ECO FRIENDLY MASK GUIDE FOR CORONA PREVENTION

Dr.Praveen Tumuluru¹, Dr.S.Hrushikesava Raju², CH.M.H. Sai Baba³, S.Dorababu⁴ and B.Venkateswarlu⁵

¹Assistant Professor, Dept. of CSE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur,
²Associate Professor Dept. of CSE, Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur,
³Assistant Professor, Dept. of CSE, Koneru Lakshmaiah Education Foundation- Vaddeswaram, Guntur,
⁴Assistant Professor, Dept. of CSE, Koneru Lakshmaiah Education Foundation. Vaddeswaram, Guntur,
⁵Assistant Professor, Dept. of CSE. Koneru Lakshmaiah Education Foundation, Vaddeswaram. Guntur,

Email: praveenluru@gmail.com

Abstract. At present, every live human being is worrying of COVID-19 and its varying forms to be attacked and its consequences. To invent the drug and vaccine, it is becoming a harder task that makes people hard to survive with this disease. Many people are getting this covid-19 because of contaminated environment as well as un-disciplinary actions. To avoid the spreading of COVID-19, the populace has to be aware with several sectors such as use of sanitizer, drinking of hot water, having of nutrition drink and hygiene food, and last but not the least consumption of immunity boosters. In this paper, we focus on developing an eco-friendly mask which not only prevents against COVID-19 but also purifies the air intake. The objective of this invention is to fight efficiently against COVID-19 pandemic in terms of preventing the spreading of Corona virus. The performance of this mask is validated against the conventional mask by considering and its maintenance will judge the success of this in the global mass society. Not only to face COVID, but also to face the pandemics to be raised in the future too. Hence, the proposed materialistic method using corona sensor will guide about corona surfaces and objects in the surrounding environment.

Keywords: features, corona sensor, automation, IoT, GPS and eco-friendly mask.

I. INTRODUCTION

Now-a-days, everybody purchasing masks in order to safe guard against covid. The COVID-19 is a new virus came into this world and appeared in china first. Later, it show its spreading in Europe countries and later to other countries. Every country is suffering with Corona (COVID), and they are spending lot of budget to overcome on this covid. Mainly, middle class and low income people’s lives became ruin because if they could not afford their families due to maintenance of daily wages. There were many types of masks available in the market stating that they are available to partial stop / obstacle the opposite person’s infected air
particles. The varieties include face mask, head shields and in other forms. They won’t guaranty healthy air that the people will breathe. Also, those kinds of masks are just for earning money but not for real serving the people. Therefore, an idea came across this scenario, that leads to develop eco-friendly mask using IoT as main component. This proposed integrated device is portable and could be attached to any kind of mask. The maintenance of this is also easy and is powered by DC type battery which is automatically recharges whenever it is charged. Using with this, many drawbacks like breathing of bad air which cause damaging the parts that are in contact of breathing, also lacks to scan the environment and judge and warn about the bad zone to the customer who is currently in, and also guides the direction from which virus components are available in more or determine the thing or a person possessing that virus. From this, the customer will decide to go in that particular direction or not during their walk. Here, instant judging of the environment is achieved using Internet of Things (IoT). Here, IoT is a technology that communicates and displays the information by minimizing human to computer interaction. Hence, the proposed approach is eco-friendly mask which purifies the air that breath in, scans the every new environment and caution the customer, and guides to the customer about the thing or person who are having this form of virus.

II. RELATED WORK

There were no advancements on portable masks in this short span of time. In [1][2], the methods used and applied for controlling from the virus, where face mask is used to shield from the virus environment. In [3][4], the prevention from covid is done by using mask. The traditional way of use is to wear the mask which will save personal contact from others. In [5][6] respiratory issues are discussed and review is conducted. These are minimized if mask is used during the daily life. In every other paper mentioned in references [7-16], all are discussion about various kinds of viruses and ways to follow to get rid of virus by using the mask like face mask or face shield. In reference [17] and [18] describes about hanta-virus in a specific region and recovery plans from covid-19 virus respectively. In [19], and [20] describes about Covid-19 outbreak review and respiratory syndrome in Covid-19 and its consequences respectively. In [21] and [22] describes about prospect of ranking the cloud service provider and automatic scaling of cloud in a server respectively.

