ROBOT FOR SERVE FOOD AND MEDICINES TO PATIENTS OF CORONA VIRUS IN INDIA

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ABSTRACT

This project is an innovative solution to robotics in health care and more important to the management and control of the spread of coronavirus disease (COVID-19). The main facilities of the robots are delivering food and medicine to minimize person-to-person contact and support in hospitals and similar facilities such as quarantine. This is supportive as well as helps to minimize the life threat to medical staff and doctors to an active role in the management system of the COVID-19 pandemic. The main point of this project is to highlight the importance of medical robotics in general and then to connect its utilization with the multipurpose robot of covid treatment. This is improving smart telemedicine. Which is also effective in similar situations.

Keywords : *Medical robotics, Service robots, COVID-19 healthcare digitization, Corona-virus pandemic, COVID-19 Delivery Robots.*

1. INTRODUCTION

Our aim is to develop Medical Assistant Robot. This robot consists of a medicine reminding and medicine providing system, Automatic hand sanitizer and Physiological Monitoring System (Body Temperature, Pulse rate, Oxygen saturation level).

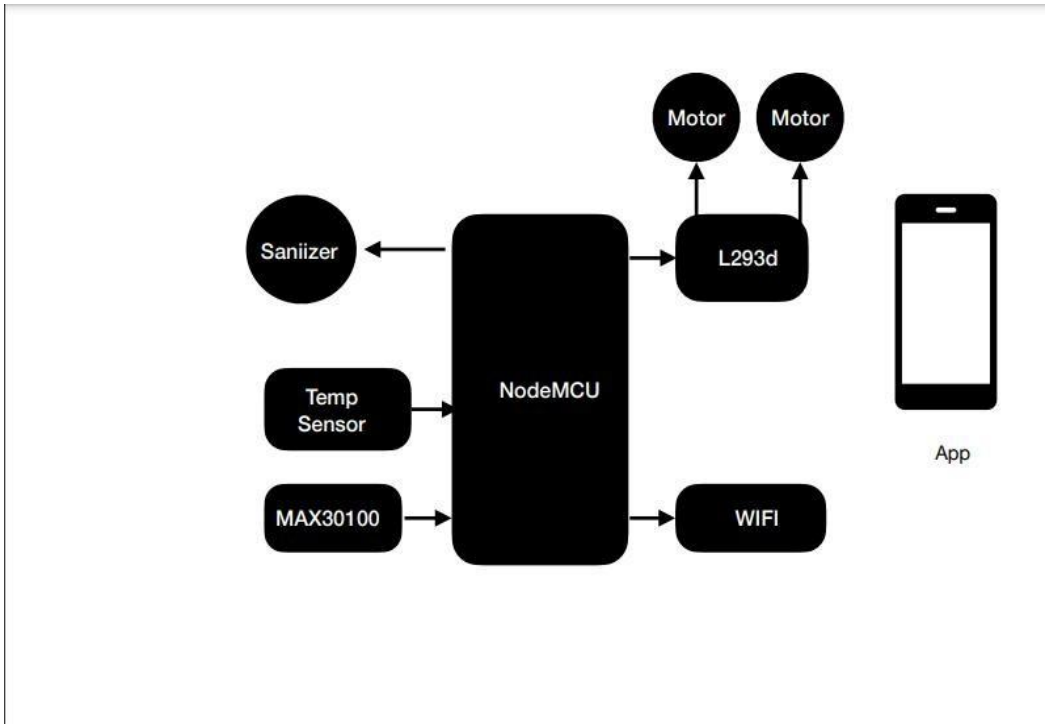
On January 30, 2020, the World Health Organization (WHO) publicly declared the COVID -19 pandemic a "global emergency" because of the speed at which it spreads around the world. The virus shook the global economy and crashed the stock markets of many countries. After confirming the first case in Wuhan, China in December 2019, the corona-virus Pandemic quickly spread across the borders with China, causing numerous incidents in almost every country in the world. According to the WHO's situational report the death rate is highest among older people compared to young ones, while male patients are more susceptible to risk compared to female patients in the same age group. Patients with pre-existing hypertension, diabetes, cancer, and chronic respiratory disease have a greater probability to pass away due to COVID-19 complications compared to patients without comorbid conditions. Therefore, it is very important to use hand sanitizers, face masks, and practice social distancing to avoid viral infection, which can spread through sneezing, touching, and shaking hands. For the medical and health care community, the use of personal protective equipment (PPE) including N-95 face masks, hand gloves for covering against the spread of coronavirus is mandatory for close monitoring of COVID-19 patients [12]. Considering the current disastrous situation, robots are well suited for caring for COVID-19 patients thus replacing or at least sharing the workload of the medical staff in hospitals under over-saturated conditions. Some robots are used for medical support in hospitals today. Robots have been assigned multiple tasks to minimize the spread of COVID-19 such as utilizing them for food and

