A Mechanised Approach to Detect Viral Infections

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Abstract
Viral infections have been the cause of deaths in many families more recently since the virus can infect a healthy person even if not in direct contact of the infected person. The symptoms of viral infections may vary from high fever, tiredness, dry cough, sore throat, tastelessness, misery, anorexia and diarrhoea in people. Viral infections viz. corona are contagious and communicable so the challenge remains always to diagnose the infections at an early stage with the ultimate aim to save the mankind. In this endeavour, autonomous and miniaturised bot is proposed which can detect the ailing persons remotely by judging the human behaviour, actions and related eventual activities. The same bot can be customised to detect all existing viruses by adopting relevant changes in the procedural algorithms of the whole proposed system or the mechanism embedded into the bot. Due to obvious reasons, it is always desirable that every virus in consideration has to end after being declared pandemic. With the effective use of artificial intelligence and machine learning, the BOT is supposed to detect the symptoms of the affected person and can be prescribed adequate treatment and precautions on the go. The data gathered by bots can further be used by Doctors to diagnose the disease more effectively with a real time approach.

Keywords: Viral Infections, Autonomous BOT, Corona, Symptomatic

1.INTRODUCTION
Virus with the passage of time it has a huge impact all over the world and one of them is Coronavirus. Efforts are being made on the medical aspects of this virus by conducting various experiments to preserve populations from this catastrophic virus[1]. Disease infection starts 3-4 days before the symptoms are observed, on the other side the tracing of symptoms take place 2-3 days after the symptoms take place. On the basis of current reports the virus discarding is upto 10 days after the beginning of symptoms take place in people with lenient COVID-19 and the 10 days discarding can reach upto 20 days for the people with extreme level of infection and even for those who have less immune system[2]. (SARS-COV-2) is a new type of corona virus that causes extreme respiratory progression. It was detected for the first time in the city WUHAN, CHINA were the people with infection called pneumonia related to the bunch of acute respiratory illness cases in Wuhan. All systematic functions of the original (SARS-COV-2) virus particle seem related to corona virus in nature. Other remarkable alternatives of (SARS-COV-2) emerged in 2020. As of the end of December 2021, a total of 5 variants of SARS-COV-2 were circulating among the general public Worldwide. Demand, these a real ph a variation**,** gamma variation, beta variation, delta variation, and micron variation. Confirmation of corona virus disease was given by quantitative analysis by PCR (Polymerase Chain Reaction).Impact of covid-19 on public comprises on different parts/organs One not unusual symptom, lack of odor, outcomes from contamination of the guide cellular of the olfactory epithelium with next harm to the olfactory neurons [3]. In many publications it has been reported the involvement of the central and peripheral nervous system in COVID-19, since the vastness of the ACE2 in the glandular cells is affects in gastrointestinal organs, the duodenal, the rectal epithelium as well as endothelial cells of the small intestine. It can even cause acute heart damage and incurable damage to the cardiovascular system Acute heart injury has been found in 12% of public who are hospitalized in Wuhan, China, and is more common in China severe illness. The prevalence of heart disease symptoms is high, due to structured erythrogenic responses and due to change in immune system during disease progression, but acute heart disease may also be associated with heart ACE2 receptors [4]-[13].

In addition to the coronavirus, there are a number of other viral infections that spread between people through physical contact and lead to widespread spread of the virus.Diseases such as influenza, meningitis, pneumonia and many more diseases are the example of spreadable diseases on the basis of physical contact talking about influenza, viral infection that attacks your respiratory system — your nose, throat and lungs is often known as influenza. It is often called the flu, but not similar to as that of stomach "flu" since this virus causes diarrhoea and vomiting. At first, flu-related symptoms are initial**,** with a cold-like feeling, rhinitis, sternutation, and tonsillitis. But colds usually develop slowly, while flu tends to come on suddenly. And while a cold can be uncomfortable, you often feel much worse with the flu.[13-16]

Another named viral infection which is mild in terms of infection and usually resolves on its own is known as Meningitis. Group of virus named Enteroviruses caused many cases in the United States, this usually happens in the season of late summer and early fall. Other virus which can cause the infection of meningitis such as HIV, Mumps Virus[17].

