A Survey based IoT Model to Maintain Social Distancing

Deepa Sonal

Department of Computer Science, Patna Women's College, Patna-800001, India
deepsonapwc[at]gmail.com

Abstract: *Ever since the end of 2019, the planet has been facing the COVID-19 challenge. Pandemic that has spread worldwide. Scientists and researchers are trying day and night to create a vaccine, Coronavirus to monitor it. The world will have to fight COVID before an effective vaccine is created— Pandemic 19 with caution. The recording of the health of people is now done with a smart phone, and Web- based questionnaire-focused applications. Networks that are embedded with artefacts, computers, or items Sensors are known as the Web of Things (IoT). It's possible to use the Internet of Things (IoT) to avoid the Covid-19 Spreading. This impacts not only the reduction of healthcare costs, but also facilitates the rapid recovery and care of an infected patient. The present research, therefore, is an attempt to investigate, analyse, and highlight the using a perspective roadmap to discuss the COVID—overall implementations of the well-proven IoT philosophy Pandemic of 19.In this paper, the Covid-19 monitoring technique's real-time detection and alerting method is Proposed based on the literature available.*

Keywords: IoT, Social Distancing, COVID-19, alerting, Monitoring

1. Introduction

The Internet of Things (IoT) is a well-developed system of interconnected, interactive and virtual machine techniques mechanical instruments capable of transmitting data across a given network at any point without human interference. IoT is now a well-established and validated programme that serves as a gateway to countless tactics, rapid Study, the theory of machine learning, sensory goods, etc. In normal periodic activity, IoT is also recognised as the Features of products or facilities that, in many ways, serve the real-life needs of human beings, such as Home defense, smart classes, smart healthcare systems, and many more that can be easily managed by our frequent use of notebooks, laptops, etc. The majority of nations, in the latest pandemic situation, they are struggling against COVID-19, like India, and are also searching for a realistic and cost-effective solution to face the challenges that emerge in many ways. No medication or vaccine has, sadly, been successfully implemented yet. The manufacturing of an efficient drug should take over a year, especially because the presence of the virus has not yet been completely identified (MônicaVitalino de Almeida et al., 2020). Scientists and researchers aim to overcome these problems, to generate groundbreaking ideas to clarify new problems of analysis. To generate explanations that are user-centered and to construct The civilian population and ourselves as a whole. Today, the best way to fight against Corona disease in the world is to delay its spread by precautions such as social distancing, washing hands, and face masks (i.e.'flattening the spread').

The curve Many innovations, however, are being used to overcome the consequences of the pandemic of COVID-19. AI, the most popular digital networks are block chain, IoT and next-generation telecommunication networks like 5G technologies that play a very significant role in the 2020 Pandemic (Ting et al., 2020).In the sense of digital technology can play an important role in improving healthcare facilities in the COVID-19 pandemic, WHO and CDC According to the (World Health Organization, 2020). Usage of IoT potential in today's world has been increased its implementations. IoT technology may also help limit its spread through early detection. (or forecast) and monitoring of new cases of COVID -19(2016 Kelly) (Hlaing et al., 2018). Any current process, for example, the Aarogya Setu App is used to notify individuals about the suspected patient of COVID-19to come around or come over. But sometimes, many people have no symptoms.But they don't upgrade themselves, their app information. Thus individuals in the public unknowingly came into touch with an infected person Domain. Thus, from one infected person to another, the chain of transmission of diseases continues.

The COVID-19 patient communication system fails several times due to a lack of knowledge. The paper proposes a COVID-19 digital ring alarm system which is connected to the Arduino UNO board with an IR sensor. As follows, the remainder of the paper is structured. A comprehensive literature review is given in section 2. The suggested IoT In section 3, along with its components and functions, the model is presented. Finally, the work is concluded in section 4.

2. Objectives

In our research we'll capture the following objectives-
- To learn more about major forms of attacks in safety band.
- To know about security requirements involved in corona virus period.
- To assimilate the issues involved in security of with corona virus.
- To overview the academic and technical solutions.

