GPS Tracking, QR code Scanner Based Application to Help the Health Workers and Common Citizens during Covid-19

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Abstract. - At the end of 2019, a novel Corona Virus surfaced as a pathogen and eventually resulted in a pandemic situation. The infection rate unleashed havoc worldwide firstly affecting European nations then the US. So, in this paper we proposed a software application which intakes user data to calculate the threat based on the merits of reconducted survey which prompts the user to check if they are undergoing any of the medically proven symptoms and sends it to the local municipal clinic. This in turn will minimize the need for medical workers to visit door to door constantly at risk of getting infected. This software is equipped with features like GPS tracking, threat level predictor, contamination graph it also determines medicinal urgency etc. Basically, our system is supposed to assist the day to day workers and visit places in scenarios of maximum urgency. This proposed system is used to prevent allowing likely symptomatic as well as asymptomatic users to enter in the hotspot regions’ public places such as malls and markets. The application will generate a unique QR code for respective users which will depict their merit based on mandatory survey that whether that person is affected or not. The QR code can be used in order enter the public area places where scanners are placed.

Keywords - GPS tracking system, QR code, Contamination graph.

1. Introduction
Now days the whole world is suffering from a disease, which is known as Coronavirus disease (COVID-19). The world health organization (WHO) declared the coronavirus disease a pandemic which means it is occurring over a wide area and affecting a high portion of the population. The common symptoms of corona virus are fever, cough, fatigue, shortness of breath but in some of the cases result in mild symptoms like multi-organ failure, septic shock and blood clots. Primarily the
virus is spread between two peoples during close contact, most often via small droplets which is produced by coughing, sneezing and talking. So, to prevent the virus we already have taken some measures. To identify the corona effected persons a team of health workers visit door to door and take the data of family that any of them have fever or not or anyone of the family member travelled intentionally in last 28-45 days. But in this process, there is also a possibility that the health workers can also get effected by the corona virus. So, to overcome this problem we proposed a software application which intakes the user data to calculate the threat based on the reconducted survey which prompts the user to check if they are undergoing any medically proven symptoms and send it to the municipal clinic. This will result in minimise the medical workers to visit door to door at a risk of getting infected.

Basically, this application is supposed to assist the health workers and visit the places in the scenarios of maximum urgency. With the help of the system we can also prevent symptomatic as well as asymptomatic users to enter in the hotspot regions’ public places. Here we also used QR code which can be used in order to enter in the public areas where scanners are placed.

Rest of the paper is organized as follows: Section 2 provides a brief description of proposed systems, Section 3 presents the merits and drawback of our proposed technique, section 4 provides the conclusions and future scope of our proposed technique.

2. Proposed System

2.1. Working Principle

As we know a Novel Corona virus (COVID-19) has loomed large due to its wide spread nature. Our team has come up with an idea to cope-up with this spread and help the health workers to know their surroundings better. This android based application is proposed to work for both human and health workers. Block diagram for sign up process is depicted in Fig. 1.

- There will be a login page with two types of entry. Firstly, for the common civilians and secondly for the health workers. Once they register their names and will have to answer the following questions which will be designed accordingly to identify their status of infection roughly. Along with that civilians will have to enter the number of people there are in their residence and answer the same number of questions for the rough estimate of the infection.

![Figure 1: Block diagram for sign up](image)

- This application when takes user data will calculate the threat and will give a colour to the respective users. The colours will be Red, Orange & Green according to their following threat in a descending order. Now these colours will be given to all the civilians and the health workers, their respective residential folks and will calculate an average and contain the data in a unique QR-code which will be given to an individual.
• Now, this QR-code are unique to an individual and his residence. They can use this QR-code to enter a secure area and use their amenities. Now this QR-code will contain the information like the colour of the individual and the colour of his residence, which can be re-uploaded to a secure server by the health workers after they have done their surveys.

• Since the application uses only colour and nothing else this will be user friendly, no data will be shared except mobile number and their respective profile pictures which is necessary. Hence leakage of other user information is off the charts.

2.2. Process and Architecture of the application

Fig 2. Depict the block diagram for login process. The complete architecture and its application are stepwise explained below:

• Our application follows a standard registration which requires the user to input necessary details such as phone number along with Age, Sex and Profession of the applicant in order to access the application.