Pneumonia is an infection of the lungs. It is characterized by the painfulness and redness of the tiny sac of the lungs. Although pneumonia can be effectively treated with antibiotics, late detection can lead to serious complications and even death. The causes of pneumonia are many and range from mild to severe, but the most common cause is the flu. The disease is spread when germs enter your lungs while breathing. Comprises of symptoms for detection of pneumonia starts with fever, runny nose, headache and it will detect pneumonia if this is true so.[18]

Every viral infection spreads through the physical contact so to overcome this problem and eliminate the chances of physical contact the robot is developed which with the help of sensors can detect the symptoms and identify the problem which the patient has come across. It will reduce the chance of infection spreading since this machine is simply detecting every actions remotely and sending the combined report to the physician who will conclude the result.

II. LITERATURE REVIEW

Several viruses resulted contagious disease embedding symptoms such as high fever, tiredness, dry cough, sore throat, tastelessness, misery, anorexia and diarrhoea has been observed in isolated. Unpredictable cases and flare-ups have been represented with extended for the virus named covid-19since 2019 from China, the USA and even more starting late from Europe.[19]

The Chinese government alerted the WHO to the infectious covid- 19 virus spreading on the coasts of China, starting with a fish that was the first person confirmed to be infected with this virus. The standard methods to check for the presence of SARS-COV-2 are nucleic acid tests to detect the presence of viral RNA fragments. Because these tests detect RNA but not the infecting virus, its "ability to determine how long the patient has been infectious" is limited. The test is usually performed on respiratory samples obtained with nasopharyngeal swabs **;** however, a cotton swab or sputum sample canal so be used. Results are usually a vailable within a few hours. WHO has published several testing protocols for this disease. The virus was later renamed by the corona virus research team to the extremely severe respiratory disorder corona virus 2 (SARS-COV-2) and the disease was named corona virus disease 2019 (COVID-19) by WHO.WHO declared the SARS-COV-2 outbreak a Public Health Emergency of International Concern (PHEIC) at the same time.

With the expansion of spreading the several viruses across the globe death rate due to virus became a point to be noticed, with the starting of the virus the death rate counted to be 2.1% across china and 0.2% across globe excluding china, and soon it arose to 15% across globe and this percent keeps on increasing gradually. Guidelines were taken by WHO to prevent the expansion of the virus amongst the public prevention such as isolation of a person infected by the virus, social distancing among the public so that to stop the spreading of virus amongst the respiratory function, as well as avoid to touching people.[20-21]

Before April 2022, there was proper medication for this infectious disease COVID-19, but now countries have proper medication for this disease onlyin some of the countries not all countries have. In countries having proper medication there patients with mild/moderate infection is serve by Remdesivir, which prevents the patient from serious illness and reduces the chance of hospitalization of the patient.

Most of the patients were encountered with mild infection of this virus, and this virus generally impacted to the people with age group above 50, since these age groups peoples have less immune and the virus directly attacks on immune system resulting to the mortality of the people. People with mild infection were recommended to isolate themselves in there home and to supply themselves with proper fluids supply in order to let themselves fully hydrated, and this home isolated was only for 2 weeks since it has been observed that within 2-3 weeks people with good immune system recover themselves from this infected virus.

Observing the preventions In mind the BOT will be a great asset in this particular scenario, the main symptom of COVID-19is fever which is detected by the thermal scanner& infrared scanners, this BOT is embedded with a system which will examine the body temperature of a patient, apart from fever a person with coronavirus infection also come across against tiredness, for this the BOT has a pulse checker which will observe the pulse of the patient as well as the BOT is embedded with a camera which will examine the facial expression of the person through scanning and can identify the expression of the person whether the patient is tired or not this technology is creating results on the basis of different set of instructions which are already feed in the BOT talking in context with the facial expression the different sorts of facial expression are there which on the basis of type tell the level of tiredness and accordingly makes report on it, On the other hand the Sore throat is also a symptom coronavirus which is recognized by the utilization of a camera and a spotlight introduced in the BOT. The camera and electric lamp takes pictures of the throat, the picture captured by the camera is then forwarded to the consultant doctor depending upon which the doctor predicts the throat infection of the infected person, the framework forms the procured pictures utilizing shading change and shading remedy calculations, lastly orders Streptococcal Pharyngitis (or strep) throat from solid throat utilizing AIstrategies. The cough is diagnosed by the microphone through which recorded the sound and through artificial intelligence analysis. The sensory nodes in WBAN can be used effective data delivery of various symptoms to the servers for evaluation of patient health.[22-24]

