COVID 19 – Tracking and Management System (CTMS)

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Abstract. As concerned individuals and pursuing engineers, we are greatly affected by the adversity of the implications of the Corona Virus and thus decided to come up with a solution that aims to create a digital tracking and monitoring system so as to pacify the panic that is generated from the implications and severity of the COVID-19 virus. This digital solution system is targeted to help the masses in obtaining all the relevant and necessary information related to the scenario that would keep them well informed and updated and also give them an immediate and preliminary assistance if they develop the symptoms of the COVID-19 virus so as they can be subjected to immediate medical care and attending.

Keywords:
• Coronavirus
• COVID – 19
• China
• Digitalized
• Tracking and Management System
• Health and Welfare
• Mobile Application

1. Introduction
The COVID-19 virus which had its first outbreak as a pneumonia with unspecified aetiology in Wuhan district of China in the year 2019[8] took the form of a pandemic and rose to a huge global threat level within a significantly short period of time, i.e., 4 months precisely while affecting a huge number of people and killing several thousand under its wake. The COVID-19 or the Corona virus is responsible for causing normal to severe complications and respiratory failures inside the body of an affected victim. Corona viruses belong to a detailed family of viruses that cause health complications such as common cold, headache, dizziness, fever and even severe health complications such as Middle East Respiratory Syndrome (MERS), and Severe Acute Respiratory Syndrome (SARS)[4][5], both of which having high mortality rates in an average human being. But COVID-19 is distinct in its characteristics as it has prominent properties such as prominent infectivity rate and thus spreads among groups of people without any signs of indication at an unprecedented rate.
COVID-19 or the Corona virus had its first outbreak in the month of December in the Wuhan district, Hubei province of China [4][5]. Although there are several speculations regarding the outbreak of the virus, but nothing has been officially proven yet apart from the presumed declaration from the Republic of China which at this stage is significantly debatable. Immediate symptoms for speculating or assuming whether a person is infected with the COVID-19 virus are dry cough, fatigue, fever, common cold.[5]
This virus is spread basically through two types of carriers that being - Asymptomatic Carriers (People with no symptoms of the virus whatsoever) and Symptomatic Carriers
(People with the basic symptoms of the virus and who need immediate medical tests and subsequent care).

As officially declared by WHO\cite{1} and other concerned administrative bodies, the virus is not air-borne and thus the only medium of spread is through person to person contact in the form of touch, oral discharges through coughs or sneezes, etc. The virus has the characteristic ability to contaminate a surface it’s infested upon for a period of around 3 to 6 hours after which it gets disintegrated. Up till now, no beneficial treatment has been discovered; nevertheless, clinical trials probing the efficiency of multiple agents, consisting of Remdesivir and Chloroquine, are on-going in China.\cite{6}\cite{7}

2. Solution Methodology

As concerned individuals and pursuing engineers, we were greatly affected by the adversity of the implications of the Virus and decided to come up with a solution that aims to create a digital tracking and monitoring system so as to pacify the panic that is generated from the implications and severity of the COVID-19 virus. This digital solution would help the masses in obtaining all the relevant and necessary data revolving around the crisis that would keep them well informed, well updated and also give them an immediate and preliminary assistance if they feel that they have been affected by the COVID-19 virus so as they can be subjected to immediate medical help. The application is to be known as CTMS and the targets to be achieved are as follows:

2.1 Real Time Notifications from the Government (State & Central) Regarding the Wake of the Pandemic

The application will access and retrieve information, recent declarations or releases such as Lockdown notifications and guidelines, feeds from the office of the Prime Minister of India, and all Novel Coronavirus related statistics such as total number of cases, number of casualties and the number of people that have been cured of the virus from the key governmental bodies that are working in regulating the pandemic situation such as the Ministry of Health and Family Welfare (MoHFW)\cite{3}, and the official website of the Government of India. Also, these data would be updated daily for real time analysis.

2.2 Region Wise Concentration of Covid-19 Affected Patients and Region Wise Hotspot and Sensitivity Concentration Matrix

The application will access and retrieve region wise concentration of Novel Coronavirus affected patients all across the country and would also show the list of locations around the country that has been deemed as hotspots by administrative bodies and also segregate regions of the nation as various zones such as Red, Orange and Green by obtaining data from the official portals of Ministry of Health and Family Welfare (MoHFW)\cite{3}, and the Government of India and the respective State Government.

2.3 Record Personal Data Such as Name, Address, Location of the Consumer

The application will record personal data from the consumer such as Name, Address, Geographic location using mobile’s in-built GPS sensor, Phone number to perform some key functions while taking privacy concerns into consideration in order to safeguard the personal data shared by the consumer.

2.4 Assess the Nearest Concentration of Covid-19 Patients and Sensitivity of the Pandemic around the Consumer

The consumer would be able to track the total number of Novel Coronavirus infected patients around him/her within a diameter of 5 kilometres and would also be able to check the status of his region of residence as Red, Orange or Green. All relevant data would be procured from official portals of the respective State Government, the Government of India and other concerned key bodies.
2.5 List of Nearest Government Approved Covid-19 Hospitals and the Number of Available Beds in Real Time

All the government approved COVID-19 hospitals would be notified and requested to update the number of available beds for COVID-19 patients at each day which would facilitate the consumer to check the nearest hospital for COVID-19 treatment should he/ she feel the need of emergency. This feature will work in collaboration with Google Maps, in-built GPS service and the aid of the respective State government and the concerned hospitals.

