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An Enhanced Deep Learning Framework For COVID-19 Detection

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ABSTRACT:

The year 2020 is witnessing a global health and economic crisis due to the COVID-19 pandemic. Countries across the world are using digital technologies to fight this global crisis. These digital technologies strongly rely, in one way or another, on the availability of wireless communication systems. This system aims to outline the role of wireless communications in the COVID- 19 pandemic from multiple perspectives. First, we show how wireless communication technologies are helping to combat this pandemic by monitoring the spread of the virus, enabling healthcare automation, and enabling virtual education and conferencing. We emphasize the importance of digital inclusiveness in the pandemic and possible solutions to connect the unconnected. Next, we discuss the challenges posed by the use of wireless technologies, including concerns about privacy, security, and misinformation. Later, we highlight the importance of wireless technologies in the survival of the global economy, such as automation of industries and supply chain, e-commerce, and supporting occupations that are at risk. Finally, we outline that the rapid development of wireless technologies during the pandemic is likely to be useful in the post-pandemic era. Since the outbreak of Covid-19, infrared thermometers are being used as a screening tool to scan the people at Airports, Railway Stations, and other crowded establishments. These scans are being used to identify potential patients of Covid-19. The government made it compulsory to scan everyone before entering the office, school, or any other crowded place. We will be using Arduino Uno, MLX90614, IR Sensor to build this project. The IR sensor is used to calculate the distance between the thermometer and the person. The thermometer will only measure the temperature when the distance is less than 25 CM.

Keywords: COVID-19, wireless communication protocol, MLX90614

INTRODUCTION

Nowadays people around the world are facing lot of difficulties for controlling and destroying the COVID-19 virus. Most of the medical expertise and researchers are continuously working to find the solution for this corona disease. Corona virus disease (COVID-19) is an infectious respiratory disease that originated from the city of Wuhan, China, in December 2019 and spread worldwide. COVID- 19 has affected almost all the countries in the world, significantly disrupting the noble sustainable development goals (SDGs) of the United Nations (UN) and prompting the World Health Organization (WHO) to declare the virus a global pandemic in March 2020.

Since COVID-19 is a global issue, researchers around the world from fields as varied as biomedicine, virology, data analytics, and artificial intelligence have contributed to combating this pandemic. The applications of digital technologies are numerous, ranging from tactile robotics to assist medical doctors and nurses at hospitals, drones to monitor crowds, artificial intelligence and deep learning to analyze and model healthcare trends, the Internet of Things (IoT) for supply chain automation, and virtual learning for education. All of these crucial applications, as well as many others, require reliable and high-speed communication networks, placing tremendous pressure on these networks. In light of the pandemic, the International Telecommunication Union (ITU) conducted an emergency meeting of the Broadband Commission for Sustainable Development, which directed governments, industries, and society at large to improve the capacity of communication networks at critical location such as hospitals and transportation hubs. In addition, the Commission also stressed the importance of communication technologies for disseminating critical information in a timely manner, supporting e-learning for more than 1.5 billion students, training workers to improve productivity through digital means, and promoting e-businesses.

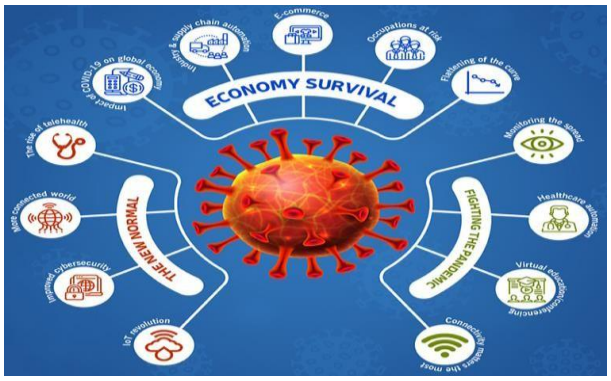

Fig: 1.0 Role of wireless communication technologies in the COVID-19 pandemic

PROPOSED SYSTEM

FUNCTIONAL BLOCKS

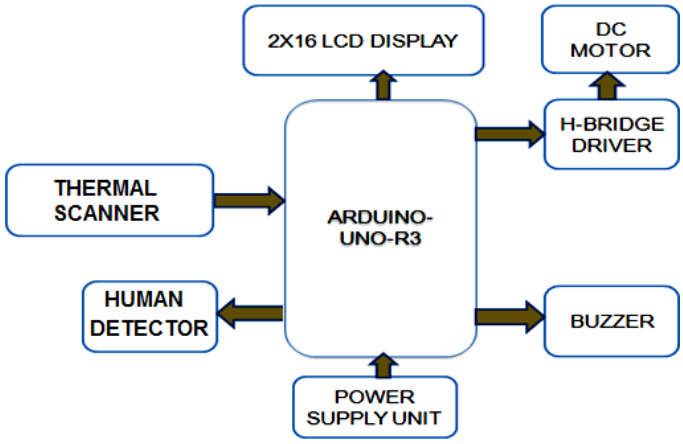

Fig: 2.1 Functional block diagram of the system

The system consists of Arduino UNO- R3(ATmega-328) microcontroller, Digital thermal scanner, Human detector (IR), H-bridge driver, buzzer, 2X16 LCD display unit and +5V power supply unit. The human detector is used to detect the human entry. The IR (Infra Red) sensor is act as a human detector. The wireless thermal scanner is used to scanning the body temperature of the human and generates the equivalent electrical output. These outputs are applied to the input of the controller. The controller controls the gate mechanism for block the human who exceed the normal temperature level (100^0C) and also the controller activates the buzzer when the people identified. The H- bridge mechanism is used to drive the DC motor of the gate control mechanism. The 2X16 LCD is used to display the information about the locker function.