III. ARCHITECTURE

In contrast with the architecture of the BOT, it initialises automatically when a person stands infront of it using the mechanism of artificial intelligence. As soon as the initialization of robot is done it starts with symptoms diagnosing starting with fever diagnosing in terms of body temperature with the help of infrared red sensor, as soon it is done with fever sensing it senses the cough of the particular patient with the help of microphone which records the audio of that patient taking result from audio technology, thirdly it starts sensing the tiredness of that particular patient in three different levels the first level is pressure sensor strip which detects the pressure of the patient, second level is facial expression detection with the help of sensors and camera to detect the expression of the patient and detect the tiredness level of that patient, lastly it checks the pulse of that patient or heart rate of that patient to give the result on the tiredness level, after this process it analysis the soar throat of the patient with the help of flash light and

camera in the throat to take the photos of that soar throat and depict accordingly , in addition it also performs various other test related to the symptoms of other viral infection and keeps the record of the previous test since it have to accumulate the report, once all the process accomplishes the report which consist the result of all the tested symptoms as well as the final result in terms of whether the person is infected from which virus and which viral infection the patient is infected. The cumulative report processed by the BOT is uploaded on the application as soon as the report is done for and the report is shared to the prescribed doctor to help the patient with the relief action from the infected virus.The application works like the registered patient phone number is there in the report so when that specific patient is nearby (GPS is used by the application to track the patient location) someone has that same application installed in their smartphone. The proposed system can be extended using autonomous ZIGBEE, WIFI, BLUETOOTH and satellite notes for cohesing covid-19information to all in an Adhoc environment. The architecture is explained and proposed to be implemented throughFig.1. which explains the working of the BOT on the behalf of flow chart.

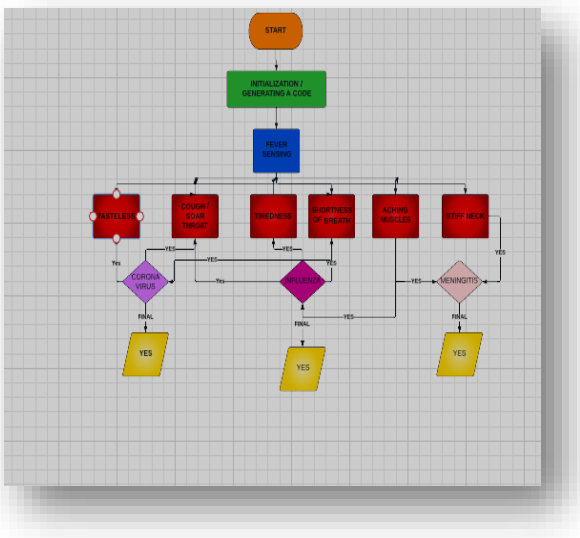

FIGURE-1 FLOW-CHART DIAGRAM

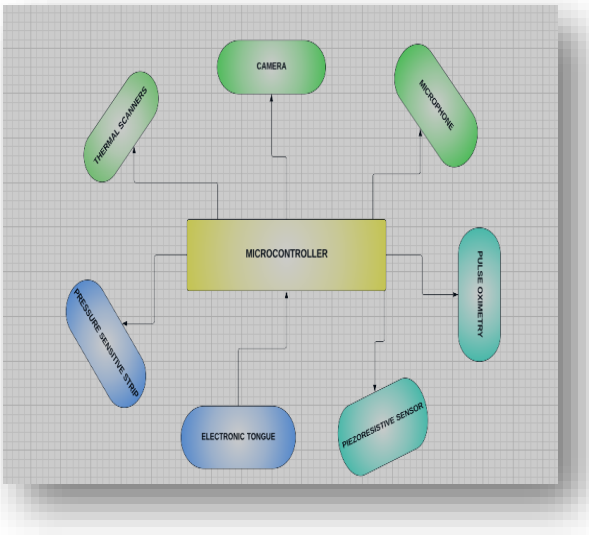

FIGURE 2: COMPONENTS USED IN THE OVERALL CONCEPT

IV. METHODOLOGY

The technology used in this particular domain is mainly IOT which is the sub part of artificial intelligence since we are using sensors in this BOT and the sensors technology is particularly based on IOT (internet of things) and all these setups is interconnected with Artificial intelligence technology apart from this we are using camera sensors as well which will be performing on the basis of image scanning technology.

