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Artificial Intelligence in Battle against Coronavirus (COVID-19)

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***Abstract* - Artificial intelligence has been applied widely in our daily lives in a variety of ways with numerous successful stories. AI has also contributed to dealing with coronavirus disease pandemic, which is currently happening across the globe. In this paper we are encouraging the usage of new innovative AI empowered devices and for its adoption for future growth and ultimately reducing the coronavirus pandemic. This paper highlights a survey of AI methods being used in various applications in fight against deadly COVID-19 outbreak and outlines crucial roles of AI research. We touch on number of areas for automatic sanitizing usage of drones for various sort of applications are widely discussed. Research directions on exploring the potentials of AI and enhancing its capabilities and power in battle are thoroughly discussed.**

Key Words*: *Coronavirus disease-19(COVID-19), Artificial intelligence (AI), outbreak, drones, sanitizing

1. INTRODUCTION

On 8 December 2019, the first Coronavirus case was discovered in Wuhan, China. This Novel Coronavirus disease was latter named as COVID-19, has changed the world significantly. As of writing this paper, this COVID-19 virus has spread rapidly in 215 countries, causing 9,394,071 cases and 480,591 dead cases [5]. As the leaders in the war against coronavirus, the World Health Organization (WHO) and Centres for disease control and prevention (CDC) have released a set of public advices and technical guidelines. As a search engine giant, Google launched a COVID-19 portal (www.google.com/covid-19) where we can find useful information, such as coronavirus map, latest statistics, and common questions on COVID-19. In addition to that IBM, Amazon, Google and Microsoft with White house developed a supercomputing system for researchers relevant to Coronavirus. This is the time to turn technology and ensure the cutting edge research in artificial intelligence (AI), Machine learning and health informatics are part of our pandemic response. New wave of investment and research in wake of the coronavirus crisis could spur even more innovation. Numerous new tech companies, universities, and researchers are stepping up to apply AI technology to pandemic response. Small start-ups such a Bluedot and OWKIN are tapping into the immense power of combining human teams with machines in order to combat pandemic. Bluedot's AI system constantly scans through 100,000 official and mass media sources in 65 languages each day in order to detect outbreaks in real time. Due to the coronavirus outbreak the life of the people have become risky since they have to handle each and every activity and task without contact and it is not that easy to do all the kind of stuffs without making a contact at times it is a strong need to make a contact in solution to this we have proposed the idea with advanced AI technology which will help minimize the contact.

2. LITERATURE SURVEY

1. Artificial intelligence (AI) and Big data for Coronavirus (COVID-19) Pandemic: A Survey on the State of the Arts [1]

This paper presents researchers and communities with new insights into the ways AI an big data improve the COVID-19 situation, and drives further studies in stopping the COVID-19 outbreak. A simple and low cost solution for COVID-19 identification is using smart devices together with AI frameworks. X-ray images and computed tomography scans are widely used as input to DL models so as to automatically detect the infected corona patients by designing deep convolutional neural network (CNN).The use of ML and DL techniques for chest scans for COVID-19 detection were considered which shows the accuracy of 99.86% by representing the output as binary classification: COVID-19 infected and normal . Big data plays a vital role in combating outbreak prediction, virus spread tracking, coronavirus diagnosis and vaccine discovery. By using embedded camera and biosensors, a mobile phone can connect personal information, for example, X-ray and CT images, cough sound and heart rate encrypted and compressed before sending to the cloud for training. Integration of AI and big data can be the key enabler for governments in fight against covid-19.Big data associated with AI tools can build the complex simulation models using coronavirus data stream for outbreak estimation. This would aid health agencies in monitoring the coronavirus spread and preparing the better preventive measurement

2. Application of AI in Covid-19 diagnosis and prediction [2]

The method is applied in screening index, Chest Computer tomography (CT) is valuable component of evolution and diagnosis in symptomatic patients with suspected SARS-COV2 infection. The purpose is that AI algorithm meet the needs by integrating chest CT finding and clinical symptoms, exposure history, laboratory testing in algorithm. An initial

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prospective analysis in Wuhan revealed bilateral lung opacities on 40 of 41 (98%) infected patients and described lobular and sub segmental areas of consolidation as the most typical imaging findings. AI empowerment image acquisition can help in automated scanning process and also reshaping the work with minimum physically contacting to the positive patients, also providing the best protection to all doctors, nurses, staff, as well as imaging technicians. Moreover the computer aided platform help the radiologist to meet all clinical decision that is for disease diagnosis, prognosis and tracking. Reverse Transcription-Polymerase Chain Reaction (RT-PCR) test serve as the gold standard of confirming COVID-19 patients and it is developed a novel and accurate method to quickly achieve COVID-19 diagnosis association indexes to improve confirmed diagnosis rate for clinical use.