In this paper, detecting the footprints in the surroundings requires to process and store the reports in the cloud and hence cloud oriented services and internet of things services are considered for analysis of data. In [23] and [24], the first study represent on affected regions because of change of detection and other study describe heart disease using machine learning approach respectively. In [25], the study elaborates on post-traumatic stress disorder diagnosis and its effects. In [26] and [27], the first study denotes about monitoring of employee’s health using IoT and second work represent on contamination of metals on ground water and its implications respectively.

In [28] and [29], the studies represent mental state of human being using EEG signal and employees health monitoring system using software application respectively. In [30], the study on security issues in healthcare applications using human sensor networks. There is no way of detecting the virus characteristics and sending as a report to the end user through a communication gadget. Suppose the details of the infected object is reported to the user about the environment in which user is staying. Also, the history of the infected person in time manner is specified that will be helpful to the future predictions of the infected objects. This is like how the weather to be forecasted. Similarly, it will provide guide about the predictions. Hence, a mask is required that reports about the infections in environment and count of those expected in the future. This leads to have a eco-friendly mask where few sensors are integrated together, if a specific virus is found in the environment that could be found through s specific sensor, otherwise it could be sent to corona sensor which identifies infected object and displays the report. If that environment is not in defined virus, and also not in corona virus, it could be named according to the nature and picks a high term from the online dictionary. The mask proposed should be operated by USB or rechargeable battery showing the percentage of the charging is available. Hence, the eco-friendly mask is for user satisfaction and guides through alert messages about the infected environment. It also produces a report where the characteristics of the virus and the time span the virus are initiated and the time it became more severe.

III. PROPOSED APPROACH

This proposed approach is an eco-friendly mask, which is used to purify the air, determines the polluted part in the environment in which customer is moving. The mask is taken as double layered cloth with built in two
components such as air filter and IoT sensor. In this, when breath force is happens, air filter senses the air and checks the air is normal air or polluted air. If it is contaminate air, it informs to the IoT and purifies to the extent the air become normal possible, and asks the IoT to take further step like intimating to the customer about the status. The IoT while scanning the environment determines polluted items on which this virus is laid or available. This IoT has following features.

i) Input: Environment in which direction the mask is moving and also input taken from the air filter.

ii) Processing: Guides to the customer when input taken from the air filter. Also, it guides the components that made the environment bad to the customer. Also, it specifically marks the item that possess partial or full affected feature of this virus.

iii) Output: Either voice or text or positioned item in the direction this mask is moving.

Now, the architecture and modules of this eco-friendly sensor to be demonstrated in the given below.

In this architecture or working model of the eco-friendly mask, there were five modules identified which are as follows:

Along with modules, the architecture is depicted in the below diagram where each module functionalities are represented as use cases and the flow from one module to another module is also indicated so that the end user could easily can understand the scenario of the eco-friendly mask

**Fig. 1: Working Model of IoT based Eco friendly Mask**

a) **Themed Component (Eco-friendly Mask):** It is the central theme of the proposed idea. It is to be interacting with many further components like Air Filter (where breath out particles are filtered out, and statistics of the air is noted), Environment Sensor cum Filter (where prediction of infections are in the defined list or not), Corona Sensor (Where the contemporary virus identification in the dynamic environment in which it is in use), and Communication gadget (where information of the corona and its statistics are displayed and alerting the future infections).
b) **Air filter**: It is arranged in the mask. It can communicate with Environment cum filter sensor about the polluted air and quality of the air is assessed. It will notify the Environment cum filter sensor if the present air is polluted. It is wired with Environment cum filter sensor.

c) **Environment Sensor cum Filter**: It receives the quality of air information as well as infection present in the environment through guided information. If the infected data is in the list of infections, it will pass that to Communication Gadget. If not means unpredicted infection will send to corona sensor. If the corona sensor detects the input is corona affected, it will immediately alerts the user about the object that is contaminated with that virus. If not, will notify severity of that infection and confirm it is not of corona type.

d) **Corona Sensor**: It is trained by certain samples of objects. By reinforcement learning, it will determine the infected objects in the environment in which it is present. The infected information is to be notified to communication device. The end user will be aware of the environment in which their stay is safe or to be cautious.

