IOT POWERED SMART ELECTRONIC NOTICE BOARD

Dr. B. Sravan Kumar[1*], Theegala Shravan[2], Naliganti Uday Kiran[2], Rapaka Nagamani[2], Badavath Swapna[2]

[1,2]Department of Computer Science and Engineering (AI&ML), Vaagdevi College of Engineering, Bollikunta, Warangal, Telangana.

*Corresponding Email: sravankumar_b@vaagdevi.edu.in

ABSTRACT

The project focuses on developing a digital notice board that displays messages on an LED scrolling board using IoT technology. Instead of relying on traditional notice boards, users can view information directly on the digital display. This system can be effectively implemented in environments such as schools, colleges, banks, and other institutions. The setup consists of an LED scrolling display, an IoT modem, and a microcontroller. Users can send messages to the IoT modem, which is interfaced with the microcontroller-based control system. The microcontroller reads the received message from the modem and automatically displays it on the LED scrolling board. Each new message overrides the previous one, ensuring that only the latest information is shown. This process repeats seamlessly with every incoming message, providing an efficient and up-to-date communication platform.

Keywords: Electronic Display, Digital Notice Board, Real-time Updates, ESP32/ESP8266, Wi-Fi Enabled Display

1. INTRODUCTION

In the contemporary world of overwhelming connection, we are so focused on the ease of accessing information. By the virtue of the internet or newspapers, we love keeping ourselves updated and informed. Notice boards are the primary thing in any institutions or public utility places like bus stations, railway stations, colleges, malls etc. Now a days, papers or wired notice board displays serves for the purpose. A specific person is assigned the task for pasting the notice. This not only calls in for extra labour charges as well as consumes a whole lot of time. In the current era where ease of access has always been at the top place in the catalogue of development, need to deliver the message faster is very crucial. This project enables us to communicate without even having someone's contact details or neither needed to have any account with the system hence is better than any online services available till date. The range it provides is its biggest capability. With routers as repeaters, it can service an entire organization located at one place. With furthermore work removing the complexity 'n' no. of classrooms can be delivered with the separate messages to be displayed by having all the tabs representing the classes in only one app. Hence this paper is based on an ingenious rather an exhilarating manner of directing messages to the peers or common folks by employing a wireless electronic display board which is synchronized using an android app. This is a project that displays messages that the user desires, on an LED Display Matrix. The Display consists of 256 LED lights, sequentially arranged in 8 rows and 32 columns (8*32). Apart from the display, the project consists of a Node MCU controller which helps the system to connect to the Wi-Fi. This system makes use of Google Assistant to accept speech inputs from user, through user's Android smartphone. User needs to login into their Google account. A USB cable acts as the power

cable for the system. The speech input is converted into a text display in an alphanumeric format which is predefined. The displayed message will either scroll or remain static, based on the size of display and length of message. This project can widely use in offices, schools, educational institutions as well as government and corporate offices to display important notices and messages. This can prove to help users save a lot of time as against the use of traditional pin and paper notice display. The Digital Campus Notice Board Android app, empowered by IoT technology, revolutionizes communication within educational institutions. This innovative app seamlessly integrates Internet of Things capabilities to provide real-time updates, event notifications, and important announcements. By leveraging IoT, the app ensures efficient and instant dissemination of information, fostering enhanced connectivity and engagement among students, faculty, and staff. From emergency alerts to academic notices, the app transforms traditional campus communication into a dynamic and interactive experience, contributing to a more connected and informed educational community. In an era defined by technological advancements, educational institutions are embracing innovation to streamline communication and enhance campus life. One such innovation is the Digital Campus Notice Board Android app empowered by IoT (Internet of Things) technology, which revolutionizes the traditional campus bulletin board experience. By leveraging IoT sensors, devices, and connectivity, this app offers a dynamic platform for disseminating information, facilitating engagement, and improving overall campus communication. The integration of IoT technology into the Digital Campus Notice Board app enables real- time updates and notifications, ensuring that students, faculty, and staff receive timely

information about events, announcements, schedules, and emergencies. Unlike traditional notice boards that require manual updates, this app automates the process, allowing administrators to remotely manage and distribute content with ease. With IoT-enabled sensors strategically placed across the campus, the app can provide location-specific information and alerts, such as room changes, maintenance updates, or campus security advisories. This granular level of communication enhances situational awareness and promotes a safer environment for everyone on campus. Multimedia support is another key feature of the Digital Campus Notice Board app, allowing users to access a variety of content formats, including text, images, videos, and audio recordings. This versatility enables administrators to deliver engaging and visually appealing messages, capturing the attention of the campus community and effectively conveying important information.

