



DESIGN FRAMEWORK OF REALTIME COVID-19 ALERTS AND TRIGGER

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ABSTRACT

In this paper, we proposed Design framework of realtime covid-19 alerts and trigger. This design framework proposes a framework about coronavirus alerts which frequently notifies people about the spread of coronavirus. It provides notification which

contains information about the current covid-19 cases, discharged cases , total number of cases and total number of deaths due to this infectious disease. Corona-virus tracking is essential for health-management organizations and individuals as well to be updated with

the information. Therefore , as the need to provide frequent updation about covid-19 to user we decided to propose a system which gives alerts to user and hence there is no need for user to visit other website and check again and again for covid-19 cases .As they will get automatic notification after certain time interval. The proposed system uses Machine learning together to combat the spread of Coronavirus Alerts are enabled by the user and are triggered after certain time interval. System alerts are system events that have passed a pre-defined threshold and that provide Services that contain information about the spread of covid. Thus for tracking the covid-19 cases and using the latest technology isa better alternative instead of checking the current covid-19 cases again and again.

Keywords: Machine learning, covid-19, Safety , Alerts and trigger, Heath-management,Virus tracking.

1. INTRODUCTION

Corona virus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus.The virus can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breathe. These particles range from larger respiratory droplets to smaller aerosols. Anyone can get sick with COVID-19 and become seriously ill or die at any age.COVID-19 deaths are a key indicator to track the evolution of

the pandemic. However, many countries still lack functioning civil registration and vital statistics systems with the capacity to provide accurate, complete and timely data on births, deaths and causes of death. A recent assessment of health information systems capacity in 133 countries found that the percentage of registered deaths ranged from 98% in the European region to only 10% in the African region.Countries also use different processes to test and report COVID-19 deaths, making comparisons difficult. To overcome these challenges, many countries have turned to excess mortality as a more accurate measure of the true impact of the pandemic.

In many cases, medical science and medicaments have prevailed over diseases through knowledge, expertise, capacity and medicaments applied to disease management Through the integration of technology in the spectrum, instrumentation and control campaigns, robust systems including those with real-time capabilities have been developed and implemented across different socioeconomic sectors of the global society including the health sector. In the area of public health management, medical alert system have been developed to manage patients . Using these platforms, information dissemination, disease prevalence and position tracking of carriers, confirmed carriers and status of treated patients could be easily managed. Coronavirus notification system will help you to easily get updated about the latest information.

2. OBJECTIVES

Following are the main objective of Design Framework of Real-Time covid-19 alerts and trigger:

To develop a system that helps people to save time

- To develop a system that helps people to stay updated with the current information.
- To develop a system that uses technology for healthcare.
- To provide covid-19 alert triggers to user.

3. RELATED WORK

Sunwoo Lee proposed the application of Applying a Deep Learning Enhanced Public Warning System to Deal with COVID-19. Public warning systems are being actively used to provide COVID-19 information to people to avoid additional infections. The explosion of COVID-19 warning messages has caused redundant and unnecessary transmission of warning messages. This study propose an enhanced public warning system. First, a generation model based on deep learning is proposed for automatically generating the coordinates of the broadcast area. Second, the public warning system is modified to provide additional warning information to the users. Finally,

a customization scheme for warning information is presented; therefore, the number of redundant and unnecessary warning messages decreases. The proposed generation model is evaluated by measuring the overshooting area and it is compared with the ground truth image. The output of the polygon generator and the circle generator show an image that is similar to the ground truth. The proposed public warning system was implemented and a test scenario was conducted for the validation. The results demonstrate the feasibility of the proposed public warning system.

Tianbo Gu proposed how Blockchain Meets COVID-19: A Framework for Contact Information Sharing and Risk Notification System in which He specifies that COVID-19 is a severe global epidemic in human history. According to Roy et al. (2020), more than 80% of people over 18 have shown the need for attention to their mental health as a result of the anxiety and stress experienced during the pandemic. Forte et al. (2020) agree with this idea, stating that the pandemic has caused stress, psychological discomfort, sleep disorders, and instability, among others, in a large part of the population.