e) **Communication Gadget**: It is used to store the received information from the Corona Sensor, Air filter, and environment sensor cum filter. Based on severity, it will alert the user who wore the mask. Here, the mask is made with double thin eco friendly material which is more secure than single layer mask. The pseudo procedure of the eco-friendly mask is demonstrated as follows:

3.1 **Procedure for Eco-friendly Mask**:

**Eco-friendly Mask**(real power_status, list[] modules):

1. Calls air filter
   1a. Scans the air and judge the quality
   1b. Outputs if it is polluted air

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**Fig. 2**: Modules flow in Eco friendly Mask
2. If the polluted air is detected, will send to environment sensor cum filter. Call the environment sensor cum filter.
   a. Already the infections details and characteristics are fed. The objects which are infected with prediction and are in list of available diseases, will propagate to the communication gadget.
   
b. The objects which are not predicted in the list of predicted diseases, and predicted as corona characteristics, will be propagated to Corona Sensor

3. Call the Corona Sensor, identify the objects that possess the corona instantly by sensing the surroundings. The statistics of that virus is sent to Communication gadget. The report of what objects are affected and are having corona symptoms, will be propagated to last module (communication gadget)

4. Call the Communication gadget, it displays the report in case of all viruses. The report consist of components percentage that lead to the virus, and the period they started one by one (that means history) in detail.

The Figure 2 shows the flow of modules interaction in this proposed approach:

### 3.2 Working procedure of the Eco-friendly mask:

The working of the Eco-friendly mask is it starts by automatically enabling of the air filter, which scans air particles and determine the polluted or not, then information of air filter is propagated to the Environment sensor cum filter, which scans the objects and identifies the infected viruses according to their characteristics, and unpredicted viruses are then sent to Corona sensor, which identifies the objects and surfaces possessing the corona, the details of them is sent communication gadget.

If the virus is not corona kind, it is considered miscellaneous virus. The miscellaneous Sensor names it with some identifier according to its nature from the online dictionary, and its details are sent to communication device, where the all the details are available including characteristics and history of that virus like when it started, and when it is fully converted into actual virus.

![Fig. 3: Internal structure of Eco friendly Mask](image)

In this, the modules identified are Air Filter, Environment Sensor, Corona Sensor, Miscellaneous Sensor, and Communication gadget. The internal structure of eco-friendly mask is demonstrated as
below. In this, Air filter communicates with Environment Sensor which is bio Sensor, where it has many built in sensors(defined sensors) which are activated whenever specific form is identified, later corona sensor is used when corona virus is detected according to the symptoms.

IV. RESULTS

Here, the output is displayed in the communication gadget. What kind of output will be displayed depends on the environment. If the environment possess anyone in the list of built-in viruses, that can be alerted and information is sent to Communication gadget. If it is other than existing viruses noted in the list, it will be sent to corona sensor for confirming the virus. If not, it will be sent to unknown virus and it names automatically from the dictionary based on its nature. The report of the virus and its history is stored and alerted in the communication gadget.

Fig. 4: Air Filter Structure.

Here, the output is analyzed in few ways such as output of air filter to be described, the output of environment sensor and filter will be also described, the output of corona sensor to be discussed, and output of miscellaneous sensor to be discussed. Among these outputs, the final output to be available in the communication gadget. The formats that contain the end output is to be described in this results only.

In fig 4., first part represents mask having air filter, second part shows air filter with colors, the third part shows how air filter looks like, the fourth part shows another air filter. These parts show that how an air filter looks like. The next module is Environment Sensor cum filter will enable to take input and determines that is in available viruses. The viruses are listed here zika virus, influenza flue, Dengue, and etc.

The environment sensor cum filter will be used by integrating the all of specific sensors which are noted in the list of known viruses. Only those viruses could be predicted by the available sensors. The following shows bio sensor. It predicts the virus by the characteristics imposed in the graph.
The corona virus is determined when object has foot print of corona infected object or when an object possessing corona characteristics such as fever, cough, motions, respiratory issues, and etc. If all these are present in a person, that person has to undergo quarantine. Over quarantine period, the medicine used is hot water, protein food, medicinal drinks, and curable medicines.
The following shows the germs nature and appearance of it is:

After the corona sensor, if the virus to be determined is not in lists of defined viruses, then miscellaneous sensor will be invoked where the characteristics of the virus are recorded. Based on characteristics, name to be considered from the online dictionary automatically.