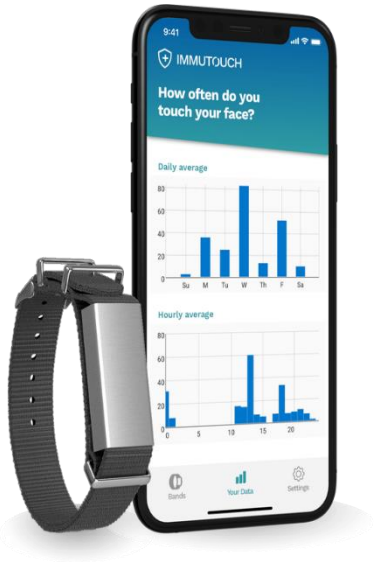
3. PROPOSED METHOD

In coronavirus disease outbreak it's a prime duty of every individual to take a sort of preventive measures by sanitizing our hands to fight against germs, maintain social distancing, not touching our face, maintain cleanliness, wearing mask. Thus in order to achieve this and to protect the individual from getting infected. We have proposed the certain set of ideas

1. Fire Alarm: This days it's a strong need to always keep ourselves, rooms, schools, college, cars, etc. free from germs we mostly do this by sanitizing. But at times it is bit hazardous to do excess sanitizing, since sanitizer are alcohol based and may leads to fire. As a solution to this problem, alcohol sensor must be placed where there is a need of excess sanitizing. Such that it will detect whenever the alcohol level has risen beyond limit in a particular area that time it will automatically buzz the alarm by sending a message to the authority and simultaneously calling via a GSM to the owner of the place.

2. Automatic sanitizing at the doorsteps: Here we have proposed an idea that whenever the person enters into the room through a door that time the motion will be detected with the help of motion sensor and the person entering into the room get automatically sanitized. This idea is helpful since it is automatic and does not need any kind of man power. It can be used in homes. School, colleges, office, theatres. Etc.

3. Im-mutouch Wrist belt: This is design of the wrist belt that is just like a smart watches that helps to resist the urge to touch our face. Since in the hectic schedule of the day, people tend to forget that and touches the face n number of times which is very risk. It is how the virus can travel from doorknobs or other objects to your mucus membranes and get you sick. Im-mutouch a wristband that vibrates if you touch your face. Its accelerometer senses your hand movement 10 times per second. It then buzzes when you touch or come close to touching eyes, nose or mouth. A companion app help you track your progress. Additionally, we can also add a feature of how much time we touch our mobile thus it helps us to minimize the use of mobile.phone connects to the device using wireless Bluetooth in order to set it up, control it, process the data, and display this data back to you. The Im-mutouch Band is based around a tiny device called an accelerometer. The accelerometer measures the wristband's orientation with respect to gravity, and by proxy, your hand's position. As its name implies, the accelerometer also measures acceleration, but we don't really use this data and run some fancy algorithms to keep it from affecting your bracelet's accuracy too much. Though it may seem like it should intuitively, the wristband does not detect movements or gestures themselves.



4.Patient's Questionnaire: This is the design of an application in a mobile wherein. If a person falls sick. He can consult a doctor via an application instead of physically going to the doctor. Patient can then fill up into the questionnaire which is in the application of whatever symptoms he is facing. And then can sent it to the doctor. Doctor on the other side will check the details of whatever the patient has filled up and accordingly will provide a tablets to the patient.

5. Application of Drones:

- Drones can be used for contactless ordering, spraying disinfectants, Patrolling and screening. It can also be used for delivery of the goods in quarantine zones which makes contactless delivery possible.
- Drones will be able to detect the corona positive patients with the help of thermal scanner. Thermal scanner works on principle of infrared thermography which can detect the temperature pattern in between range of 40 to 500 degree Celsius. It can detect fever, SARs, influenza .The infrared camera which is present in the thermal scanner is capable of detecting the excess germs in the body. With the help of image processing the drone detects the presence of the person and bleeps if the temperature is beyond some value. It will first detect the temperature of the person which is the first symptom of corona positive patients. If temperature is not as expected then that time it will throw a chip on to the patient's neck area wherein

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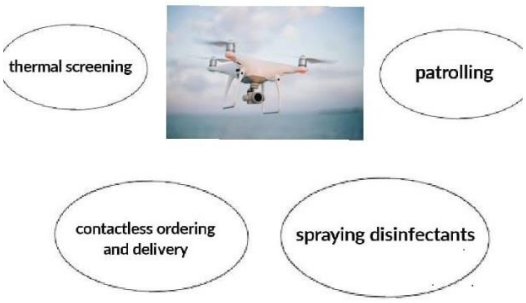
the deep learning (DL) model comes into picture. DL model will do the further testing to check whether the person is fine. It will take action if it detects the corona positive patient it will buzz the alarm by delivering a message that the person is corona positive and will point to the that person with the help of led or laser so that people can understand the patient and can take a preventive measures by maintain social distancing.