3. Methodology

Area of study
People unknowingly came in contact with an infected person in the public domain. Thus, the chain of disease transmission

continues from one infected person to another. So the existing system of COVID-19 patient's contact fails many times due to lack of information. This paper proposes a COVID-19 alerting digital ring system that has an IR sensor attached with the Arduino UNO board. Sensors are information suppliers the actual world, which has been passed through the network, and the actuators enable objects to respond to the feedback sensed. IR Sensor, Thermometer, Infrared, Optical camera, Smartwatch and IP Camera are important sensors, which are used in IoT system. This model has to be designed in a band shape so that people can wear it as a wrist-band. Whenever we are in the public domain area, we have to switch on this model circuit, which is battery operated and has a switch to on and off the band.In the proposed model, a digital ring is designed that has an IR sensor attached with the Arduino UNO board .Arduino UNO gets input from the IR sensor when we move our hand near any object. As soon as IR will sense the object, Arduino will activate the output pin. At the output pin, the buzzer will start producing alert sound. This Alert sound can be off manually when we wash our hand.

4. Hypothesis

Before a successful vaccine is developed, the world will have to fight the COVID-19 pandemic with precaution. The monitoring of the health of individuals is now done with a smartphone, and web-based apps focused on questionnaires. Networks of objects, devices or items that are embedded with sensors are referred to as the Internet of Things (IoT).

1) Person wearing this band tries to touch something in the public domain, the IR sensor in the band will sense the object and the buzzer attached with this band will produce a beep sound that will put the attention of that person that he/she has touched an anonymous object which can be virus infected.

2) Networks of objects, devices or items that are embedded with sensors are referred to as the Internet of Things (IoT). The Internet of Things (IoT) can be utilized to stop spreading the Covid-19.

3) Sensors are information suppliers the actual world, which has been passed through the network, and the actuators enable objects to respond to the feedback sensed.

5. Methodology

5.1 Proposed IoT Model

For solving some real-time issues, IoT is application-specific, low-energy, reliable and simple to use. The Sensors the real environment, which has been passed through the network, is information providers, and the actuators make objects are detected to respond to the feedback. IR Sensor, Thermometer, Infrared, Smartwatch and Optical Camera and IP Camera is an important sensor used in the IoT framework.

A proposed IoT system to prevent the dissemination of knowledge COVID-19 is shown under Mistake! Source reference not found. In the proposed model, a digital ring

that has an IR sensor attached to the Arduino UNO board is planned. In order for people to wear it as a wrist-band, this model has to be built in a band shape. Whenever we are inside, we have to turn on this model circuit in the public domain region, which is battery-operated and has a band on and off switch.

5.2 Theory of Working

The IR sensor in the band whenever a person wearing this band attempts to touch something in the public domain, the object will be sensed and a beep sound will be produced by the buzzer attached to this band that will put the attention that individual has touched an anonymous item that may be contaminated with the virus. Block diagram of the proposed model you can see this model in Figure 1.
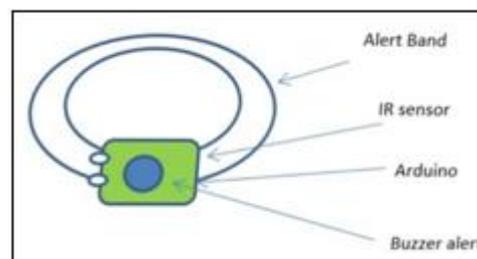

Figure 1: Proposed Model Diagram

This Arduino Board and IR Sensor Communication with Buzzer you can see it in Figure 2. The person is now alert to touching his face, nose, and eyes. Once there is the person will wash his hand, and then only the sound of the buzzer will stop buzzing by resetting it.
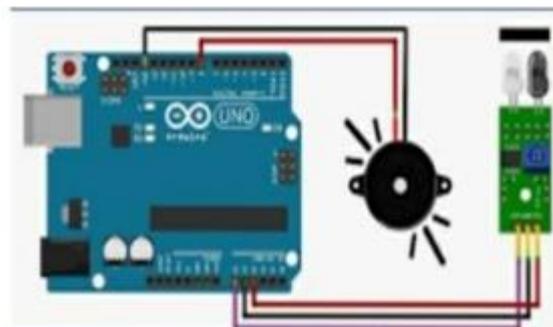

Figure 2: Circuit Diagram of the Model

5.3 Algorithm for the Model Proposed

1) When we move our hand close to some object, Arduino UNO obtains input from the IR sensor.
2) The output pin is triggered by Arduino as soon as the IR senses the object.
3) The buzzer will start generating warning sounds at the output pin.
4) When we wash our hands, this alarm sound can be manually switched off.
5) End Up

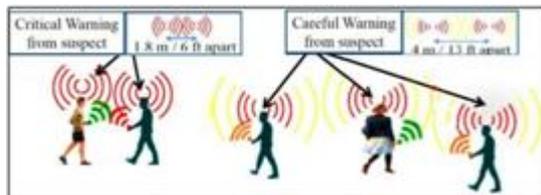Based on the distance of the object detected, this warning band can create two types of alert sound. As described in

Figure 3: Working of Alert Band

It can be clearly noted in Figure 3 that:-
1) When any entity is 4m-13m away, a "careful warning" alarm sound will be produced by the band. If we're warning, then enough of that, we can manually turn off the sound,
2) When an object is just 1.8m-6m away, a "critical warning" alert sound is produced by the band. This warning the sound indication for the breach of "Social Distancing" is higher alert. This sound cannot be turned off.It was only manually switched off when the object retains social Distancing.

