

COVID ENTRY SYSTEM

ABSTRACT

Due to Covid-19, the requirement for face mask detection and temperature detection has increased. This is applicable to various public places like airports, railway stations, etc. These steps are done in a manual way by which social distancing is violated while sanitizing and checking the temperature. Our project aims to improve Covid-19 entrance safety by introducing an affordable and easy-to-use Internet of Things (IoT) based solution that includes various safety features, such as automatic hand sanitizing mask scanning and temperature sensing. The only person who can enter the building is the one who has the conditions of approval set by the system. The system will then alert the security if there are any violations.

INTRODUCTION

The occurrence of novel infectious respiratory disease Covid19, also known as coronavirus has affected people from all around the world. It usually appears with a fever, severe coughing and nasal congestion. It can be transmitted through respiratory droplets. The usage of face masks and sanitizers has shown positive results when it comes to disease spread reduction.

Whenever a person enters a building such as malls, cinema halls, banks, schools, airports etc., it is important to check them for fever, mask and sanitize their hands. Manual temperature scanning has lots of disadvantages and is not suitable for large crowds. The personnel are not well trained in using temperature scanner devices. There may be human error that can occur while reading the values. Some of the personnel's may ignore checking for temperature and mask if their supervisors are not watching them. The personnel can also be bribed by the people entering the building and enter inside with no mask. Some people can forcefully enter inside without listening to the personnel.

Contactless covid entry system devices can be used for the initial check at entry points for screening people for temperature and mask. This device can quickly scan and display a temperature reading and scan for a mask so a large number of people can be evaluated individually at points of entry. These devices may help reduce the risk of spreading COVID-19 infections.

We have developed a fully automated covid entry system. It is a multipurpose system that makes use of a contactless temperature scanner, a mask scanner and automatic sanitizer disposal. The scanner is connected directly with a human barrier to restrict the entry if a person is diagnosed with high temperature or if no mask is detected. No person will be provided entry without a temperature and mask scan. Only the person who satisfies both the conditions correctly along with sanitizing their hands can enter inside.

Our system uses a temperature sensor, camera and hand sensor. The temperature sensor is used for scanning of temperature, the camera to scan for mask and the hand sensor of disposing of the sanitizer. Our system processes the sensor inputs and decides whether the person is to be allowed inside or not. If a person is detected for high temperature or no Mask the system glows the red light and bars the person from entry. Also, the face and temperature of person are transmitted over IOT to the server for authorities to take action and test the person for covid. Thus, the system provides a 100% automated system to prevent the spread of COVID.

LITERATURE SURVEY

Rehman et al proposed a system that restricts the growth of COVID-19 by finding out people who are not wearing any facial mask in a smart city network where all the public places are monitored with Closed-Circuit Television (CCTV) cameras. While a person without a mask is detected, the corresponding authority is informed through the city network. A deep learning architecture is trained on a dataset that consists of images of people with and without masks collected from various sources. The trained architecture achieved 98.7% accuracy on distinguishing people with and without a facial mask for previously unseen test data.

Enerst Edozie et al implemented a low-cost smart hand sanitizer dispenser with a door controller that can help to solve the challenges faced by security guards at different stations in enforcing this hand sanitizing action before letting people into where ever they intend to enter. That is to say, when a person(s) wants to access the entrance door, they must first sanitizer their hands or else the door will remain locked.

Nenad Petrović et al proposed a system aiming to help organizations respect the COVID-19 safety rules and guidelines to reduce the disease spread. It focuses on the most common indoor measures - people with high body temperature should stay at home, wearing a mask is obligatory and the distance between persons should be at least 1.5-2 meters.

Po-Wei Huang et al developed an automatic body temperature estimation system that could continuously and unconsciously measure the human temperature in real-time. The system ensures that the human face is focused while measuring. With wireless communication

techniques, users can review their physiological Information via App and Web, which is beneficial to remote healthcare.