Even though there are particular medications and vaccines to curb the epidemic, tracing and isolating the infection source is the best option to slow the virus spread and reduce infection and death rates. There are three disadvantages to the existing contact tracing system: 1. User data is stored in a centralized database that could be stolen and tampered with, 2. User's confidential personal identity may be revealed to a third party or organization, 3. Existing contact tracing systems only focus on information sharing from one dimension, such as location-based tracing, which significantly limits the effectiveness of such systems. We propose a global COVID-19 information sharing and risk notification system that utilizes the Blockchain, Smart Contract, and Bluetooth. To protect user privacy, we design a novel Blockchain-based platform that can share consistent and non-tampered contact tracing information from multiple dimensions, such as location-based for indirect contact and Bluetooth-based for direct contact. Hierarchical smart contract architecture is also designed to achieve global agreements from users about how to process and utilize user data, thereby enhancing the data usage transparency. Furthermore, we propose a mechanism to protect user identity privacy from multiple aspects. More importantly, our system can notify the users about the exposure risk via smart contracts. We implement a prototype system to conduct extensive measurements to demonstrate the feasibility and effectiveness of our system.

4. SYSTEM DESIGN

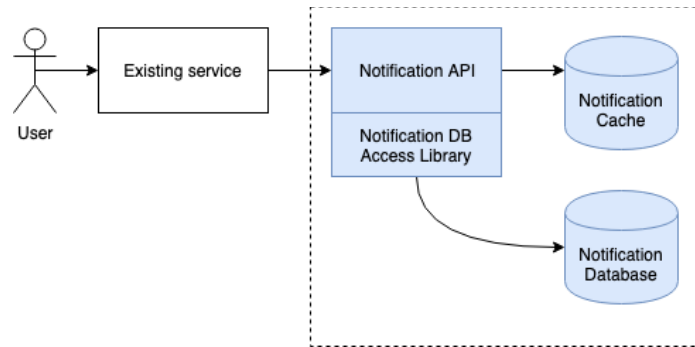
A. THE NOTIFICATION PROCESS FLOW STEP:

1. Notification Trigger Time and Conditions (when and what)
2. Notification Sender (who discovered the matter)
3. Notification Recipient (who needs to know)
4. Notification Access Channel (how to find him)
5. Notification Content (tell him what)
6. Notification Operation Feedback (what can he do) = read + operation feedback. Read-only, that is, the user does not need to do more operations after browsing.

B. SYSTEM COMPONENTS

1. Notification Service:

- 1) Create and delete a notification entry via an API
- 2) Forward the message to the respective recipient



2. Bulk Notification Handler

Deliver those messages to selected people or a selected group of people or a certain group or all.

3. Notification Handler & Preferences

Decide if the user wants to receive those message

4. Rate Limiter

Control or limit the notification flows as per necessity to handle and balance the load of notification

5. Notification verification, validation and prioritize (Notification setting service)

Metadata contain its destination and source and label/remark for priority .Still receive notification if the system check and verifies if the notification is still relevant to the user

Priority: Urgent, important, high, medium, and low

6. Event Priority Queue

Process and validate message before sending to notification handler service

7. Notification/adapter

Transmits message to the various supported adapters before sending to notification dispatcher. Use case requirements: OTP adapter service, SMS adapter service, Email adapter service,

In-App notification adapter service, WhatsApp notification adaptor service, telegram notification adapter service.

8. Notification Vendors

Provide transmission using their infrastructure like AWS, SNS, MailChimp before sending to notification dispatcher Use case requirements: SMS Vendor Integration Service, Email Vendor Integration Service, App Push Notification Vendor Integration Service, WhatsApp Vendor Integration Service, Telegram Vendor Integration Service.