ARDUINO
Arduino is an open source microcontroller that is easy to program, uninstall and reprogram at any time. The Moment in Time. Arduino boards, launched in 2005, are based on Atmel microcontroller modules (MCU). On some of there is an additional microprocessor-based computer with more efficient devices that offers greater processing power and connectivity over networks.
The Atmel MCUs are based on Arduino Uno, Nano, Mini 05, Mega 2560, Leonardo, Micro, Robot, Esplora boards,AVR architecture with (Cvjetkovic & Matijevic, 2016).
• ATmega328-Uno Nano and Mini 055
• ATmega2560-Mega 2560
• ATmega32u4-Leonardo, Robot, Micro, Esplora

The ATmega328 / P provides the following features: In-System Programmable Flash 32Kbytes with ReadWhile-Write capabilities,1 Kbytes EEPROM, 2 Kbytes SRAM, 23 Real-Time Counter (RTC) gepurpose working registers, three flexible timers/counters with comparable modes PWM, one programmable serial USARTs, one 2-wire serial interface (I2C) byte-oriented, 6-channel 10-bbb serial interface (I2C)Serial Interface (I2C) The CPU stops idle mode while allowing SRAM, neral-purpose operating registers, to continue service, Timer / Counters, SPI port and system interrupt. The Power-down mode preserves the contents of the register but freezes the oscillator, disabling all other functions of the chip before the next interrupt or reset of the hardware. The asynchronous timer continues to run in power-save mode, enabling the user to retain a timer base while the remainder of the system is sleeping.

In order to reduce switching noise during ADC conversions, the ADC Noise Reduction mode stops the CPU and all I/O modules except the asynchronous timer and ADC. In Standby mode, when the rest of the system is sleeping, the crystal/resonator oscillator works. Combined with low power consumption, this enables very fast start-ups.

Figure 4: ARDUINO UNO Board

As shown in Figure 4, in Extended Standby mode, both the main oscillator and the asynchronous timer continue to run (Ajit Kumar, 2020).

IR Sensor
An infrared sensor is an electronic device that emits some external objects to detect them. An IR sensor can measure the temperature of an object, but it can also detect movement. Instead of the so-called passive IR sensor emitting it, these kinds of sensors only measure infrared radiation. Usually, within the infrared range, all objects radiate some thermal radiation. Our eyes are invisible to these sources of radiation, but an infrared sensor can detect them.

The emitter is simply an IR LED, and the detector is simply a sensitive IR photodiode of the same wavelength as that emitted by the IR LED. The resistances and the output voltage scan change in relation to the magnitude of the received IR light when IR light falls on the photodiode.
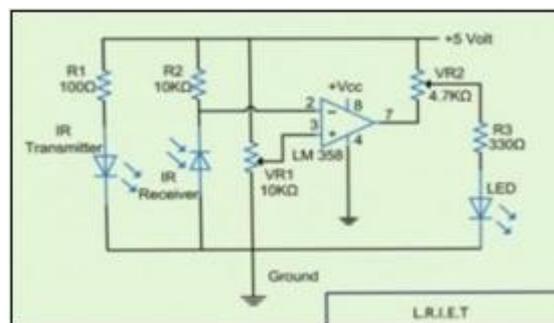

Figure 5: IR Sensor circuit

Figure 5 demonstrates this IR sensor circuit.

The following components form this circuit:
1) IR transmitter and receiver pair LM358 IC
2) The Resistors (Range of kilo-ohms)
3) Resistors vector
4) Diode Emitting Light (LED)

In this model, the transmitter section includes an IR sensor, which transmits continuous IR rays to be received by an IR receiver module. An IR output terminal of the receiver varies depending upon its receiving of IR rays.

Since this variation cannot be analyzed, therefore, the output can be fed to a comparator circuit. Here an operational amplifier (op-amp) of LM 339 is used as a comparator circuit.