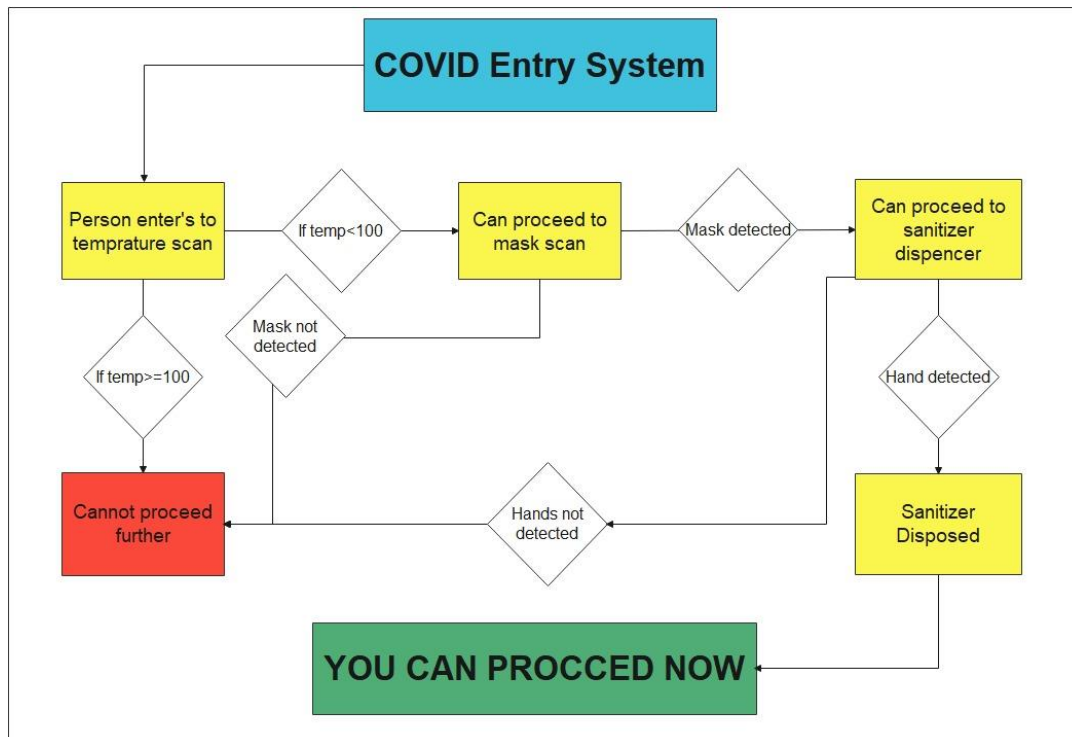
PROPOSED SYSTEM

We have created an automated IoT system for contactless temperature sensing, mask detection and automatic hand sanitizing aiming to increase Covid-19 entrance safety. No one is allowed to enter a building if they are detected of high temperature or not wearing a mask. A buzzer will alert the security of this situation if any fail-safe condition is found.

Initially using the temperature sensor, the temperature of the person is detected. If the person is detected with a normal temperature, the camera captures the image. The image is processed using a trained tensor flow model to classify between the person wearing a mask and not. If a person is wearing a mask, the hand sensor detects the hand of a person under the sanitizer and it dispenses the sanitizer accordingly. Additionally, all the data is recorded in the system.

We have used node-red for implementing our entry system. The training of the data is done using teachable machine, a tensor flow node. And to visualize our system and data we have used ThinkSpeak.