- Drones can be further used for patrolling against ones those who are violating the rules e.g., breaking the social distancing, not wearing the mask. If at a place there are large number of people police can send a quad copter and if quad copter detects the citizen violating the rules it will automatically announce via it. And if the people ignore the announcement. It will sprinkle a mild acid or ink on to the body who is violating the rules. So it's easy to search for the police afterwards because of the acid.

6. Handheld Projector (Pocket projector): Due to the coronavirus outbreak, It is practically not possible to organize a large number of gathering e.g., in schools and colleges. Since cities are lockdown. But it is necessary to continue with the academics at schools and work at offices to continue our routine. This days E-learning has provided the platform for the students to learn. But looking at the loopholes we come down to a conclusion that it is bit annoying to continuously concentrate on laptop or mobile screen since this may affect the eye-sights or blurred vision. In solution to this we can fetch a device which can be externally added to the mobile just to have an experience like a projector. This projector will be designed in such a way that, it will reflect its focus on entire wall projector attached externally to the device. This can be used for school, college, work from home conference and meetings purposes.

7. Mobile Application:

1. COVID-19 apps are mobile software that are used to track digitally to contact tracing in response to COVID 19 pandemic, that is to trace and identify peoples who have came into contact with an infected individual. Privacy concerns are been raised, especially about the systems that are based on tracking the geographical location of the application users. Also India, Australia, Bangladesh, china etc.

2. Wireless COVID-19 CHECKER: The device is the size of a postage stamp and sticks to a person's chest to constantly measure coughing, breathing, and fever. Researchers at Northwestern University are testing out dozens of the devices right now on patients and front line health workers in Chicago. It's technology that could be expanded coast to coast. They're using it on front line health workers to help determine if they've been exposed to the virus. "For front line health workers if you pick that up early you can pull them out, give them treatment and kind of mitigate the spread of the disease," said John Rogers, a professor at Northwestern University. While it helps determine if someone's getting sick they're also testing it out on patients who have the virus to understand how patients get better and why some deteriorate so quickly

4. FUTURE SCOPE

1. X-ray exposure parameters can be automatically calculated and optimized with AI inferred body region thickness of the patient, ensuring that just the right amount of radiation is used during the scan, which is particularly important for low-dose imaging this will help in reduced radiation dosage consumed by patients.
2. AI can be used to create more effective robots and autonomous machines for disinfection, working in hospitals, delivering food and medicine or looking after patients. AI and NLP technologies can be employed to develop Chabot systems that are able to remotely communicate and provide consultations to people and patients about the coronavirus.
3. AI can be used to eradicate fake news on social media platforms to ensure clear, responsible and reliable information about the pandemic such as scientific evidences relevant to the virus, governmental social distancing policies or other pandemic prevention and Control measures.
4. Patient questionnaire can be applied to the deep learning model. Which will predict that what type

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of tablets are suitable for the patient to provide based on the symptoms of what the patient is suffering from.

5. Whenever the person sneezes or coughs that time the invisible germs may accumulate on our body which are unknown to us. So that time wrist watch will give us a bleep or a message on its display to sanitize the hand before letting the germs entering into the body.
6. Facial recognition can be used for payment at the shops, malls, etc. After that automatically the money will be debited from the persons account. This ensures contactless payment.

5. CONCLUSIONS

The coronavirus disease has terrifically affected lives of people around the globe. Many people have lost their loved ones with the number of deaths worldwide. While AI technologies have penetrated into our daily lives with many successes, they have also contributed to helping humans in the extremely tough fight against COVID-19. However, we expect that the number of AI studies related to COVID-19 will increase significantly in the months to come. Government's efforts are mainly responsible to stop the pandemic, e.g., lockdown the area to cope with outbreak and provide crisis package to alleviate the impacts on national economics and people and adopt the adaptive policies according to COVID-19 situation. At the same time, individuals are encouraged to stay healthy and protect others by following some advice like wearing the mask at public locations, washing hands frequently, maintain social distancing and reporting the latest symptoms information to regional health center.

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7. BIOGRAPHY

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