9. Notification Dispatcher

Will deliver the message notification to the respective device

10. Notification Tracker

Tracks dispatched notification, will log data for the notification is delivered, received, opened, or seen. The metadata will have information like, time of notification dispatched, delivered, opened, and seen, message type, device, communication channel

11. Scheduling Service:

- 1) Provide schedule notifications
- 2) Second, minute, hourly, daily, weekly, monthly, yearly, customer frequency

12. User Profile Service:

- 1) Store and manage users profile and their preferences
- 2) Provide unsubscribe and subscribe for notification
- 3) How often does the user want to receive

13. Notification DB:

- 1) Store all notification messages with their delivery time and status
- 2) Metadata contains the destination and sources
- 3) It should be a no-SQL database

14. Notification Analytic Service:

- 1) Analyze and identify notification usage, trends
- 2) Using Cassandra as an analytical DB
- 3) Notification DB for reporting purpose
- 4) Use case: Total number of notifications per day, what application take highly used notification system, the average size, and frequency of message, message priority, who often send or communicates with the user, and many more

15. Cassandra Database Cluster:

- 1) Design for writing more and reading less
- 2) Good performance and low latency for the high number of notifications

16. Inbound Service:

- 1) Inbound notification service expose API endpoint to the external client application to send inbound message
- 2) The inbound event hub is used to queue and process all incoming inbound notification message
- 3) Inbound Handler will consume all incoming notification messages from the Inbound topic
- 4) Inbound Notification clients DB store the internal and external sources and clients application device, ID

C. DIFFERENT NOTIFICATION SYSTEM MODEL:

1. PUBLISH SERVICE PATTERN:

- 1) Many users can receive the same message sent from a single or many sources
- 2) The sender will push messages to the message queue service based on the message type and the rules which are applied

2. PULL-BASED APPROACH:

- 1) Without a message queue
- 2) Each user poll the server to check if any messages are updated from their following article, friends, service, or webpage
- 3) If the system detects the existing new posts, the system will pull up all the recent posts created and display them on the user's home page.
- 4) The disadvantage is that it will consume a lot of bandwidth and unnecessary load on the database. It is not real-time possibly.

3. PUSH-BASED APPROACH:

- 1) Payload is applied. The system will update the database to store the post, and also send the content of the post to the message queue, which is called a payload.
- 2) The message queue will asynchronously push the message to the users once the Internet is connected.
- 3) No polling the database within periodic intervals
- 4) What if the offline users, the system will store the message in the message temporary storage within an expiry time (usually less than a week)
- 5) Require user ID for the system to send messages accordingly

D. THE CONDITIONS OF A GOOD MESSAGING NOTIFICATION SYSTEM:

Comprehensive: The message notification can provide a better-updated content of the message completely and comprehensively

Timely: The way to reach the user with the message should be timely and effective

Efficient: To avoid excessive message intrusion to users by allowing to group messages based on the senders or group member senders into so that users can process messages without confusion.

E. FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS FUNCTIONAL REQUIREMENTS:

- 1) Send notifications
- 2) Prioritize notifications/ turn-on or off the application notifications, categories the message from the settings
- 3) Adjust notification sequence based on the user's saved preferences (User preferences)
- 4) Single/simple and a bulk notification message
- 5) Provide read-only or read and operation feature to notification messages
- 6) Any notification can be canceled at any time because the user remove the user ID from the client-side application.
- 7) No same notification twice
- 8) Log every notification dispatched, delivered, opened, seen, unsuccessful, canceled.

NON-FUNCTIONAL REQUIREMENTS:

- 1) Low latency
- 2) Highly available (Handling exceptions when any component failure occurs)
- 3) High performance (real-time)
- 4) Support as many devices as possible
- 5) Durable — Message should not be lost, no duplication
- 6) Scalable — Support a large number of publishers, subscribers, topics, and users
- 7) Decoupled — follow the SOLID principle, and merge with another notification system
- 8) Pluggable — Provide API integration with the other client applications.

5. SYSTEM IMPLEMENTATION

To implement this system we have designed a website in which user needs to subscribes for the notification to start after hitting on subscribe button on website the notification will start and update user after certain time interval.

