

# A SMART AI BASED PERSONAL ASSISTANT TO SUPPORT COVID-19 PATIENT

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## ABSTRACT

The project is to design a smart assistant for Covid-19 patient which will take care of physical and mental health. The project consists of three main parts. The first part includes the measuring the O<sub>2</sub> of the user and uploading it to the firebase cloud storage. Second part retrieves the data from firebase and assesses the trend of O<sub>2</sub> level, if the levels are low then the AI will automatically generate a whatsapp message to the predefined contact of the doctor. The third part is the personal assistant that uses speech recognition to surf the web for the user and perform other tasks. The assistant is specially designed to be user friendly and entertain, educate and engage the user especially those affected by Covid-19.

*Keywords: Covid-19, Oxygen, AI, personal assistance, mental health*

## 1. INTRODUCTION

We have witnessed millions Covid-19 cases across the globe and large number of deaths in the war against the virus and is still on through vaccination program, lockdowns etc.

The care of all such Covid-19 infected persons & the effect on their mental health due to lock down has been very difficult.

The pandemic has generated specific need, that require initiatives & on ground actions. The Covid-19 symptoms gave a direct attention of WHO and ICMIR but the mental health was neglected. Isolation and scarcity in health services created an additional boost to increase the number of additional patient with psychosocial and mental health disruption. Lockdown, stay at home and quarantine policies has undoubtedly developed fear, anxiety and stress amongst the patients.

Now the mental health governance is the need of the hour & strategies to meet the need by extending different virtual platforms, strengthening of mental health services. For ensuring the governance on these health services, short term & long term strategies along with the appropriate infrastructure & facilities needs to be developed. The execution of all such infrastructure requires proper financial planning & redistribution of funds as well.

While developing this project for Covid-19 patient, our approach was to focus on the identification of opportunities for implementation of long term health reform & the inclusion of platforms like 'A smart AI based personal assistant to support Covid-19 patient'.

This platform will give mental, physiological and physical health support to the Covid-19 patient. It monitors health parameters like oxygen level, temperature & Body Mass Index

and provides timely report to doctor so that the patient can be hospitalized immediately if necessary. Oxygen monitoring is very important in this case. The primary cause of the death in Covid-19 patients is the dropping of oxygen level in the patient.

Abdelrahman Y et.al. suggested the oxygen level is monitored by non-invasive measuring and observing of oxygen and heart rate using LED as a transmitter and a photodiode as a receiver. On the principal of light absorption, the oxygen level is measured. The processing is done on microcontroller using MATLAB and the output is displayed on the LCD screen. Archer, N et. al. proposed a personal health record system to take care of patient and regulate healthcare by creating medical histories and other applicable information accessible to patients, thus supporting patients in fitness self-management. The spo2 measurement is done by taking ratio to ratio of red systolic and diastolic states to infrared systolic and diastolic states of blood. C. Schreiner et.al. proposed this module which requires bi color LED transmitter and a photodiode. A two stage amplifier circuit is used to give the Spo2 reading. Dias, Duarte, and João Paulo Silva Cunha designed a Wearable Health Devices (WHDs). An emphasis on vital cyphers learnt by WHDs, health assessment, description, monitoring and acquisition of each vital cyphers is done. G. Ates and K. Polat suggested a system to measure oxygen using fuzzy logic. The value of R is calculated from red and IR signal and is used as input to fuzzy logic. Guazzi A.R. et.al. proposed a method to find the oxygen saturation using camera in the precise environment. The region of interest from the image is carefully chosen and SNR is calculated for the particular region of interest. M. T. Tamam et. al. proposed a system which measures heart rate, oxygen saturation and temperature of the human body. The system is based on the principal of capturing the changes in the voltage and processing. S. L. Iacona et.al. suggested the Personal Health System which develops a clinical file, gives the information of the illness, creating patient vigorous and sensible in the care methods. The oxygen level of arterial blood vessel is analyzed. The evaluation is done by non-invasive way in which fingertip is placed in front of glass fiber. The glass fiber is an optical transmitter. The light is passed to a spectrometric optical reception where oxygen level is determined by the inflow of blood.

