

Final Course Paper (Micro Research)

Smart&SafeCovid19 Platform

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ABSTRACT

Till now only way we realised that can control the covid19 is social distancing and minimizing the movement of people across towns that help in breaking the chain early and currently police is doing this job and as a result some are even getting infected. Now, many agencies are turning to AI to support in unique and innovative ways by increasing the surveillance, monitoring, and detection of the capabilities that are on their priority lists. It could help in getting the infected man travel history, illegal inter-city movement without pass and could help in many more ways.

This paper focuses on considering the current situation and solving this problem, how we can use our existing [IAS platform services](#) and additional services that are currently not part of our platform for such an application, algorithm, kind of sensor streams will be needed to automate the current scenario to reduce human contact and manage the crowd.

Introduction

In the current scenario, a novel coronavirus spillover event, has emerged as a public health emergency of international concern. This pandemic has triggered an unprecedented demand for digital health technology solutions and has revealed successful solutions such as for population screening, tracking the infection, prioritizing the use and allocation of resources, and designing targeted responses. In this paper, I will describe how our platform can be used with additional services to build SmartSafeCovid19 Platform which will be a platform that will provide services to fight against Coronavirus.

Background Work

Gradually lockdown will be lifted in India to sustain our economy. But recently we have seen that [how people forgot Coronavirus](#) and [how unruly crowd didn't follow social distancing norms](#) when shops are opened after many days. Thus, the government would have to keep a check on whether social distancing is properly followed or not remotely using this type of platform which we are discussing in this paper.

Related Work

Tracking Social Distancing

To achieve this, CCTVs can be deployed at public places. They will continuously monitor public movements. This data will be fed to a trained model that would be deployed on systems controlled by policing authorities. The model will estimate the distance b/w each pair and then changes color to indicate if the minimum threshold is not maintained at a particular location. Using this, the law and order authorities can take necessary action and manage the crowd remotely. *Figure 1 and Figure 2 are the snapshots of a CCTV footage.*

Other useful works

Other means of increasing the surveillance, monitoring, and detection include early warnings and alerts, tracking and prediction of active cases such that government can prepare in advance for the number of hospital beds required,



Figure 1. On the left is a feed of individuals strolling around in the city. On the right, a bird's-eye chart represents each one as a dot and turns them splendid red when they move excessively near another person.

Source: Analytics Insight

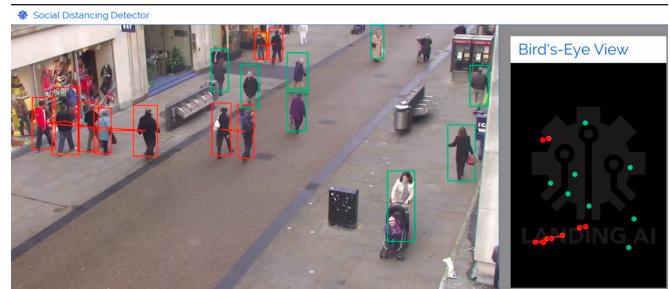


Figure 2. Figure 2 has more red dots as compared to Figure 1 and one big cluster of people can be seen in the left part of image.

Source: Analytics Insight

data dashboards, diagnostic AI, social media monitoring to let people make aware of the fake news, surveillance systems, using computer vision for scanning patients, AI prominence in drug discovery, intelligent drones and robots for the distant monitoring, intelligent systems to scan patient health scans and reports, robot assistance in providing 24*7 healthcare services, telehealth or virtual care. Some other applications are virtual healthcare assistants(chatbots), facial recognition and fever detector AI, etc.

The Chinese company SenseTime has developed a platform that **scans people's faces even if they wear a mask**, so that identification check can be done without removing masks.

Proposed Solution to the given Problem

In this paper, I would propose an All-in-one AI based platform which can deploy a variety of the usecases including some which are discussed above by using the suitable algorithms for every test case to reduce human contact and manage the crowd remotely.

We can use crowd formation analytics for crowd surveillance that will trigger real-time alerts to the Police Command Center. This will help the Police to disperse the crowd using Drone speakers or loudspeakers making a significant distance from the crowd. Adding to that we could also have an **emergency pass system using Chatbot**(as *thousands of people thronged the police offices and the police had a tough time ensuring social distancing*), and drones-based surveillance for crowd formation. We can also have virtual healthcare services deployed in this platform such as **drone with AI camera** to detect people who may have COVID-19, drones can also be used to **deliver medicines, collect blood samples and spray sanitizers in containment zones**, or wherever required.

Using our platform and other services to solve this problem

The components that can be used in our existing IOT-based platform:

- **Configuration of various sensors and their data collection:** We can configure the various sensors and take the data from them according to the use case. For example, in the crowd surveillance use case, we can take the real-time video streams with very small poll rate, which can be configured in our platform by making the configuration of this new sensor according to the required data rate. For patient's health monitoring use case, the temperature sensor could be used with poll rate of 12hours. *The user can configure the sensors by adding their respective config json file, whose format is mentioned in our report.*
- **Composing an algorithm for the usecase and upload it to the platform to compute and solve the problem:** We can upload various algorithms, such as for the usecase defined above to track social distancing, models which can measure the separation between people on foot in public areas can be defined. Utilizing a traffic light indicator system, the algorithm can secretly identify and label people who keep up safe distances, while hailing certain cases in red where social distancing measures are disregarded. *The user can provide one/many service or algorithm files defining his application or use case(code files) on the portal under 'Upload Algorithm' section.*
- **Scheduling the various tasks:** The different algorithms demand different types of scheduling such as temperature checking algorithm needs to take temp every 12 hours, drone should spray sanitizers on a daily basis, but medicine delivery would be done on demand, also there are high priority scheduling that must be done real time such as notification of gathering of huge mob. Hence, there must be different types of scheduling policies and our

platform is already handling their different kinds such as scheduling periodically, running on a fixed time, instantaneous(High Priority) scheduling. *The user can exchange his application metadata file as "app.meta" defining scheduling information as to when to start a service/ algorithm.*