The different modules are:

- 1) Home
- 2) About Us
- 3) Contact us
- 4) Blogs

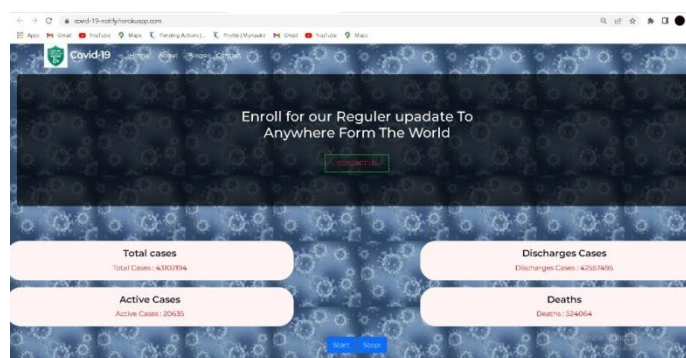
1) **Home Page:** The home page of the website displays covid-19 information about different cases and precautions to take to stay prevented from covid-19

2) **About us Page:** The About us page of the website displays information about steps taken by government and the information of how this application helps user

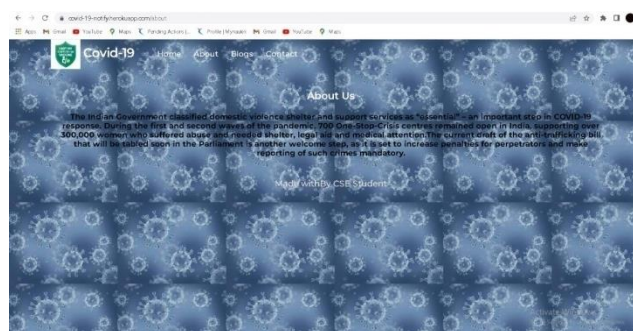
3) **Contact Us:** In contact us page if the user has any query regarding covid-19 can click on contact us and will be redirected to another website to raise query.

4) **Blogs:** The blog section of the page displays some well known blogs related to corona virus and the effects of corona virus on business and human life.

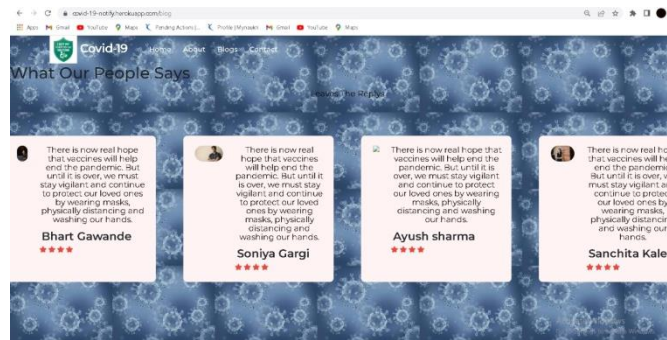
COVID-19 pandemic has resulted in loss of lives of thousands across the globe. Socially and economically, the burden it exerts on governments and societies is quite huge. Having taken into cognizance the damages the pandemic could cause, it is believed that it would be ideal to conceptualize and evolve a technological tool that could assist in managing the challenges presented. Consequently, analyzed and designed an alert and tracking system. Using this technology, will automatically update the user with latest information by notifying them within a certain time limit set. The user will get notified after the certain set time interval ends, the new notification will be sent. This system will give you the real-time update about the number of new cases, deaths, and the recovered cases of corona-virus according to time. For implementing this technology we will use python language and its associated library. Notifications always contribute to the overall user experience, improve productivity, and help users accomplish their goals without annoying the recipient with unimportant information.



As in the above it is visible that the site provides information about this disease as well as two buttons start and stop to start and stop the notification



As we can see in the above image the about us section of page The About us page of the website displays information about steps taken by government and the information of how this application helps user



In this image we can view different blogs related to covid written by various bloggers that how covid-19 affected farmers ,businessman, human-life, economy and how are they recovered



This image shows how notification will be visible to user during work.

6. CONCLUSION

The goal of design framework of real time covid-19 alerts and trigger is to design a notification system to connect it to the government official web site. In this application we scrap data from government official website using web scrapping and thus modify it to use in our application .we used government official website to get accurate information. It achieve high and quick organize and hence save time, effort by connecting application to the official website using latest technologies. It provides a wide range of information about total cases, discharged cases ,active cases and total deaths Alert/Notification systems can be used to effectively transmit alerts and warnings to emergency responders. Through quick delivery of an emergency message, emergency responders are able to respond when necessary. Going forward, we conclude that it is possible to implement a system that could be used to notify cases locally or remotely and that it is possible to tag and track confirmed cases and suspected-case

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