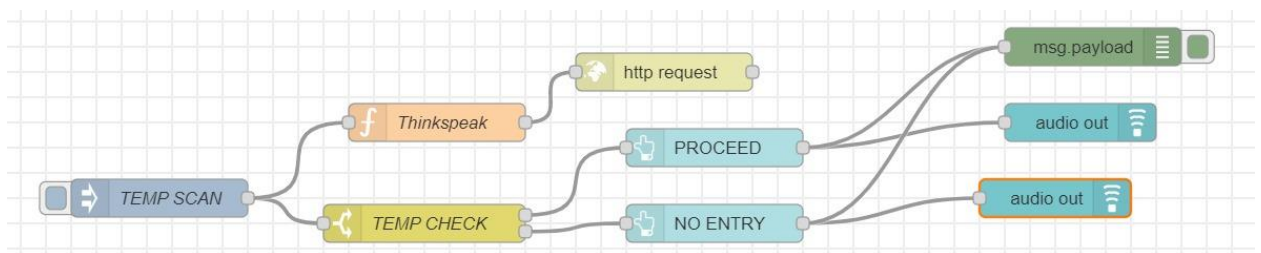
FLOW CHART



MODULES

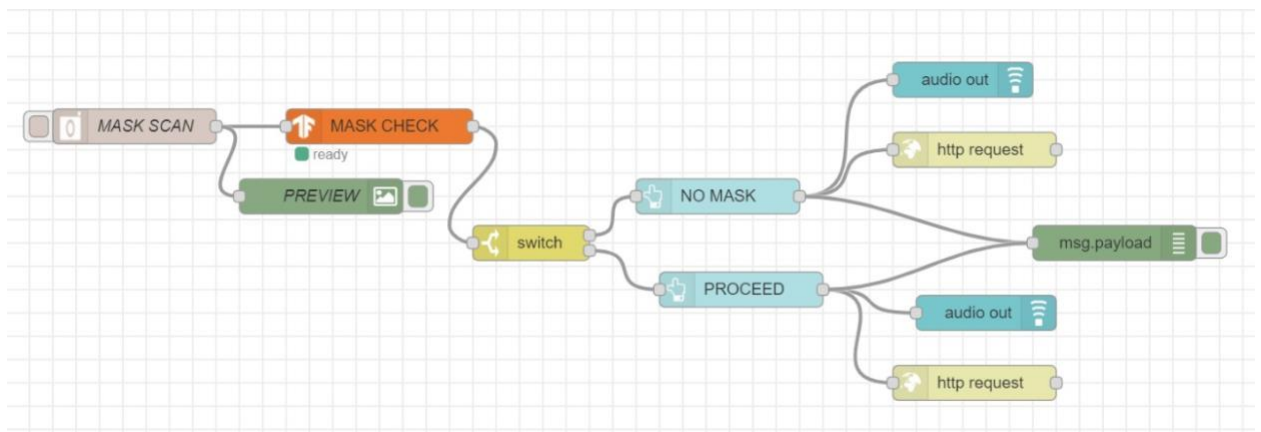
1. TEMPERATURE SCAN

When a person enters a building, he is scanned for temperature. If a high temperature is detected, a red light glows along with displaying and playing an audio “HIGH-TEMPERATURE DETECTED. YOU CANNOT ENTER” and the person is barred from entry. if a normal temperature is detected, a green light glows along with displaying and playing audio “YOU CAN PROCEED TO MASK SCAN” and the person can proceed to mask scan. A line graph is also plotted for visualizing the data on a per-day basis.



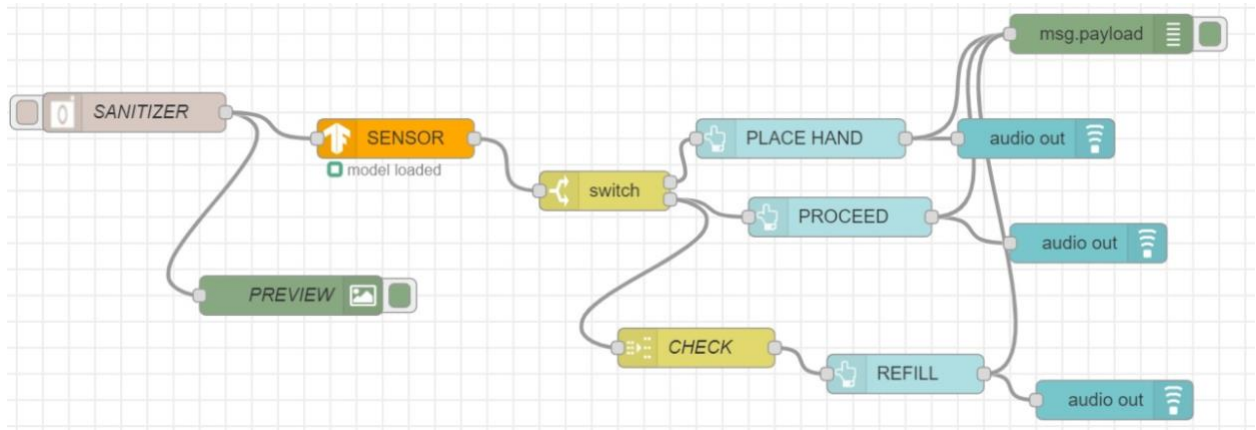
2. MASK SCAN

After the temperature scan, the person is checked for a mask. If no mask is detected, a red light glows along with displaying and playing an audio “NO MASK DETECTED. PLEASE WEAR MASK” and the person is barred from entry. If a mask is detected, a green light glows displaying and playing audio “PROCEED” and the person can proceed to sanitizer disposal. A line graph is also plotted for visualizing the data on a per-day basis.