Measurement of oxygen saturation of venous blood uses hominoid breathing rhythm. The photoplethysmogram indicators were noted at various wavelength. Finger is kept between the sensor and the receptor, the scattered light is cast-off in blend for the measurement.

## 2. PROPOSED ARCHITECTURE

Goal of the project is to design a smart system that will support the physical and mental health of the Covid-19 Patient. Social media has created panic, fear and anxiety and amongst the common people. Once the patient is being tested positive he/she is scared and feels lonely because of isolation. A huge variety of psychiatric signs like anxiety, worries, depression, stress symptoms, sleeplessness, visions, suspicious and suicidal ideations etc. have been found during the pandemic. Trouble in quarantining patients with active indications of obsession and severe psychosis causes mental health emergencies, which is an hour of concern. Therefore, there is a necessity to support physical and mental health of the masses during pandemic. The project development will support the patient by monitoring the oxygen level, by providing entertainment like, music, movies and information and alarm for medicine. The project consists of three main parts.

The first and second part consists of measuring and monitoring the oxygen level of the Covid-19 patient and uploading it to the firebase cloud storage. Fig. 2 shows the connection of Raspberry pi with Max30102 Oxygen level measurement module. The working of measuring and monitoring is given in flow chart in the section 2.1. All the data is sent to the cloud storage and trend of Oxygen level is measured and monitored. The plot shown in Fig. 3 and Fig. 4 shows the trend of the oxygen level of the Covid-19 patient. Fig. 3 shows that the oxygen level of the patient is above 95 and is normal and he/she needs to be isolated. Fig. 4 shows that the oxygen level of the patients is dropping below 95 and the AI will auto generate the alert whatsapp message to predefine the contact doctor for immediate care and hospitalization. Fig. 5 shows the message has been dropped to the doctor. The third part consists of the personal assistant that uses speech recognition to surf the web for the Covid-19 patient and perform variety of other jobs. The personal assistant is particularly intended to be user friendly and entertain, educate and engage the patient those affected by Covid-19. The various functions supported by Smart AI is given below in section 2.2.

### 2.1 Flow chart:

Python file is used to read and log SpO<sub>2</sub>. The code uses the modified version of the max30102 library which is an unofficial port of an Arduino library used to read oximeter data. The system uses I2c protocol to read the sensor output and convert it to useful data. The code eliminates the false readings i.e., readings below 85 and above 100 caused by improper finger placement. Five readings are made and a mean SpO<sub>2</sub> is calculated. The SpO<sub>2</sub> data is uploaded to firebase along with the date and time. The data is acquired by the AI on computer and plotted on a graph. If the oxygen has been low then a whatsapp message is sent to the predefined contact for doctor. If the oxygen level is above 95 then no notification is generated.