If the IR receiver does not receive a signal, the inverting input potential is greater than the IC comparator's non-inverting input (LM339). The comparator's performance is therefore tiny, but the LED does not shine. The signal at the inverting input is poor when the IR receiver module receives the signal to the potential.
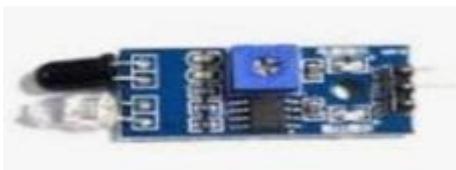

Figure 6: IR Sensor

Thus, the comparator production (LM 339) goes high and the LED begins to glow. Resistors R1 (100), R2 (10k) and R3 (330) are used to ensure that the IR LED devices such as Photodiode and normal LEDs pass through at least 10 mA current. For changing the output terminals, Resistor VR2 (preset=5k) is used. To set the sensitivity of the circuit diagram, Resistor VR1 (preset=10k) is used. The IR sensor is shown in figure 6.

Buzzer
In general, to signal individuals, a piezo buzzer is used in the form of a tone or beep. In alarms, domestic gadgets or embedded systems goods, this type of buzzer is commonly used to provide some indication or warning. By creating a small circuit, we can easily connect it with the Arduino.


Figure 7: Illustrates an active buzzer of 5v with three pins, i.e. GND, VCC and I/O (5v).

6. Data Analysis and Discussion

Survey Conducted on Lockdown
According to 29.8% peoples lockdown should be done in future to control corona virus and 21.3% peoples do not want any kind of lockdown specially the middle class people and the basis worker but 48.9 % opinions between yes or no they want to control the corona virus but, due to unstability, occurring in income they also don't want lockdown in future.
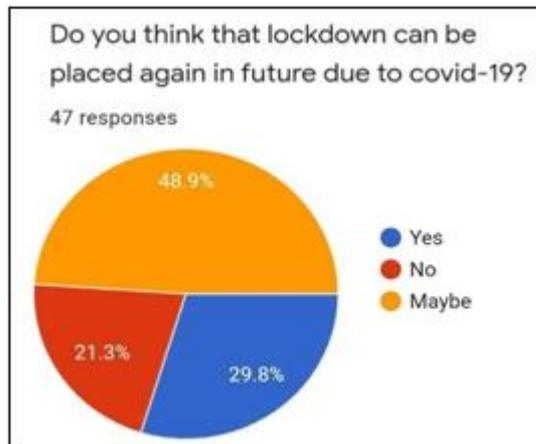

Survey Conducted on Uses of Masks
In the survey of uses of masks we get to know that peoples are using masks but not in proper way many people wear masks properly but there are many peoples that they wear mask not as their responsibility.
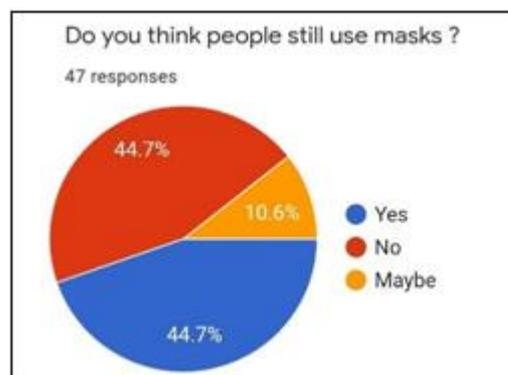

Survey Conducted on Vaccination
Regarding vaccination safety, 78.7% people are not sure about the safety of vaccination but 17% people are sure about the safety of vaccination and very few people don't trust on vaccination here we conclude that unless and until people uses the vaccination they are not going to believe on the vaccination safety.
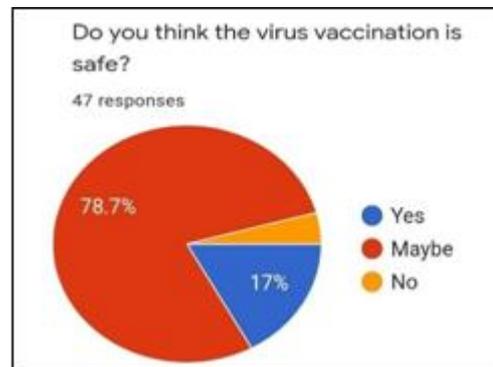