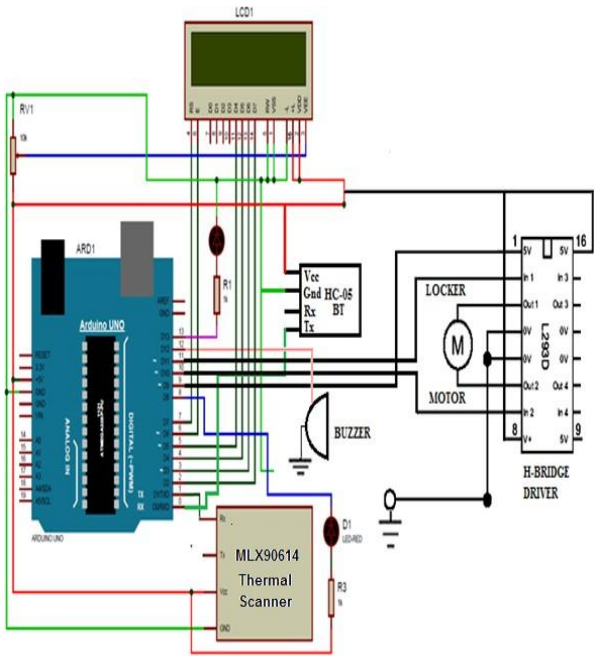

Fig: 2.2 Circuit diagram of the proposed system

POWER SUPPLY UNIT

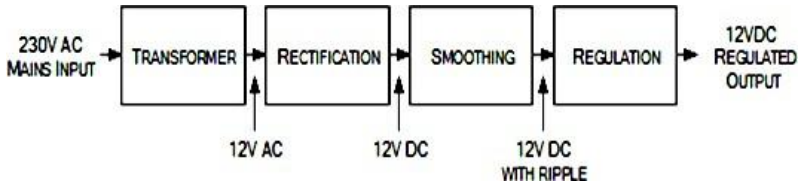

Fig: 2.3 Block diagram of power supply unit

AC power is easily in bulk from through different methods, but generally for many power control circuits and other industrial application DC power is very much required. Hence AC power necessarily has to be converted into DC power by means of electronic rectifier, which is simpler, cheaper, and highly efficient compared to rotary converters or DC generators. The "**rectifier**" is a circuit, which converts AC Voltage and currents into pulsating DC voltages and currents. It consists of DC components and the unwanted ac ripple or harmonic components, which can be removed by using filter circuit. Thus the output obtained will be steady DC voltage and magnitude of DC voltage can be varied by varying the magnitude of AC Voltage.

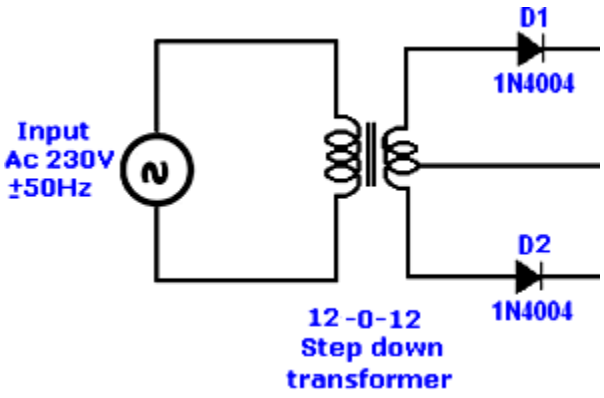

Fig: 2.4 Circuit diagram of power supply unit

2.ANDROID STUDIO

Fig: Android studio Logo

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems. It is a replacement for the Eclipse Android Development Tools (ADT) as primary IDE for native Android application development. Android Studio was announced on May 16, 2013 at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0. The current stable version is 3.0 released in October 2017.

TABLE: Specification about Android studio

Developer(s)	Google, JetBrains
Stable release	3.0.1 / November 20, 2017; 3 months ago[1]

Preview release	3.1 Beta 2 / February 10, 2018
Repository	• https://android-review.googlesource.com/
Development status	Active
Written in	Java
Operating system	Windows, macOS, Linux[2]
Size	683 MB compressed[2]
Type	Integrated development environment (IDE)
License	Freeware[3] +Source code[4][5]
Website	developer.android.com/studio/index.html

CONCLUSION

Wireless communication technologies are playing a significant role in winning the fight against pandemic's disruption of everyday life and in looking forward to the "new normal." In this paper, we discussed the variety of global challenges stemming from the COVID-19 pandemic, and we highlighted the need for wireless communication technologies in facing challenges such as monitoring the spread of the virus, enabling healthcare automation, and allowing virtual education and conferencing.

Moreover, we have also discussed the hazards posed by these technologies, such as privacy, security, and the threat of misinformation. Additionally, we also showed that wireless communication technologies are assisting in the survival of the global economy by aiding industries, supply chains, and e-commerce with automation. Finally, we highlighted several use cases that revolutionized wireless communication technologies during the pandemic, promising a technological transformation in the future.

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