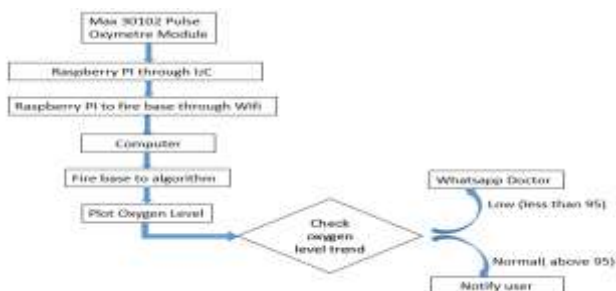


Fig. 1 Block Diagram of Smart AI Personal Assistant

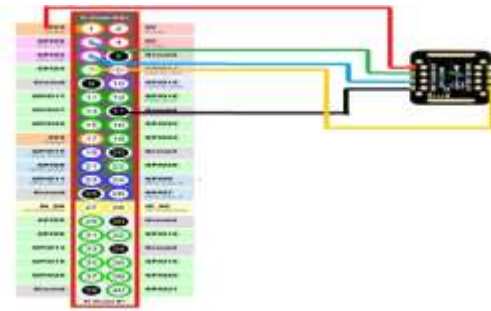


Fig. 2 Circuit diagram of Raspberry PI and Max30102



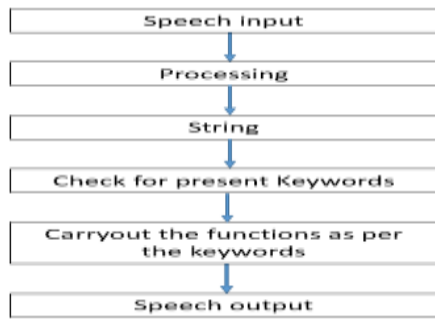
Fig. 3 Raspberry PI with Max30102

### 2.2 Smart AI Support

1. Input is taken from the user in the form of audio
2. The speech recognition library converts the audio to a string.
3. The string is converted to lower case for uniformity and checked for different keywords.
4. If a matching keyword is found then that function is performed.
5. This continues as long as the AI is awake.
6. When asleep the AI can be woken up by calling its name.

A list of the functions and the keywords is mentioned below:

1. Wikipedia: searches Wikipedia for the query.
2. On google: searches for query on google and goes to sleep.
3. On spotify: plays song on spotify and goes to sleep.
4. On youtube: searches query on youtube.
5. Message: Takes ph no. and message and sends it via whatsapp.
6. Code red: Sends message to all close family members informing them that the user has been tested positive for covid and requesting them to get scanned for covid.
7. Set alarm: takes input as time and sets an alarm.
8. BMI: calculates the BMI



### 3. RESULTS

Timely monitoring of health parameters like oxygen level, temperature & Body Mass Index. The platform will help to get connected to know the information related to covid-19 precautions through Wikipedia Google. The concept will also help a patient for recreational activities like listening to music. It plays song on spotify, youtube and goes on sleep when required. Also searches query, plays movies, songs et cetera on youtube.

Fig.3 shows the normal oxygen level trend of the patient. Fig. 4 shows the decreasing oxygen level trend of the patient. Fig. 5 shows the alert whatsapp message to Doctor.

From the result it is evident that if the oxygen level of the patient is dropping then an alert whatsapp message sent to the doctor for immediate attention.

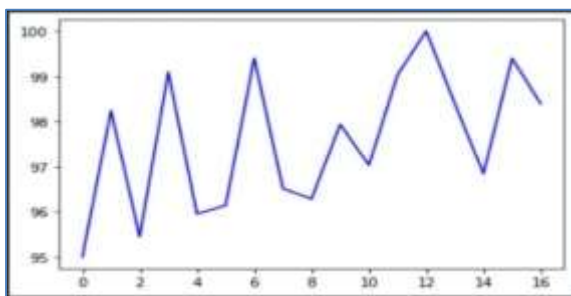


Fig. 3 Normal Oxygen level

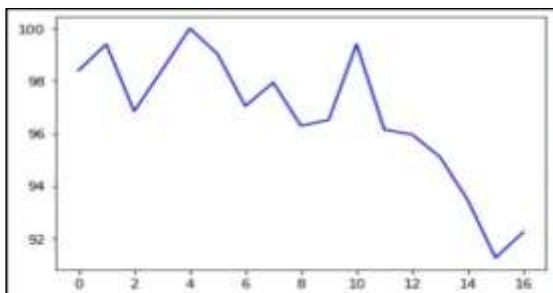


Fig. 4 Dropping Oxygen level

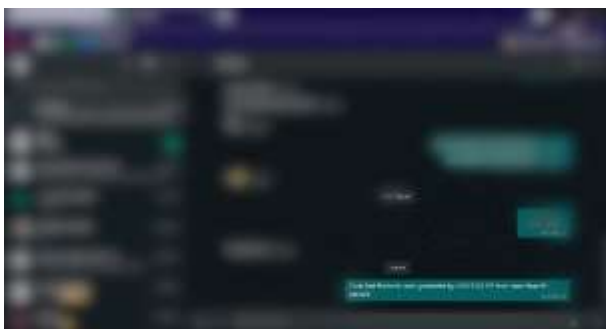


Fig. 5 Whatsapp message to Doctor

### 4. CONCLUSION

The proposed smart AI system provides physical and mental health support to the to the Covid-19 patient. If the oxygen level is low then the message is pop-up to the doctor. The stress fear and anxiety is reduced by providing the assistance of spotify, google and youtube.

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