medicine delivery in infected areas hazardous for humans. This study is one of the first studies, which highlights the importance of robotics in hospitals and health care facilities especially concerned with the COVID-19 outbreak. The purpose of this study is to explore strategic health care digitization innovation through robotics utilization in terms of global COVID-19 management perspectives [12].

Looking for the today's need We are assembling a project to protect yourself from viruses This includes building your own robot to maintain social distance. The robot delivers food and medicine with the help of a remote-control system We have added video conferencing functions in it. Because we can identify if something is available to the patient or how he is doing and we can treat them according to his needs and we can give whatever is needed to the patient with the help of robots. In this robot we have created a new robot using mechanical electrical electronics. Its sole purpose is to maintain a man-toman social distance and it does this with the help of robots It uses two geared motors, battery and battery indicator.

2. METHODOLOGY

2.1. BLOCK DIAGRAM



2.2 COMPONENTS UESD

1.Lm35 (temperature sensor)

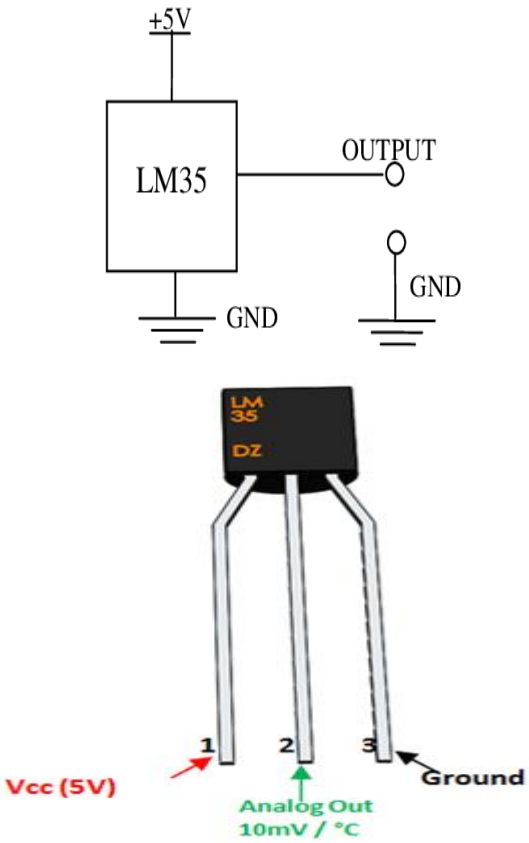
2. L293d (motor driver)

3. Max 30100 (Heart rate pulse oximeter)

4.Node MCU (open source platform)

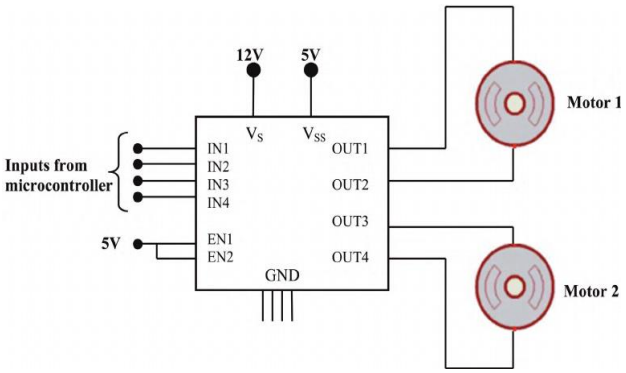
5. Camera

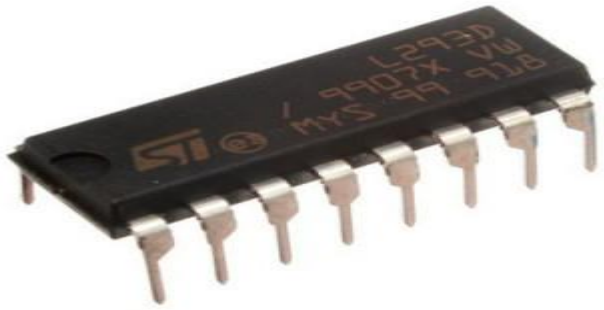
1.LM35(Temperature sensor)