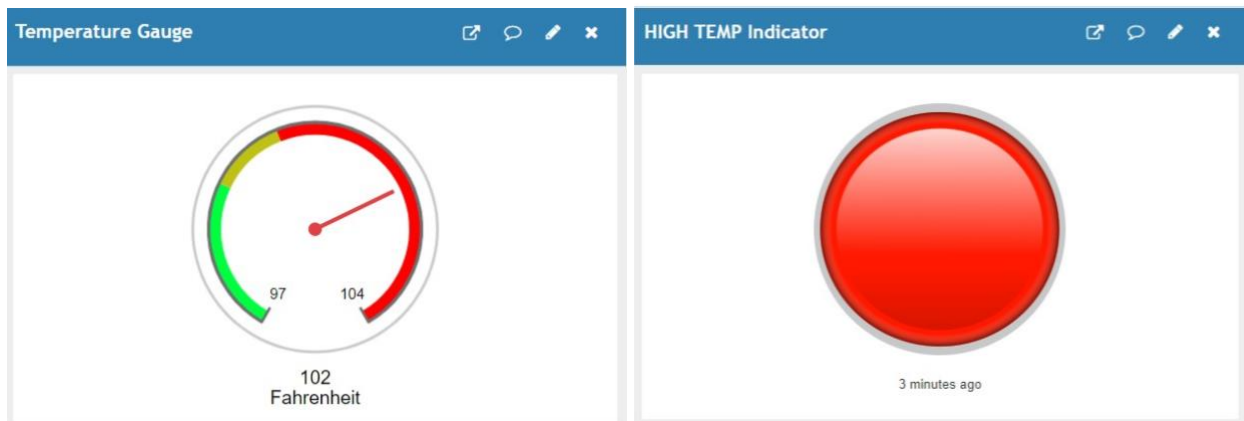
3. SANITIZER DISPOSAL

After the mask scan, the person has to go through the automatic hand sanitizer to sanitize their hands. If no hand is detected, the system will display and play audio “PLACE YOUR HAND BELOW TO SANITIZE YOUR HAND”. If a hand is detected, the sanitizer gets disposed along with the system displaying and playing audio “SANITIZER DISPOSED” and the person will be able to enter the building. If the sanitizer is need refilling, the system will notify to do so.



OUTPUT

IF HIGH TEMPERATURE DETECTED:

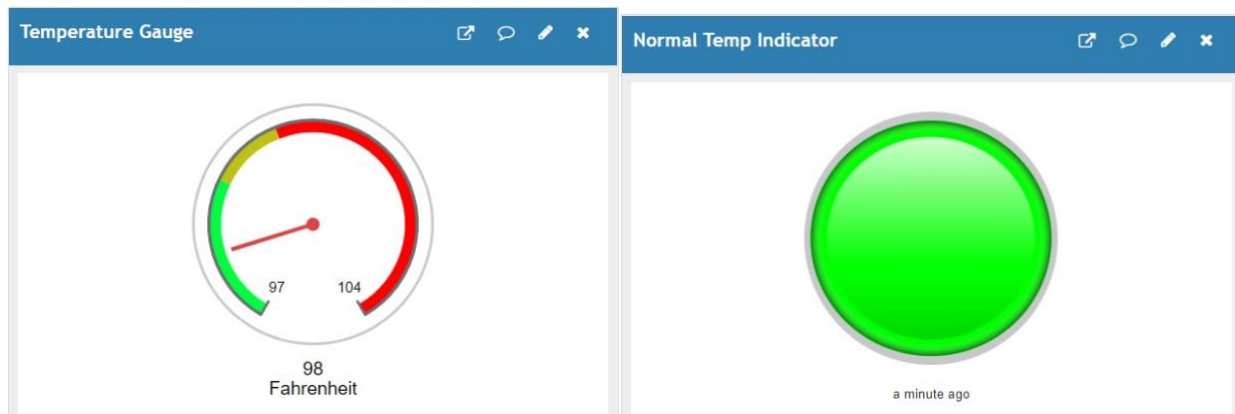


12/6/2021, 12:47:42 PM node: 0d71814dbaf21555

msg.payload : string[44]

"HIGHT TEMPERATURE DETECTED. YOU
CANNOT ENTER"

IF NORMAL TEMPERATURE DETECTED:



12/6/2021, 12:43:37 PM node: 0d71814dbaf21555

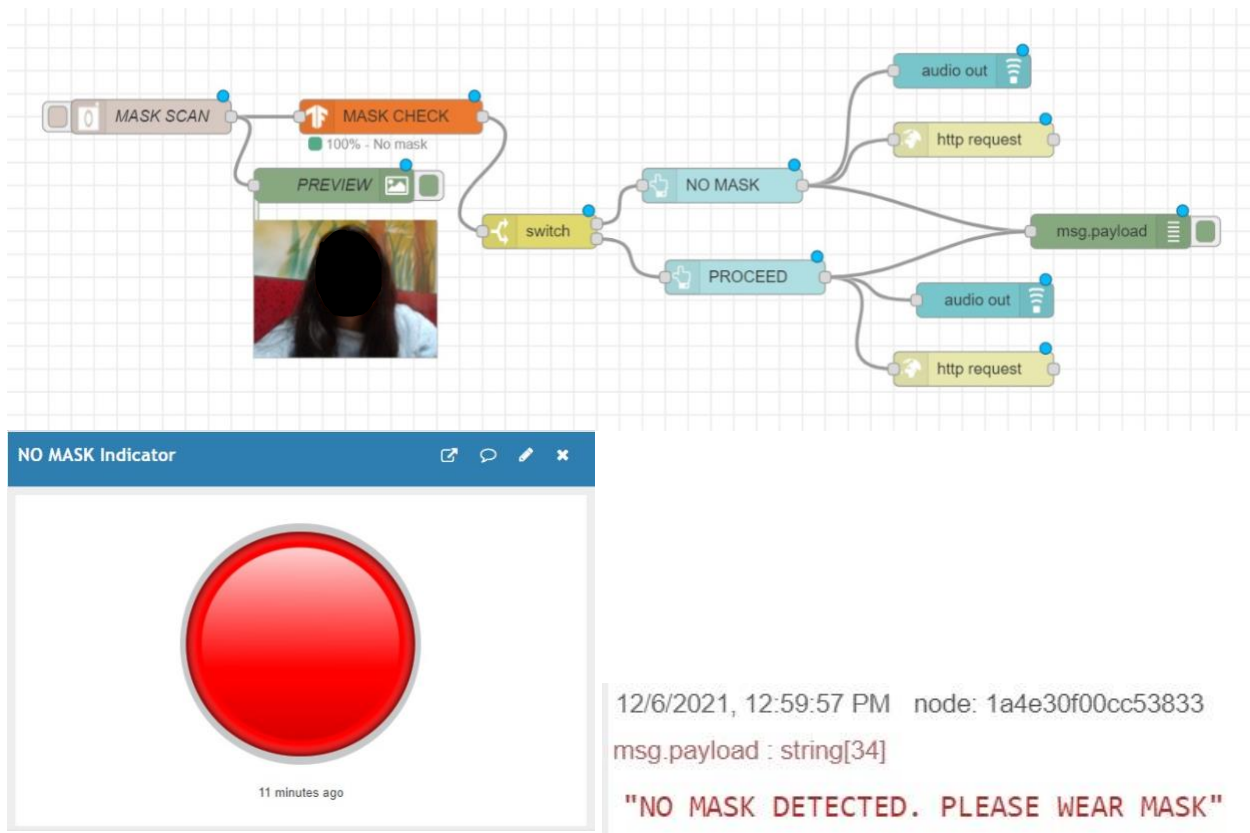
msg.payload : string[28]

"YOU CAN PROCEED TO MASK SCAN"