• And it assigns a unique ID to the user as soon as the process completes.

![Figure 2: Block diagram for login](image)

• Block Diagram for Self-Assessment test is shown in Fig. 3. Self-Assessment Tests are mandatory once the ID is being assigned. And the survey contains minute details and symptoms that might indicate that the person is COVID-19 positive or not. This will generate a new QR based code that will depict the users’ merit via colours. Red being on the extreme end of the spectrum hence suggesting the person appearing for a survey to be immediately tested and Yellow suggesting that the person is in no risk. This data will be held in servers for a period of a month, then deleted accordingly.
The application can work only when the GPS is switched on. Since it's the only mode that indicates whether there's any risk of contamination near the user's vicinity (Area of Residence). This data is updated on an hourly basis automatically and whenever the user chooses to open the application, which is encouraged highly if the user is involved in professions that demand staying outside in public and their contact with strangers is unavoidable.

Supposedly when two users come in contact with each other, the application will rely upon the Bluetooth connectivity which will further inform the users of the merit scores of opposite persons. Bluetooth connectivity allows the application servers to fetch new information regarding the movements of the user and makes the user aware of areas that fall in the red zone category. Since Bluetooth is composed of radio frequency signals, the accuracy faces a limitation when compared to GPS. But it makes up for the loss by being much less energy consuming. And GPS cannot be relied upon in indoor situations whereas Bluetooth excels.

The users are encouraged to appear for self-assessment tests frequently and honestly. The self-declared results are important as it may compromise the health of the people and the user in itself if the user chooses to hide information. If the process is completed in an ideal fashion the user who is COVID-19 positive will be taken under custody and sent to nearest health centers. The contact information will be uploaded to the Government servers and the data will be retained for two months. And a user who are under the weather or has symptoms like common cold or headaches are suggested to self-quarantine immediately without compromise. Until the symptoms cease to exist.

If a user is found to be COVID-19 positive the area that the user lives in, the places the user has visited, People who have come in contact with the user, all will be sanitized and tested for contamination accordingly. The area of the user's residence would be marked as an infected zone.

The collected data is a matter of personal safety and the data will be uploaded in an encrypted manner. The data will be updated and uploaded to a server regularly. The COVID-19 + patients' data will be retained for a period of two months for safety issues. And the users who are safe, their data will be erased once a month passes. After a month a new dynamic unique ID generation will be taking place in order to make the detection procedure robust and safe rights.

As a registered user, you have the right to access your profile at any time to add, remove or modify any registration Information that you have supplied.
In a case where the account holder chooses to cancel the registration, the account information will cease to exist after 30 days from such cancellation.

Except for Information disclosed to personnel carrying out medical and administrative Interventions necessary in relation to COVID-19, no personal information collected by the Application will ever be disclosed or transferred to any third party.

The app is equipped with standard security features to protect the confidentiality and security of the users’ information. Data is encrypted in transit as well as the rest. Personal information provided at a time of registration is encrypted before being uploaded to the cloud where it is held in an encrypted server. Personal information that is stored inside the application about other registered users that you may have in contact with is securely encrypted and are incapable of being accessed by such users.

Advantages and disadvantages

Advantages
- The application will help the Health workers because if they use this app then there is no need to visit door to door and as a result there will be less possibility of getting affected.
- With the help of GPS tracking system higher authority can easily identify the proper address of any infected person.
- In the application the QR code helps to detect the infected person.
- The proposed application will have secured database which will secure all the user details.

Disadvantages
- As the application needs constant internet connection. So, it cannot be used if there is no internet connectivity.

3. Conclusion and Future Scope

In this paper we proposed a user-friendly application which can intakes data from user and also calculate the threat on the basis of reconducted survey. So, the need of the health workers to visit door to door will be minimized. So, the possibilities of getting effected the health workers will be reduced. With the help of GPS tracking system, contamination graph and threat level predictor we can easily detect the medicinal urgency. Here we also generate the QR code for respective users through which we can detect that the person is affected or not. So, the whole application will be very helpful for the health workers and as well as the citizens.

Now days in this pandemic situation this application is very useful for the health workers and as well as for the citizens. As here we are using QR code scanner so in future we can use this application for security purpose also.

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