LM35 sensor uses the basic principle of a diode ,where as the temperature increases, the voltage across a diode increases at a known rate.By precisely amplifying the voltage change, it is easy to generate an analog signal that is directly proportional to temperature. LM35 is three terminal linear temperature sensor from National semiconductors. It can measure temperature from -55 degree Celsius to +150 degree Celsius. The voltage output of the LM35 increases 10mV per degree Celsius rise in temperature. Minimum and Maximum Input Voltage is 35V and -2V respectively. Typically 5V. Output voltage is directly proportional (Linear) to temperature (i.e.) there will be a rise of 10mV (0.01V) for every 1°C rise in temperature.

2.L293d(Motor Driver)

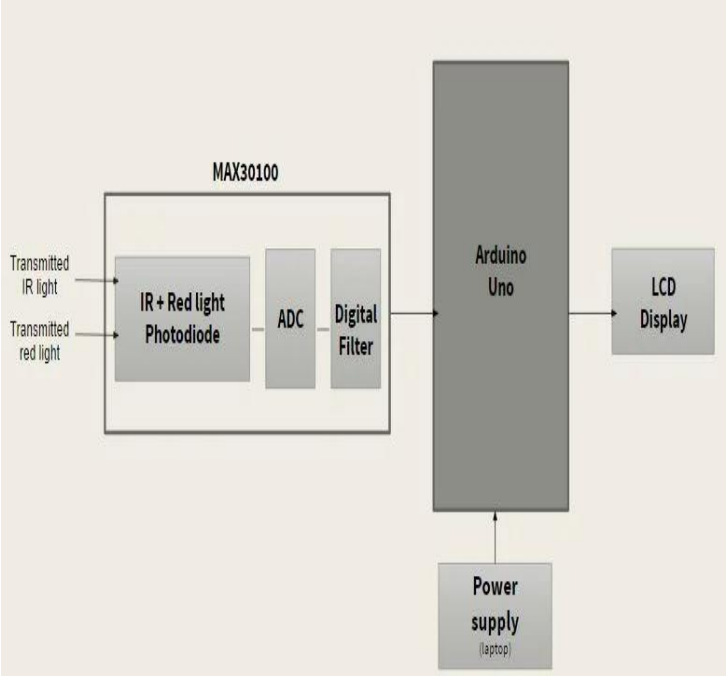




The L293D IC receives signals from the microprocessor and transmits the relative signal to the motors. It has two voltage pins, one of which is used to draw current for the working of the L293D and the other is used to apply voltage to the motors.Two of the pins on the l293d are labeled VS and VSS. Apparently they are both power. Here it shows VS being supplied with 12V, while vss is receiving 5V.

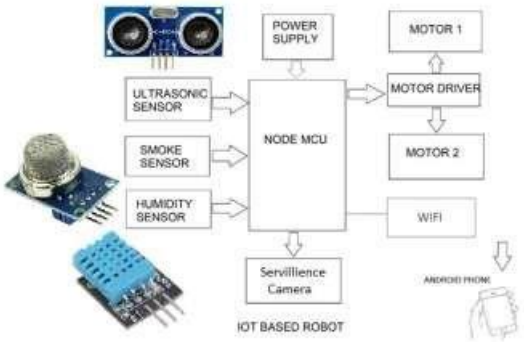
L293D motor driver Specifications: Supply Voltage Range 12V . 36V Output current capability per driver .Separate Input-logic supply . It can drive small DC-geared motors, bipolar stepper motor. Pulsed Current 1.2-A Per Driver .Thermal Shutdown. High-Noise-Immunity Inputs

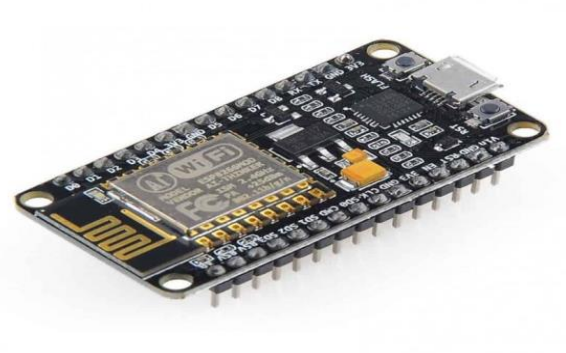
Max30100(Heart Rate Pluse Oximeter)



The MAX30100 is an integrated pulse oximetry and heart-rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals. The MAX30100 operates from 1.8V and 3.3V power sup- plies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times.

