

Design and Prototype of Low Cost Smart Mask

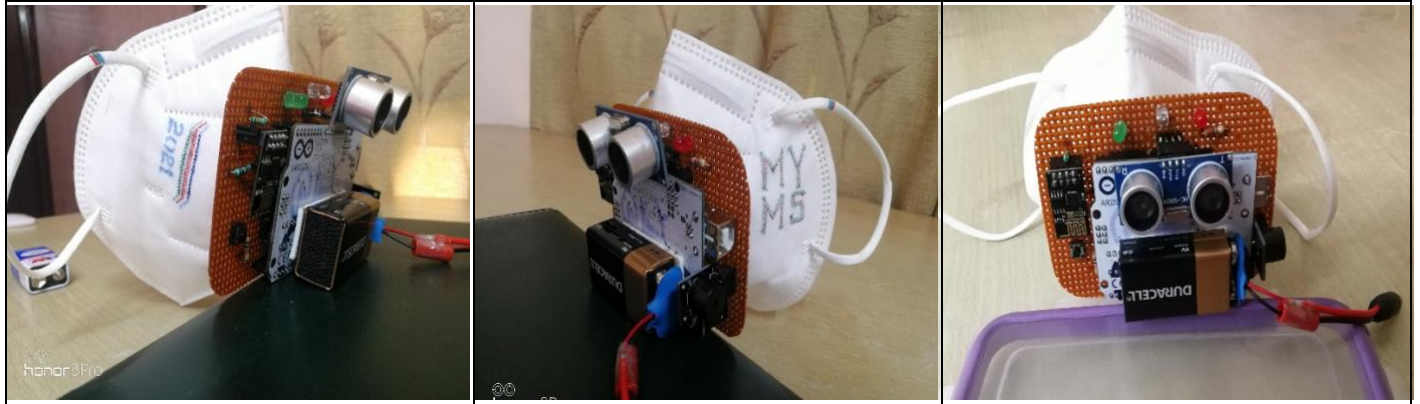
Team:

1. Mohit Yadav -17ECU012 (7.61)
3. Garry Mittal -17ECU008 (7.21)

2. Dinesh Yadav -17ECU005 (7.00)

Supervisors:

1. Dr Amanpreet Kaur – Assistant Professor - Department of Electronic and Communication Engineering



INTRODUCTION

Due to the current COVID -19 pandemic, the health care sector and other industries demand solution that allows people to go back to work without putting their health at risk. Considering this requirement as the need of the hour and as a challenge we have come up with a Smart Mask as our project. To stop and break the chain of spreading this virus we need to follow the guideline strictly and one of them is that people have to wear their mask properly, which should cover their nose and mouth instead upon their chin and mouth. This smart mask is simple in use and affordable that can be used by an individual and also by organizations such as schools, colleges, hospitals, airports and offices etc to check whether people are following the COVID -19 guideline or not. In this way this mask provides up to 80% more safety than a normal mask in any environment and we believe precaution is better than cure and can be a boon for the human race.

COMPONENTS

This mask is battery operated. The components of this mask comprise of distance sensor (Ultrasonic sensor), temperature and humidity sensor (DHT11), microcontroller (Arduino uno), WiFi module(ESP01) and LED, mic speaker and a button.

FINANCIAL VIABILITY

- The approximate cost of the base model mask would be around Rs 500.
- It will be cheaper than the other mask in the market which are of about Rs 1500 to 3750.
- It will be available in different model as per the user requirement.
- With immense flexibility, the device can be reused by the user with other masks.
- The device can be recharged for long hour functionality.

ORIGINALITY/INNOVATIVENESS

It is the first time when :-

- A smart mask is made which can monitor a person is following COVID 19 guidelines or not.
- Humidity during exhalation process is used to check a person is wearing the mask or not.
- A mask can detect a person is maintaining social distancing or not.
- The data from the mask is send to the website from where the authority can monitor real time situation.
- A mask that can warn before a person touch his face unknowingly.
- A mic and speaker are being provided to make people voice clearly audible.
- The mask is smart enough and can decide when it should send data to the website.
- The temperature of the body detected by this mask will be much more reliable than the temperature gun.

CUSTOMER ACCEPTABILITY

- It will attract attention of health care sector as it will be better than the normal mask, and cheaper than the mask which are in the market of its category.
- It will also attract education institutes like schools, colleges etc to monitor whether students are following COVID 19 guidelines or not, which can reduce the risk of transmission of virus among them.
- Places like airports, metro, malls can use this smart mask instead of keeping marshal's so that confrontation b/w people and authority can be reduced.
- Working organization like corporate office and company can use it to increase the safety and security of their employees.
- Doctor can monitor the respiration and temperature of patient from anywhere.
- Parents can use this for their children when they go out.
- Apart from the COVID 19, this mask of different model can be used in paint, cement and in working environment with potential risk, to check whether the code of labor law is followed for the health and safety of the labor.
- The ultimate aim of the project is to increase the protection of the user against COVID 19.

USEFULNESS TO SOCIETY

- As per the research done by Centers for Disease Control a procedure mask without altering the fit is about 40-60 percent effective at keeping COVID 19 sized particles out.
- A cloth mask is about 40 per cent effective. Doubling of face mask show that when a cloth mask is placed over a surgical mask , the fitted filtration efficiency improved by about 20 %.
- This smart mask will increase the safety of a person up to 80% because it will also warn for other guidelines of COVID 19.
- Can be a boon for people who work in close environment and for the health care sector to tackle the virus.
- The aim is to create a smart COVID 19 guideline mask, user-friendly, reusable and at low cost.

SUSTAINABILITY

- It is user and environment friendly.
- The device can be reused with another mask.
- There is very less need of periodic maintenance. Only, the battery needs to be charged.
- The device is inserted in the mask, after using the mask, we can throw the mask and keep the device for next use.
- It fulfills efficient, effective, cheap and productive techniques that are needed to strengthen the fight against COVID-19.

FUTURE SCOPE

- Different relaxation times can be provided.
- Can be operated on sleep mode to save battery.
- Transparent material can be used for teacher.
- The breathing rate and breathing pattern data provided by the mask can be further use in studies for COVID-19 and other disease related to respiration.
- Heart rate can also be checked by facial arteries.
- A mic and speaker can be installed in the mask to make people voice clearly audible.
- Can be customized for special purpose.

ADVANTAGES

- Monitor whether person is following COVID 19 guidelines or not.
- This mask can warn before a person touch his face unknowingly.
- It can warn if a person is not maintaining social distance.
- It can also check whether a person is wearing mask properly or not and update all this data to a website and any authorized authority from anywhere can monitor that the person is following the COVID-19 guideline or not.
- Alert person to sanitize hands after touching objects like door handles, elevator buttons, etc.
- It can monitor the real time body temperature and breathing rate and breathing pattern of a person.
- It also provides relaxation time in which person can have their lunch.
- It also has a mic and speaker so that person voice can easily be audible to other.
- It will be easy to use for the user just like normal mask.
- The focus is on simplicity and low cost in design with all requirements and needs.