The output of any sensor is shown in terms of the graph where the involved particles are represented with different colors or different symbols according to their similarity.

Where symbols in W suppose represent cough particles, symbols in X suppose represent fever particles, symbols in Y suppose represent respiratory issue particles and so on. All these together will make corona virus.

The output of the communication device is looks like as follows:
Case study 1: Output in case of Dengue:

Virus predicted is Dengue

IgM +
IgG +

Supporting Remarks:

Fever: Yes
Headache: Yes
Chills: Yes
Miscellaneous: Loose Motions etc

History of dengue is through graph:

Fig. 8: Graph for involved infected particles
Case Study 2: Output in case of Corona:

Virus predicted in Corona
SARS – Yes
SARS-CoV-2 – Yes

Supporting Remarks:
Fever – Yes
Headache – Yes
Chills – Yes
Miscellaneous: Stomach pain, Spinal problems, Loose Motions etc.

History of Corona is through graph:

| Vital Signs | Investigations |
|-------------|----------------|
| Blood Pressure | COVID swab test |
| Heart rate/minute | Chest X-ray |
| Temperature | 90.0°F |
| SPO2 | 93% |
| Respiratory rate/minute | Negative |
| Moderate | significant ground glass opacity |
| Severe | Pneumonia |

The increase of corona virus and its consequences are listed in days time manner:

Here is a day-by-day breakdown of how the symptoms of COVID-19 progress in patients:

Day 1: Patients will run a fever and may experience fatigue, muscle pain, and dry cough.

Day 5: Researchers found that it took an average of five days for signs of breathing difficulties to kick in patients. Symptoms might include shallow breathing, tightness in the chest, heart palpitations, and wheezing.

Day 7: For most patients, Day 7 would mean the end of phase one leading to diminishing symptoms. Doctors at this time advise continuing self-isolation to discard any further complications.

Day 8: Severe cases tend to develop signs of acute respiratory distress, according to a study from Wuhan. The NHS terms this as life-threatening where the lungs cannot provide oxygen to other organs.

Day 10: If patients exhibit worsening symptoms, they are admitted to an Intensive Care Unit (ICU).

Day 12: In the Wuhan study, fever ended for most people on Day 12. Many still had a cough.

Days 13-14: For those who survive the virus, breathing difficulties generally end on these days.

Day 17: On average, people who recover from the virus are discharged from the hospital after two-and-a-half weeks.

Day 18: For those who do not survive the virus, the average number of days from onset of symptoms until death is 18.5 days.

Fig. 9: Consequences of Corona after attack
The figure 10 shows the increase in corona cases in India. Hence, as there is no fond of vaccine, it is to be prevented through a hygiene mask where few portable networked devices are connected together to show a report to the end user. The user is now would take care about the areas and objects that are infected. In case of miscellaneous sensor, the output could be displayed as a report and takes a name automatically from relevant high term from the online dictionary. The virus created from the rodents and cause people to get this virus. Hence, it is named as Hantavirus.

**Case Study 3:** Output report on NewVirus “HantaVirus”

| Virus predicted | Hantavirus: |
|-----------------|-------------|
| HPS             | Yes         |
| HRFS            | Yes         |

**Supporting Remarks:**

- Chest radiographs: Yes
- Smoking history and viral load: Yes
- Cytotoxic harm: Yes
- Cardiac arrhythmias: Yes
- Miscellaneous: etc

**V. CONCLUSION**

In this, eco-friendly mask is user friendly aims at discovering the infected objects and surfaces that possess the corona virus. This dynamic natured prediction and evolution of the corona virus is recorded and propagated to communication gadget. For every change in the environment that possesses the corona, the report will be updated automatically. The outputs of the modules are sent as input to other modules, but final output will be at communication gadget. The performance if this eco-friendly mask is predicted and is battery powered or USB powered or Bluetooth powered. These facilities will upgrade the mask to be powered and initiate its work while operating. It won’t result any side effects.
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