Nodmcu(Open Platform Source)

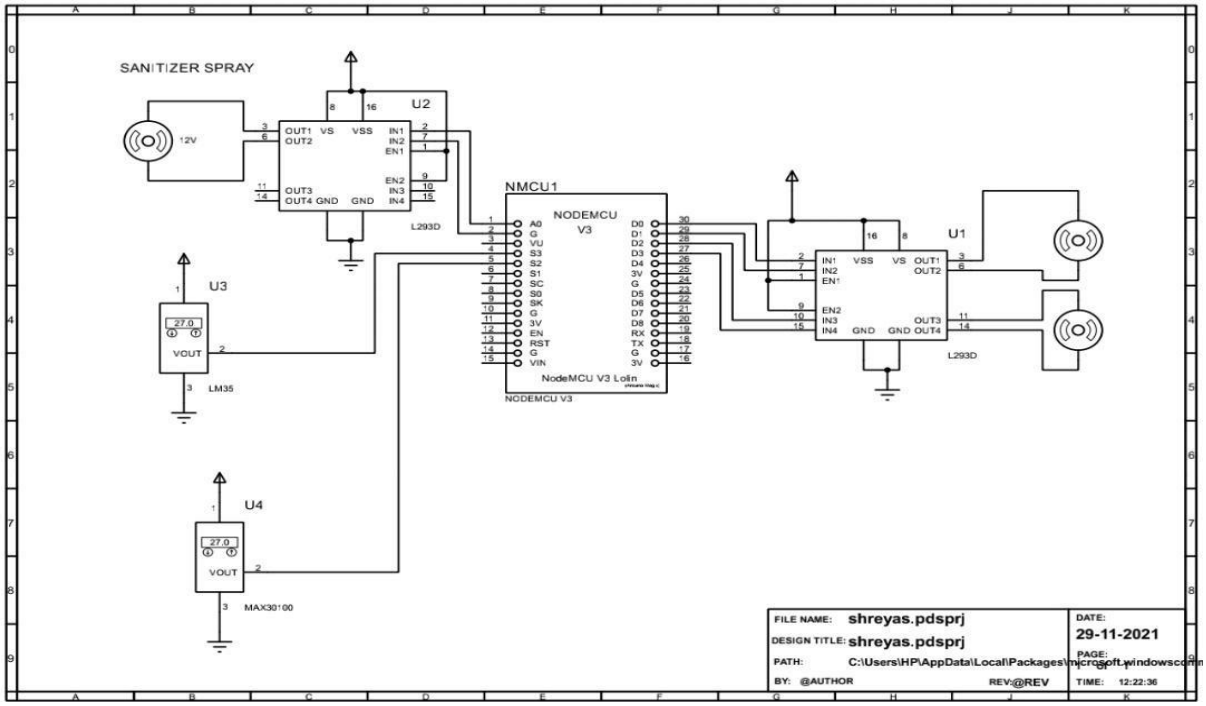




NodeMCU is an open source platform based on ESP8266 which can connect objects and let data transfer using the Wi-Fi protocol. In addition, by providing some of the most important features of microcontrollers such as GPIO, PWM, ADC, and etc, it can solve many of the project's needs alone. The module has a wireless WiFi transceiver operating in an unlicensed frequency range of 2400-2484

MHz in the IEEE 802.11 b/g/n standard, with support for TCP/IP communication protocol stack and WiFi security including WAP3.

2.3. CIRCUIT DIAGRAM



3. ADVANTAGES, DISADVANTAGES AND APPLICATIONS

A. ADVANTAGES

- Break the chain initiate.
- Special facility of reusing via charging.
- Contactless medical facilities.
- Did not come directly in contact with patient.
- Encourage the use of robots to support social distancing.
- Robots can work in hazardous environments.
- Robots need no environmental comfort.
- Protect yourself from COVID-19 situations.
- It can be used in Military purpose.