With the presence of BOT the symptoms identification is as follows, fever would be the first step towards the identification of infected virus this process will be completed with the help of infrared sensors, the second step will be the process of identifying the tiredness of a patient with the help of facial recognition which will depict the percentage of the tiredness level in accumulation to it the pulse checker will check the pulse or heart rate of the patient and will depict the rate of the patient on the other hand a pressure sensitive strip will measure the pressure of the patient at that particular situation, In addition to the symptoms of virus Soar throat is also an additional symptom which will be predicted on the basis of camera and microphone which will capture the images and voice record will be processed to the prescribed doctor with the help of specific application and it will be confirmed whether the patient is COIVD-19infected or with the virus leading to Influenza or Meningitis.

This whole process which finalises the report of the particular patient uses the technique of Artificial intelligence and machine learning to predict every symptom and depict whether the patient is virus infected or not, this technology is advanced and will work accordingly to reduce the risk factor for public in order it will avoid contact spreading of the disease accordingly. Figure 2 describes the various components which are being used in the BOT for its functioning.

V. RESULT

Summary of this project is it is totally based on the machine learning technique in the way that the machine is customized with some worthy teachings related to the symptoms reading of the infection in this way machine will be able to neglect the physical contact between public and will be able to summarise the result on the way it has been setup to.

Initialization will the most basic work which will be done by the machine as soon as the public will walk over to it, after that particular step it will generate a 4-digit code which will individualize the public from the bunch of public based on this 4-digit code the doctor or the nearby physician will depict the patient so that it wouldn’t create the mess among the patient and doctor in such a way that particular patient is suffering from COVID-19 or that particular patient is suffering from Influenza.

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Figure 3 shows the chart which describes the positive cases round the globe and it basically aims on three types of viral infections which are Influenza, Meningitis, Corona virus.

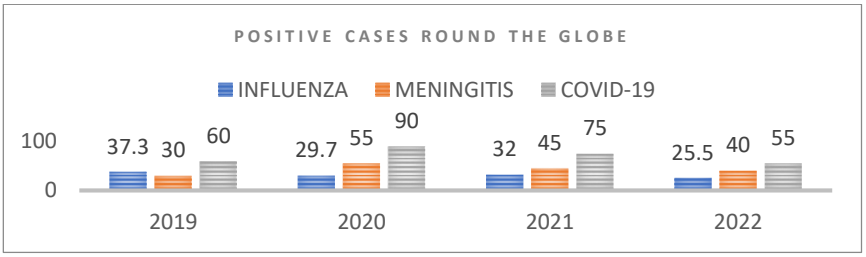

FIGURE 3: STATS RELATED TO THE INCREMENT OF CASES ROUND THE GLOBE IN THESE PARTICULAR DISEASE YEARLY

VI. DISCUSSION

The spread of the infectious disease have been the major issue across the countries and to classify them and to have a proper treatment related to the disease this BOT will be a powerful machine in accordance to this particular problem several steps has been considered and attempted in order to overcome these problems for instance Venous Pro BOT which is a clinical categorized BOT having application of biological sample collection such as automatic drawing of blood samples another is Swap OP BOT categorized under clinical condition BOT having application of collecting the swap samples and based on that create a report after particular sets of checking. On the other hand this BOT is different in every aspect to these latest technology as it comprises with set of instructions which are executed to perform a particular task which is investigating the type of viral infections based on the symptoms so the main difference between both the technologies is that they were in physical contact to the infected person which can create or infect the other person but this BOT performs every sort of task without getting in contact with that particular person.

VII. CONCLUSION

Round the globe according to the stats the problem has disturbed millions of public and keeps on disturbing by the way of spreading amongst them through physical contact and as said the robot is the best way to put a full stop on this way of spreading of all these viral infections through the way of physical contact as this robot will be fully automatic and doesn't require any manual contact as well as it will be assuring the stop on physical contact. In this way it will be contributing in the betterment of the society.

Therefore, BOT performs various operations with the help of different sorts of sensors which are existing in this BOT. Camera is also set-up in order to capture the actions of the public so that it can detect the amount of percentage a person is sick or not, even it has been given the microphone option in order to record the voice and detect the percentage in that matter if a person have soar throat, and to accumulate all these in a specific report. Then the report accumulated will be forwarded to the nearby locality physician so as to treat the affected person at its earliest, even it will warn other public nearby that this particular person nearby is infected by this specific infection and to stay safe from that particular person. By this method it will help in treating the patient at the earliest and by putting a full stop on the spreading of this disease.

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