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IOT In Virus Detection

Dr. J Hilda Christina, phd in ICT, Asst prof in Aux Coll,

Ms. B Niveetha, Msc Microbiology, Ast prof, Aux coll,

Abstract

Applications for contact tracking have been developed by researchers to automatically identify contacts who may be compromised by the index case. In order to stop the virus's spread, numerous researchers have taken advantage of the Internet of Things' artificial intelligence (AI) capabilities for early identification and surveillance of possible cases. In this investigation we are going to learn how IOT is involved in virus detection.

Introduction

The industry offers a wide range of interactive hardware platform packages, such as IoT for healthcare, which include clinical device integration, smart sensors, and smart tracking. New technologies such as the Internet of Things (IoT) can keep patients safe and healthy while also improving the way doctors provide treatment. IoT for healthcare can help increase a patient's sense of pride by allowing them to spend more time with their doctors.

During COVID

Early Diagnosis: The first line of defense against the corona virus is an early diagnosis. The healthcare authorities can take corrective action to stop the virus's spread if possible sufferers are identified early. The remote health physician can identify infected individuals more quickly by using wearable sensors to collect real-time data on individual symptoms.

Contact Tracing: One of the best ways to contain the COVID-19 spread is, for the most part, to trace contacts. To be more precise, contact tracing is defined as the process of reestablishing the infected individuals' contact chains. The medical authorities interview the patient to determine who his close contacts were during the incubation period in order to trace his contacts. To stop the spread, the close contacts are thereafter tested or placed in quarantine. The infection may spread further if the manual tracing is delayed. Researchers have concentrated on creating contact tracing applications for the automated tracking of close contacts in order to address the dilemma.

COVID-19 Management System: Using information from the healthcare facility, a centralised system keeps track of the virus's spread. Based on information provided by the health authorities, the system also controls the supply of face masks, hand sanitizers, personal protective equipment (PPE), testing kits, and other products. Decisions about supply chain management, smart lockdowns, the safe and gradual reopening of economic sectors, and other matters will be made by the governing authority.

Healthcare has advanced dramatically thanks to IoT-based technologies. The COVID-19 epidemic has put the world's healthcare systems in grave danger. The three primary COVID-19 phases involve the use of IoT-based devices and apps. IoT-based biosensors aid in reducing COVID-19 transmission during the diagnosis phase by identifying patients early. IoT-based wearable and disinfection devices can assist in remote patient monitoring during the second phase, which is the quarantine period. Devices for safe distance monitoring and crowd density based on the Internet of Things can be useful in the phase after a patient's recuperation. The role of IoT-based technologies in combating COVID-19 during the early identification, quarantine, and post-recovery phases of patient care.

In addition to the Internet of Things, artificial intelligence has significantly improved our daily lives in a variety of ways. Additionally, artificial intelligence (AI) and machine learning are crucial in the fight against the COVID-19 epidemic. On the basis of the data gathered, machine learning techniques are used to learn about the symptoms of the infection. When compared to the pricey testing kit method, this is a more economical and effective detection procedure. Given how successfully data gathered from smartphones' inbuilt sensors has been applied in several applications, this is theoretically possible. A fingerprint sensor, for instance, can forecast the degree of fever. Human weariness and nausea can be detected in photos and movies recorded with a smartphone. Coughing can also be detected by audio data captured by a smartphone microphone.

A novel hyper machine learning technique is suggested to handle extremely unbalanced datasets and contradictory characteristics. When a dataset is imbalanced, it means that there are significantly fewer samples in one class than in other classes. This is referred to as the major class, which has many samples, and the minor class, which has few samples. Due to a sharp rise in the number of cases and a dearth of knowledge on COVID-19, machine learning algorithms have shown promise in the diagnosis of the disease.

Using the k-nearest neighbor (KNN) method, the synthetic minority oversampling technique (SMOTE), one of the most potent machine learning approaches, may generate fresh samples for the minor class in the dataset, so producing almost equal classes and resolving the imbalanced dataset issue. However, this method's poor selection of highly relevant features from the original dataset results in low classification accuracy. Recursive feature elimination (RFE), a useful method for eliminating unimportant features from a dataset, can be used to this problem. In this work, we optimize a DL model and use SMOTE and RFE to create and apply various machine learning systems for COVID-19 infection detection.

Smart glasses with Internet of Things capabilities rank among the greatest temperature recorders to minimize human intervention. These eyewear monitor crowds by the use of thermal and optical cameras. Glasses utilize face detection and body temperature monitoring to facilitate tracking in crowds. Health officers get and handle these recorded data on smartphones . Infrared sensors are being used by a Chinese startup to produce smart eyewear that can monitor 200 individuals at once. Vuzix smart glasses are another example of smart glasses; they have thermal cameras to take temperature readings and can send real-time data updates to health professionals .

Robots powered by the Internet of Things are helping health professionals in the early diagnosis stage by lowering their stress levels and danger of infection. In addition to saving lab personnel' lives by avoiding contact with infected patients, autonomous robots can collect swab samples from COVID-19 patients during the initial stage of disease infection detection. By measuring temperature and other symptoms from a distance of one meter, another intelligent care robot may identify COVID-19 patient problems in less than ten seconds. Security and privacy problems are important when using IoT technology for self-monitoring.

The most affordable way to track COVID-19 cases is using IoT equation M1-band, which connects via Bluetooth to smartphone applications. Authorities in charge will keep an eye on patients who wear this band to make sure they remain in one location during their confinement. This band updates its location every two minutes. An alert will be transmitted to the authorities if a patient tries to remove this band from his arm or leaves the area. After then, additional research might be carried out. The United States introduced an e-bracelet for ankle use while patients were under quarantine [29]. Hong Kong monitored patients during their quarantine at airports using an electronic wristband connected to a smartphone.

Data is gathered and sensed by this Internet of Things gadget. It uses LED lights to display an alert and functions within a specific radius. The way bands function differs depending on the individual. The band beeps when the person with the red LED light approaches the other person. It can be used to track down suspected instances and preserve social distance. Compared to cellphones, this is a far more affordable alternative for people's protection. Its example is a wrist bracelet made of leather.

Another helpful tool to lessen social interaction and preserve social distance is an Internet of Things-based wearable helmet. A thermal camera or helmet will take a picture of the wearer and transmit it to a linked device along with an alarm whenever it detects a high temperature. One can check the places the infected person visited by tracking their location history. China, Italy, and the United Arab Emirates have all adopted this gadget to keep an eye on the situation while under quarantine. KC N901 is its example, and it displays 96% accuracy.

To fully eradicate the infection, cleanliness and maintaining sterilized and disinfected places are crucial. Before the space is opened to the public, it is sprayed using Internet of Things devices. Drones manufactured in China are capable of sanitizing and spraying a 100-meter radius in an hour. Additionally, Spain has utilized it as a sanitizer.

Conclusion

Even the technology advancements made the job it also necessary to focus on reliability, credibility and accuracy. But being precautious is the liieral meaning of advancement, root of advancement and benifit of advancement.

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