B. DISADVANTAGES

- In case of battery discharging the system can failures of supply.
- They have no emotion.

C. APPLICATIONS

- It can be used in hospitals.
- It can be used in quarantine area.
- It can be used contactless food delivery to patients.
- Boring and unpleasant tasks.
- It can be used repetitive tasks.
- It can be also used in residential, commercial and industries.

4. CONCLUSION

- In this project, we have presented a robot for serving food and medicines to patients. Who are suffering from COVID-19.
- Also, in this project, we have implemented a temperature wireless sensor.
- We concluded that moving towards high technology the upcoming model is a robot that provides food and medicine to the patients.
- This robot helps a doctor to avoid direct contact with patients.

REFERENCES

[1] T. Yukawa, N. Saito, W. Matsuoka, A. Kanda, and H. Okano, "Autonomous control of care and welfare robot," *2004 1st IEEE Tech. Exhib. Based Conf. Robot. Autom. Proceedings, TExCRA 2004*, pp. 53–54, 2004, doi: 10.1109/texcra.2004.1424993.

[2] Y. Hada, H. Gakuhari, K. Takase, and E. I. Hemeldan, "Delivery service robot using distributed acquisition, actuators and intelligence," *2004 IEEE/RSJ Int. Conf. Intell. Robot. Syst.*, vol. 3, pp. 2997–3002, 2004, doi: 10.1109/iros.2004.1389865.

[3] S. Thiel, D. Häbe, and M. Block, "Co-operative robot teams in a hospital environment," *Proc. - 2009 IEEE Int. Conf. Intell. Comput. Intell. Syst. ICIS 2009*, vol. 2, pp. 843–847, 2009, doi: 10.1109/ICICISYS.2009.5358271.

[4] J. Hu *et al.*, "An advanced medical robotic system augmenting healthcare capabilities - Robotic nursing assistant," *Proc. - IEEE Int. Conf. Robot. Autom.*, pp. 6264–6269, 2011, doi: 10.1109/ICRA.2011.5980213.

[5] F. Peleato, M. Prabakar, and J. H. Kim, "Smart global positioning system for autonomous delivery robots in hospitals," *Proc. - 29th South. Biomed. Eng. Conf. SBEC 2013*, pp. 141–142, 2013, doi: 10.1109/SBEC.2013.79.

[6] H. S. Ahn, M. H. Lee, and B. A. Macdonald, "Healthcare robot systems for a hospital environment: CareBot and ReceptionBot," *Proc. - IEEE Int. Work. Robot Hum. Interact. Commun.*, vol. 2015-Novem, pp. 571–576, 2015, doi: 10.1109/ROMAN.2015.7333621.

[7] Y. Hirata, Y. Sugiyama, and K. Kosuge, "Control architecture of delivery robot for supporting nursing staff," *2015 IEEE/SICE Int. Symp. Syst. Integr. SII 2015*, pp. 345–351, 2016, doi: 10.1109/SII.2015.7404944.

[8] S. Jeon and J. Lee, "Vehicle routing problem with pickup and delivery of multiple robots for hospital logistics," *Int. Conf. Control. Autom. Syst.*, vol. 0, no. Iccas, pp. 1572–1575, 2016, doi: 10.1109/ICCAS.2016.7832511.

[9] J. Han, H. J. Kang, and G. H. Kwon, "Understanding the servicescape of nurse assistive robot: The perspective of healthcare service experience," *2017 14th Int. Conf. Ubiquitous Robot. Ambient Intell. URAI 2017*, no. July 2013, pp. 644–649, 2017, doi: 10.1109/URAI.2017.7992693.

[10] J. Liu, F. Zhou, and L. Yin, "Design of a Service Robot Cloud Service Platform," *2019 4thAsiaPacific Conf. Intell. Robot Syst. ACIRS 2019*, pp.124–128, 2019, doi: 10.1109/ACIRS.2019.8936034.

[11] T. T. Nguyen, "Artificial Intelligence in the Battle against Coronavirus (COVID-19): A Survey and Future Research Directions," no. August, 2020, doi: 10.13140/RG.2.2.36491.23846/1.

[12] Z. H. Khan, A. Siddique, and C. W. Lee, "Robotics utilization for healthcare digitization in global COVID-19 management," *Int. J. Environ. Res. Public Health*, vol. 17, no. 11, pp. 1–23, 2020, doi:10.3390/ijerph17113819.