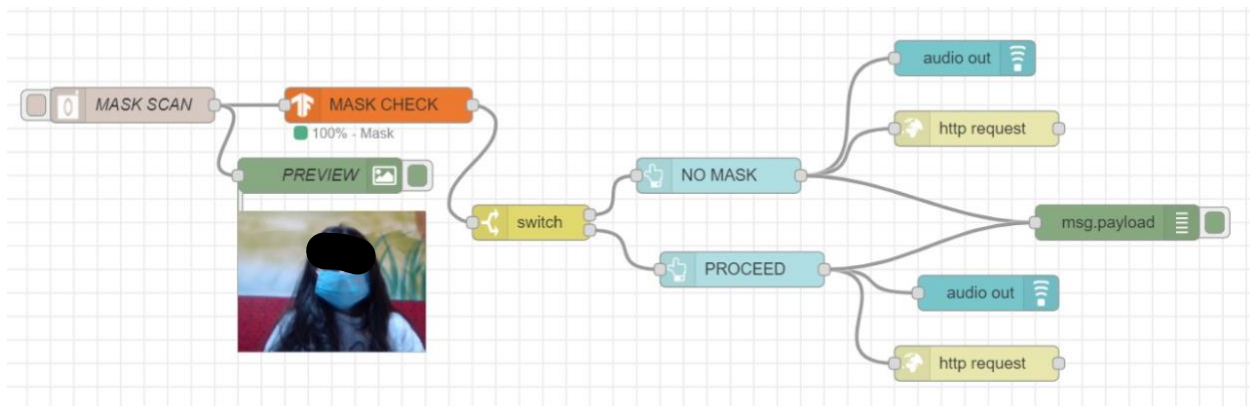
VISUALIZATION OF TEMPERATURE:

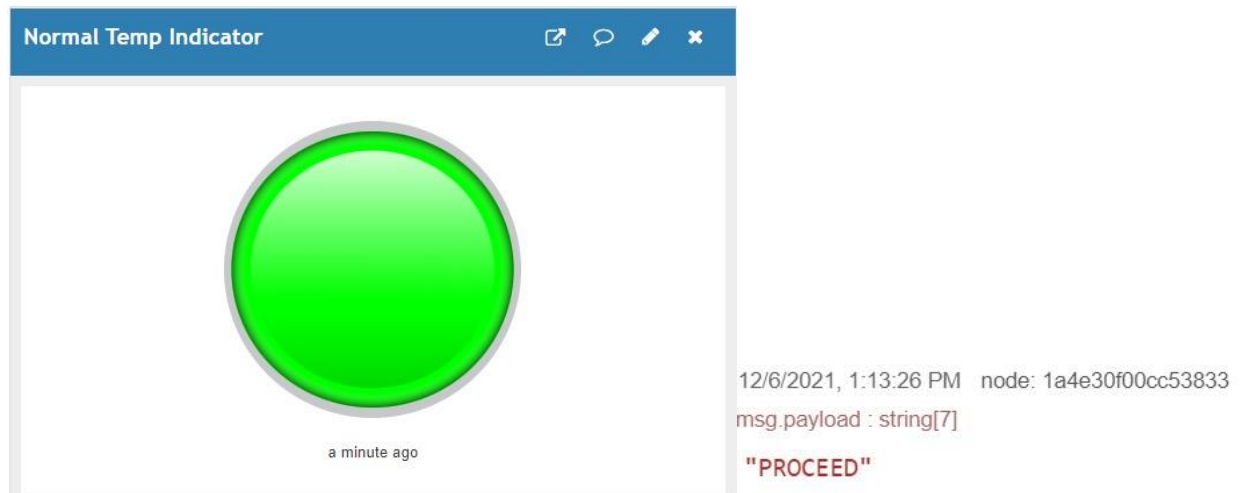


IF NO MASK DETECTED:



IF MASK DETECTED:



