key. It separately stores latitude and longitude of the person's location and Name, Phone number, image in the database. Along with that we have hash code and previous hash code of each data in the database for blockchain technology that we have implemented.

Blockchain is a technology which is used to store the information securely, so that it is impossible to change the stored record. In this technology information will be stored in the form of blocks. Each block will contain the information to be stored and along with that it will also contain the hash value of the previous block and hash value of the current block which make the block immutable.

Changing the value of one block will tamper the data in the entire chain. If we have to change one value multiple blocks need to be changed which is quite a impossible task. For each data in the database, we have hash and previous hash which is stored in the database is fetched in the server side. The type of blockchain we have implemented is consortium block chain using NodeJS. The data stored in the chain is fetched in the server and information's are created as a block by the admin which is used to send email to the respective department.
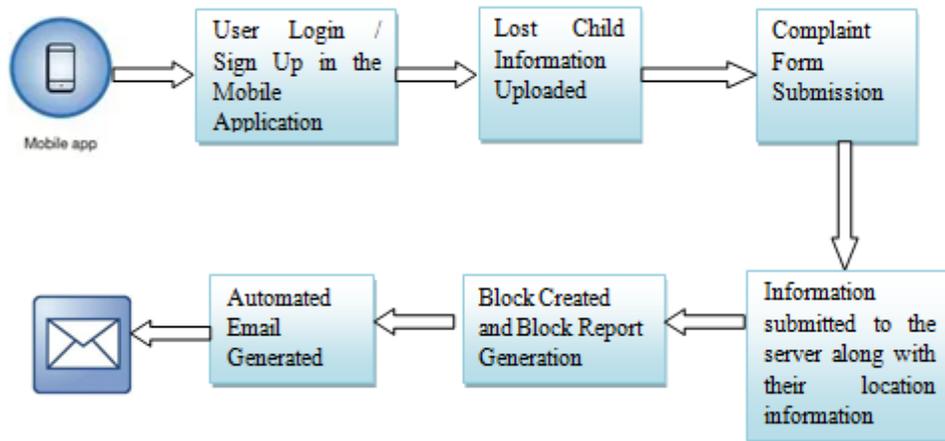
Fig 1. System Block Diagram
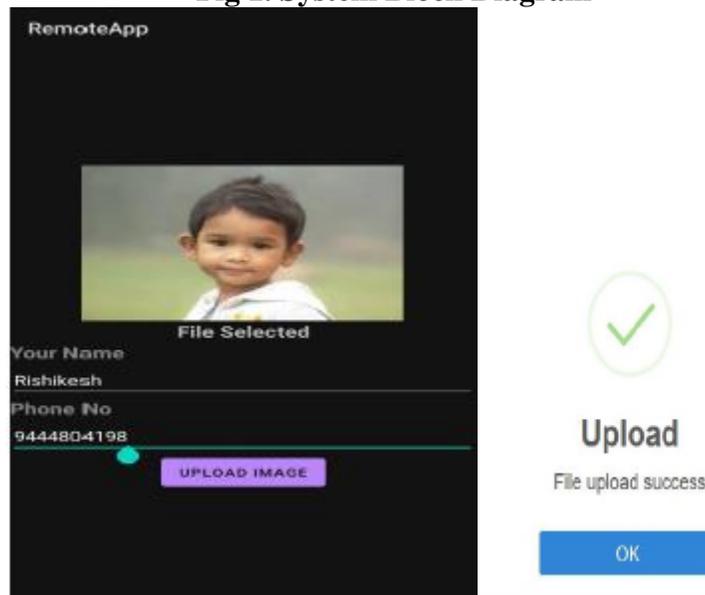
Fig 2. Complaint Form Creation and submission

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Fig 3. Block Report

VII. CONCLUSION AND FUTURE WORK

Thus in this paper, we have developed a novel method to rescue the abandoned child. Having a smart phone alone will make this process very easy. The one who wants to help can easily involve in rescuing the child without second thought. Abandoned child information is also store using block chain securely. An automated email notification will also be set to the respective departments for further action.

Our future aim is to develop this application further by adding social media links in order to seek for help faster and also adding mobile feed so the parents who lost their children can view the feed to acknowledge that any new cases have been filed in their location also women's harassment complaint form will also be added and forwarded to concerned department.

REFERENCES

1. B. Guo, Y. Ouyang, T. Guo, L. Cao and Z. Yu, "Enhancing Mobile App User Understanding and Marketing With Heterogeneous Crowdsourced Data: A Review," in *IEEE Access*, vol. 7, pp. 68557-68571, 2019, doi: 10.1109/ACCESS.2019.2918325.
2. Birari Hetal, Sanyashiv Rakesh, Porje Rohan, Salve Harish, "Android Based Application - Missing Person Finder", IRE Journals, vol 1, Jun 2018
3. Griffin, T. and Miller, M., 2008. "Child Abduction, AMBER Alert, and Crime Control Theater." Criminal Justice Review 33(2): 159–76
4. Griffin, T. et al, 2007. "A Preliminary Examination of AMBER Alert's Effects." Criminal Justice Policy Review 18(4): 378–94.
5. Griffin, T. et al, 2010. "An Empirical Examination of AMBER Alert 'Successes.'" Journal of Criminal Justice 38(5): 1053–62
6. Ledoux, F. and Van Oosterom, H., 2013. "Transportation Mode-Based Segmentation and Classification of Movement Trajectories)." International Journal of Geographical Information Science 27(2): 385–407. http://dx.doi.org/10.1080/13658816.2012.692791 (February 7, 2019).

7. Lin, L. and Goodrich, M., 2010. "A Bayesian Approach to Modeling Lost Person Behaviors Based on Terrain Features in Wilderness Search and Rescue." Computational and Mathematical Organization Theory 16(3): 300–323.

8. Michalitsi-Psarrou, A. et al, 2019. "Complementing Amber Alert: Increasing the Social Sensors' Effectiveness through Focused Communication Channels." In Institute of Electrical and Electronics Engineers (IEEE), 1–7

9. Michalitsi-Psarrou, Ariadni & Ntanos, Christos & Psarras, John, "A collective awareness platform for missing children investigation and rescue", International Conference on ICT, Society and Human Beings, July 2020

10. R. Francese, M. Risi, G. Tortora and M. Tucci, "Visual Mobile Computing for Mobile End-Users," in *IEEE Transactions on Mobile Computing*, vol. 15, no. 4, pp. 1033-1046, 1 April 2016, doi: 10.1109/TMC.2015.2422295.

11. SIGSPATIAL International Conference on Advances in Geographic Information Systems - SIGSPATIAL'17, New York, New York, USA: ACM Press, 1–10.

12. S. Singh, M. J. Baruah and R. Kumar Verma, "Implementation of a Child Rescue System from Borewell using Zigbee for Long Range Applications," 2020 7th International Conference on Signal Processing and Integrated Networks (SPIN), 2020, pp. 1029-1032, doi: 10.1109/SPIN48934.2020.9070843.

13. V S, Thrisha and Reddy S., Vikas, A Study on Smart and Safe Child Rescue System Using Internet of Things(IoT) (August 7, 2020). Institute of Scholars (InSc), 2020, Available at SSRN: https://ssrn.com/abstract=3668732