2.6 Point Based Virus Assessing Methodology That Would Determine the Possibility of a Consumer Being Infected by the Virus Where the Factors Will Be in Adherence to WHO\textsuperscript{[1]}, NICET\textsuperscript{[2]}, And MoHFW\textsuperscript{[3]}

With the help of the application, the consumer would be able to check for symptoms of the virus in himself/ herself. This would be done by a point based virus assessment methodology wherein the consumer would have to select from a list of symptoms related to the COVID-19 virus as laid out by key bodies such as the WHO\textsuperscript{[1]}, NICET\textsuperscript{[2]} and MoHFW\textsuperscript{[3]}. If the consumer agrees to having more than or equivalent to 3 symptoms for a duration of at least 24 hours, it would generate him a point of 3 or more. A score of 0 would signify a healthy individual, a score of 1 or 2 would mean a potential candidate and a score of 3 or more would indicate that the consumer is infected. If the score is more than or equal to 3, then the person’s credentials such as Name, Phone Number and Location would be sent and notified to a concerned body such as the nearest District Administration or the nearest Municipality and Police Station for further proceedings. The consumer may also choose to contact relevant authorities directly from the application via call and text message services.

2.7 Consumers Will Also Be Able to Notify Their Nearest Covid – 19 Authorities for Any Suspects or Anomalies in Their Area

The consumer will be able to report any potential suspect or discrepancies near their residence directly from the application to the concerned administration for further inspection by the same.

2.8 Consumers Will Also Be Able to Locate Their Nearest Ration Dealers/ Shops and Prominent Markets for Their Daily Necessities

The consumer would be able to check the availability of shops selling essential commodities and ration shops through the application within his/ her vicinity of 1km. This feature would be facilitated with the help of Google Maps, data from State Government and the in-built GPS service of the consumer’s device.

3. Unique Features of Our Application

3.1 Point Based Virus Assessing Methodology That Would Determine the Possibility of A Consumer Being Infected By the Virus Where the Factors Will Be In Adherence to WHO\textsuperscript{[1]}, NICET\textsuperscript{[2]}, And MoHFW\textsuperscript{[3]}

This would be done by a point based virus assessment methodology wherein the consumer would have to select from a list of symptoms related to the COVID-19 virus as laid out by key bodies such as the WHO\textsuperscript{[1]}, NICET\textsuperscript{[2]} and MoHFW\textsuperscript{[3]}. If the consumer agrees to having
more than or equivalent to 3 symptoms for a duration of at least 24 hours, it would generate him a point of 3 or more. A score of 0 would signify a healthy individual, a score of 1 or 2 would mean a potential candidate and a score of 3 or more would indicate that the consumer is infected. If the score is more than or equal to 3, then the person’s credentials such as Name, Phone Number and Location would be sent and notified to a concerned body such as the nearest District Administration or the nearest Municipality and Police Station for further proceedings. The consumer may also choose to contact relevant authorities directly from the application via call and text message services.
3.2 Fully Digitalized Economic Assistance System for The Needy Sections of The Society

There are several thousands of people who work as daily wage labourers or are in similar professional fields that have lost their jobs due to the existing lockdown scenario and thus are in a huge financial crisis which is making it very difficult for them to survive and there are also many kind hearted people who want to help these people out but do not have the non-financial resources do execute the same. Hence through the app both these sections of people would be able to register themselves under duly categorized sections for either making contributions or to receive the same. There will be a certain eligibility criteria and credibility safeguarding methodology which would ensure that the ones getting the aid are deserving candidates to properly regulate the funds to the proper sections of people. People who want to make these contributions would have to register themselves with certain credentials to maintain proper records and to avoid all legal and financial discrepancies.
3.3 Real Time Monitoring System for Checking the Number of Available Beds In The Nearest Covid-19 Hospitals And Quarantine Centers

There will be an added exclusive feature for the users to check the number of beds available for COVID-19 treatments at real time. This feature will be implemented after successful coordination with the COVID-19 marked hospitals and also the respective state and district administrative authorities. There should be a dedicated update on the number of beds available and the number of beds already occupied at the respective hospitals by the hospital management at regular intervals.
Conclusion
In these times of crisis, the fabrication of this concept into a mobile application would offer great support and strength in the minds of people who are maintaining the guidelines of lockdown and social distancing as this application would significantly reduce panic and dilemma in the minds of the people as they would be properly informed about the guidelines and measures that they should undertake so as to avoid contamination with the virus and also follow the concerned countermeasures. This application also aims to digitalize the entire tracking methodology for the COVID 19 affected regions and also assesses the consumers for a potential virus threat and should the need arise would be able to autonomously report the same to the concerned authorities. For utmost successful outcomes from this application, substantial collaboration and help is required from key governmental organizations and thus in times such as these we all need to work together for a better today and tomorrow. All the features offered by the application is believed to greatly contain the spread of the Novel Coronavirus so that we can all be free from the wake of this pandemic at the earliest possible.

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