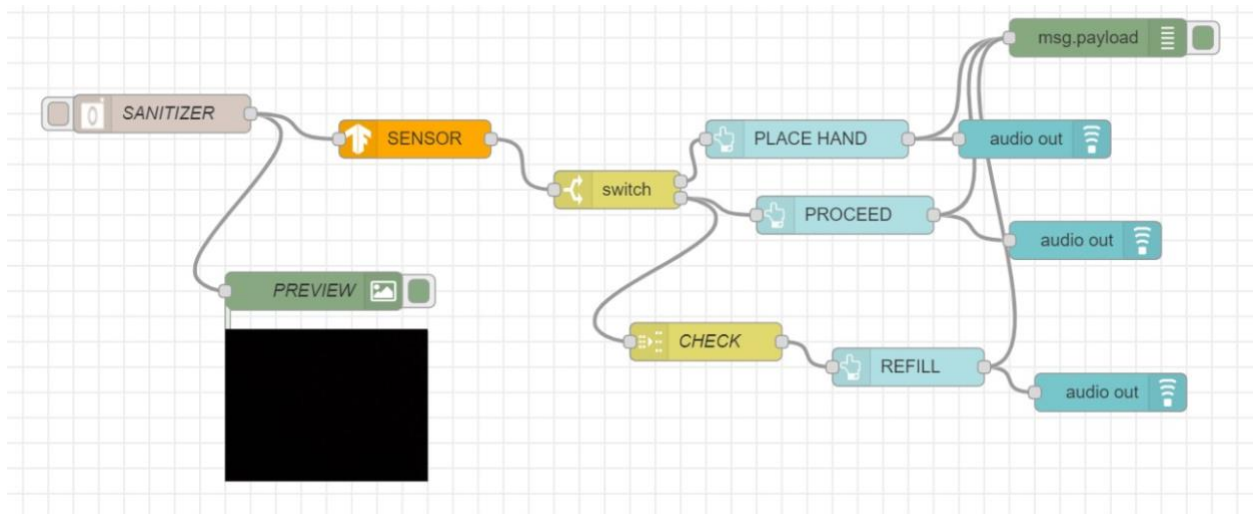


VISUALIZATION OF MASK SCAN:

0- NO MASK, 1- MASK



IF NO HAND IS DETECTED:

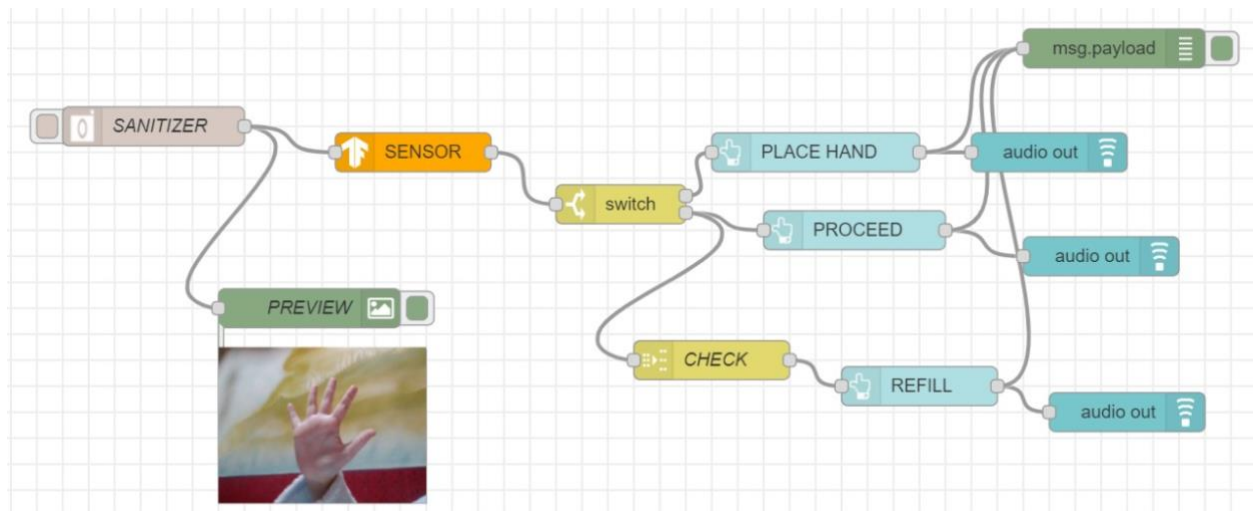


12/6/2021, 1:32:33 PM node: 72c542c48ecb0ae1

msg.payload : string[42]

"PLACE YOUR HAND BELOW TO SANITIZE
YOR HAND"

IF HAND IS DETECTED:



12/6/2021, 1:40:43 PM node: 72c542c48ecb0ae1

msg.payload : string[18]

"SANITIZER DISPOSED"

REFILL SANITIZER:

12/6/2021, 1:44:34 PM node: 72c542c48ecb0ae1

msg.payload : string[16]

"REFILL SANITIZER"

CONCLUSION

This project aims to implement an automated system that will automatically check the temperature of a person and the people wearing masks to help control the spread of the covid-19 virus. It can also control the spread of the disease by preventing people from getting infected.

If our system is used, the accuracy of the temperature checking increases than when it is manually done. Also lack of attention of the person who checks the conditions can be resolved by this system. By using these applications, people can feel more secure and prevent the human generation from getting affected by the life-threatening coronavirus.

FUTURE SCOPE

Further in future, the accuracy of the mask detection can be increased. The system can be enhanced with various features that can be utilized for various applications. Some of these include security systems and outbreak prevention.