- **Load Balancer:** Scheduler asks the load balancer to give it a runtime environment. So, this service will run just like our platform except the fact that the number of machines required will be more since Covid related tasks involve more people, and hence many more runtime environment required.
- **Requirements:** Since SmartSafeCovid19 platform involves Artificial Intelligence, many packages related to AI and other dependencies should be mentioned so that they get installed. *The user can define the dependencies required by his application in "app.config" file.*

Additional Services Required:

- **User authentication Service:** In the present scenario, there could be many users such as the common man, the police, the government officials,etc. We could design a generic platform for different type of users, such that each user will only be shown the data which is intended to be accessed by him/her. To achieve that, we must have a user authentication module in our platform which is currently not there.
- **Big Data Processing Service:** The collected data of Covid19 could be very big and would require intensive processing or analytics to generate well-formatted results. In that case, our old platform would take a very long time to process anything or may cease to work. But we need fast search/access. Within the SmartSafeCovid19 platform, all unstructured data would be saved as files into HDFS, the Hadoop Distributed File System using distributed hash tables. Within HDFS, big files are divided into small chunks to be evenly distributed across a set of data nodes and the locations of all chunks are indexed by a name node. Also, we can make the platform more efficiently distributed by scaling i.e., adding up more nodes, to achieve the bigger objective of fast processing of this big data.
- **Security Service:** Data Security is very important at this point of time when tracking is done enormously. One recent example of security breach is Jio coronavirus symptom checker security lapse. So our platform must be made more safer by using proper techniques and henceforth a security module is also required in our platform.
- **Flexible Action and Notifications Service:** Since the user types can be many, the different tasks may require different kinds of notifications as an output. For example, when the algorithm tracks a massive crowd, a siren should go off, when the user is a e-pass applicant, notifications like emails, messages should be sent to notify user about it's pass status. And also there must be different Emergency Siren tones for signalling different kinds of threats. So, overall what

kind of notifications must be triggered in different tasks must be taken up by the user for each usecase.

Comparing Existing Platforms

- **Healnet** The platform from healx.io assists the finding of appropriate drug combinations for battling COVID-19 and improve immune response.

This drug discovery process will focus on finding two or more approved drugs that target areas of COVID-19's pathology.

Healnet overcomes the challenge of analysing in detail all possible combinations out of the 4,000 available approved drugs on the market by generating success predictions, using biometric data from multiple sources.

- **IDentif.AI** Conventionally, during the emergence of dangerous new viral and bacterial infections, the immediate response is to devise a treatment methodology that integrates many different drugs. But such a process is not only time-consuming but also difficult.

While the combinations of drugs are selected sub-optimally, and dose selection simply becomes a matter of trial and error. This inefficient and expensive method of creating a treatment methodology becomes a problem when a quick response is critical for dealing with a global pandemic emergency and when resources had to be conserved. Keeping this aspect in mind, the (AI) platform called *IDentif.AI*, short for Identifying Infectious Disease Combination Therapy with Artificial Intelligence significantly boost the efficiency of this development.

Both the platforms discussed here are COVID19 medicine discovery specific in the sense that they assist particularly in drug discovery and Combination Therapy. In contrast, our platform is very generic in nature. One can develop and deploy all kinds of applications ranging from data analytics, COVID forecasting, monitoring services, virtual healthcare services to remote crowd management, emergency pass system and smart-drones using our platform.

Observations

Clinical data can be highly variable in terms of quality and consistency in case of a pandemic. Complications of this sort include cases of false-positive patients. Big data and AI can be employed to check compliance with quarantine, and machine learning can be used for drug research. These are just some of the solutions offered by new digital technologies to face the coronavirus emergency.

However the existing AI platforms are not yet playing a significant role in the fight against COVID-19, at least from the epidemiological, diagnostic and pharmaceutical points of view. Their use is constrained by a lack of data and by too much noisy and outlier data.

Finally, we can say that unbiased time series data is essential so that AI can be used as an effective tool against this pandemic.

Conclusion

Among the many Smart City initiatives, it turns out that the ability to have an overarching data platform and make use of that during this Covid19 crisis is one of the most important tools a city can have. Korea, the country that perhaps best handled the pandemic, used its "Smart City Data Hub" to allow epidemiological investigators request, obtain and confirm data about coronavirus cases and people they had come into contact with. Other cities, such as Boston, built up new platforms as the pandemic spread. So, it is the need of the hour to make use of our Smart City platforms, slightly modify them and add additional services to make them to be like the "SmartSafeCovid19" platform as discussed in this paper.

References

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- [WHO appreciates Tech help.](#)
- [Security lapse at Jio exposed covid symptom checker results](#)
- [Huge crowds outside offices of DCPs to collect passes](#)
- [This AI camera detects people who may have COVID-19](#)
- [Telangana:Drone delivers medicines, collects samples,sprays sanitizers.](#)
- [The impact of Covid-19 on the Internet of Things](#)