Survey Conducted on Social Distancing
When we move to social distance survey we find that 85.1% people are not maintaining social distance .only 8.5 % of people are following the social distance and 6.4 % people are not sure about this. So we conclude that very large number of people not taking social distancing seriously.
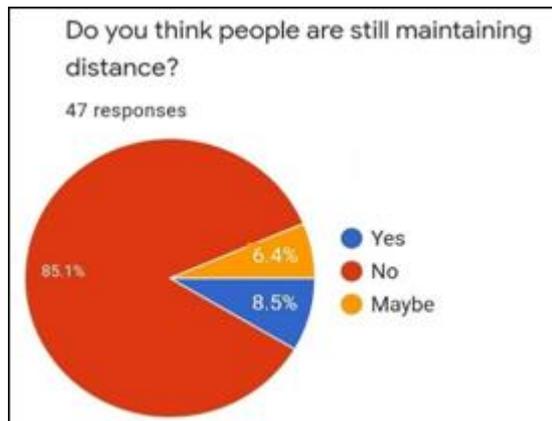
Survey on virus is fully recovered

In the survey of corona virus, we get to know that 85.1% people are still thinking that virus is still in risk and it is not fully recovered but 6.4% people are giving their positive opinion for corona virus they are thinking that corona virus is fully recovered and 8.5% are not so sure that corona virus is fully recovered or not .Therefore, in this survey, we conclude that corona is still active.
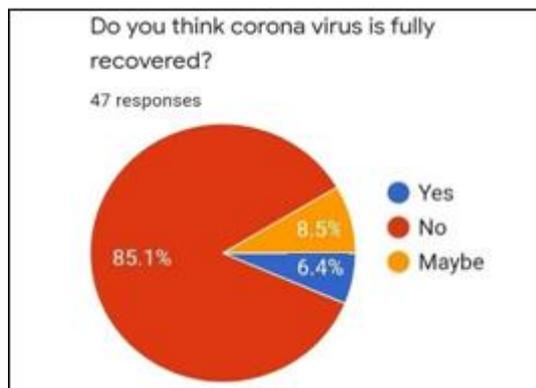
7. Future scope

As countries reopen workplaces and markets progressively after the lockdown, Band is one of the most powerful IoT devices to ensure that individuals practice social distancing. Integrated with the Internet of Medical Things, this wearable interface detects and collects data from other devices. If people are very close to each other, the band operates within a small radius and demonstrates possible danger through its LED lights. For example, if someone wearing a band gets to another person within 6 metres, the band will begin to beep to warn each of them and remind them to maintain the proper distance from each other. Compared with smartphone apps, this software has shown great performance, and it can be used without any mobile devices. In addition, it is a cost-effective system that offers a greater sense of security and peace of mind to individuals.

8. Conclusion

It's really tough to identify an infected human. The only way to avoid the spread of the virus is by social distancing from the crowd. The use of IoT with smart sensors would help to warn the person and pay attention to prevent the ears, nose and eyes from being crowded or touched. This model would also allow social distancing to be developed.Many developed countries are facing economic catastrophe because of the lockout and have begun the unlocking process. Therefore, the chances of group transmission of viruses have risen. The suggested model would help protect a person from COVID-19 by alerting and reducing the effect of group transmission over and over again.

References

[1] Ajit Kumar, S. (2020). Applications of IoT in Agricultural System. International Journal of Agricultural Science and Food Technology, 6(1), 041–045. https://doi.org/10.17352/2455-815X.000053

[2] Allam, Z., & Jones, D. S. (2020). On the Coronavirus (COVID-19) Outbreak and the Smart City Network: Universal Data Sharing Standards Coupled with Artificial Intelligence (AI) to Benefit Urban Health Monitoring and Management. Healthcare.https://doi.org/10.3390/healthcare8010046

[3] Alshraideh, H., Otoom, M., Al-Araida, A., Bawaneh, H., & Bravo, J. (2015). A Web Based Cardiovascular Disease Detection System. Journal of Medical Systems.https://doi.org/10.1007/s10916- 015-0290-7

Author Profile

Ms. DEEPA SONAL Gold Medalist in Bachelor of Computer Applications from Patna Women's College, Patna University, Patna, Bihar in 2015 and Gold Medalist in Master of Computer Applications from LNMI, Patna, Bihar in 2018. She qualified UGC-NET in 2019. Currently pursuing Ph.D. from Veer Kunwar Singh University, Arrah and currently working as Assistant Professor in Department of Computer Science, Patna Women's College, Patna. She is also the Life member of Indian Science Congress Association since 2016. She has presented two research papers in Indian Science Congress Conference on Big Data and Cloud Security. Her area of interest is Design and Analysis of Algorithms, Artificial Intelligence, IoT through Arduino Programming, Quantum computing, Cloud Security, Big data Analytics. She has published her 5-6 paper in SCOPUS/UGC-Care/ Elsevier publication. She has 3 years of teaching experience and 2 year of Research experience.