Personalized user access is another advantage offered by the app, allowing students, faculty, and staff to customize their notification preferences based on their interests and roles within the institution. Whether it's filtering announcements by department, subscribing to specific event categories, or setting notification priorities, users have the flexibility to tailor their experience according to their needs. The app's user-friendly interface makes it easy for individuals to navigate and interact with the digital notice board, whether they're accessing it from their smartphones, tablets, or desktop computers. Intuitive features such as search functionality, bookmarking, and calendar integration further enhance the user experience, making it effortless to stay informed and engaged with campus life. Moreover, the Digital Campus Notice Board app fosters a sense of community by providing opportunities for collaboration and participation. Through features like event RSVPs, discussion forums, and feedback mechanisms, users can actively engage with campus events, initiatives, and policies, contributing to a more inclusive and vibrant campus culture. From an administrative perspective, the app offers valuable insights and analytics, allowing stakeholders to track engagement metrics, measure the effectiveness of communication strategies, and make data-driven decisions to enhance campus

operations. This data-driven approach enables institutions to continually optimize their communication channels and improve the overall student experience.

2. LITERATURE SURVEY

PRASAD P.KULKARNI(2018): The paper authored by Prasad P. Kulkarni titled "Wireless Digital Electronic Notice Board Using WiFi" was published in the International Journal of Innovations in Engineering Research and Technology (IJIERT) in April 2018. The focus of the research is on creating a wireless digital notice board system utilizing WiFi technology. The system likely aims to provide a modern and efficient way of displaying electronic notices. The use of WiFi suggests a wireless connectivity feature, allowing seamless communication and updates. Given the publication in a reputable engineering journal, it implies a scholarly approach to the development of the notice board. The paper may cover aspects such as the design, implementation, and potential applications of the wireless electronic notice board. Readers can expect insights into the technical details, innovations, and contributions of the proposed system within the context of engineering research and technology.[1]

DESHPANDE ARTI PRAKASH(2015): The paper authored by Deshpande Arti Prakash titled "Electronics Notice Board Using Arduino" was published in the International Journal of Advance Research, Ideas, and Innovations in Technology. The publication, with ISSN 2454-132X, is from Volume 04, Issue 03. Notably, the paper highlights an electronics notice board system implemented with Arduino technology. Arduino is a popular open-source electronics platform known for its versatility in creating various electronic projects. The emphasis on an "electronics notice board" implies a digital and dynamic display system. The publication in a journal that values advance research and ideas suggests a focus on innovation and technological advancements. The specified impact factor of 4.295 indicates the perceived significance and influence of the research within the academic community. Readers can anticipate insights into the design, functionality, and potential applications of the Arduino-based electronic notice board as well as its contribution to technological advancements in the field.[2]

DESHMUKH V.R. and KARANDE N.D(2011): The collaborative work of Deshmukh V. R. and Karande N.D. titled "LED Scrolling Display Using Android Phone" is featured in the International Journal for Scientific Research & Development (IJSRD), with ISSN (online) 2321-0613, as part of Volume 04, Issue 01. The paper likely explores the development of a scrolling LED display system controlled by an Android phone. This implies a user-friendly interface for managing the LED display through a mobile device. The integration of LED technology suggests a visually dynamic and attention-catching display. Published in IJSRD, the research emphasizes a scientific and developmental approach, indicating a scholarly contribution to the field. Given the specified volume and issue, the paper may delve into technical details, design considerations, and potential applications of the LED scrolling display. Readers can expect insights into the practical implementation and innovative aspects of using an Android phone as a control interface for the LED scrolling display system.[3]

T.ELIZABETH DARRYL JACOB(2017);Authored by T. Elizabeth Darryl Jacob, the paper titled "Real-Time DigiNotice Board System using IoT" is featured in the International Journal of Engineering Research & Technology (IJERT) and is part of the RTICCT - 2017 Conference Proceedings. The focus of this research is

likely on developing a digital notice board system with real-time capabilities, incorporating the Internet of Things (IoT) technology. The mention of IoT suggests a networked and connected system, enabling seamless communication and updates. Being part of a conference proceedings indicates a presentation or discussion of the research at a recognized event. Published in IJERT, the paper aligns with engineering research and technology, suggesting a technical and innovative approach to the development of the DigiNotice Board System. Readers can expect insights into the real-time aspects, IoT integration, and potential applications of the system within the context of the conference's themes and discussions.[4]

BHUPESH ANEJA, CHHAVI SRIVASTAV , KARTAVYA FARASHWAL, AJEY ADITYA(2016):The collaborative work of Bhupesh Aneja, Chhavi Srivastav, Kartavya Farashwal, and Ajey Aditya titled "Wireless Electronic Display Board Using GSM Technology" is published in the International Journal of Advanced Technology in Engineering and Science. This paper, part of Volume 4, Issue 3, dated March 2016, likely explores the development of a wireless electronic display board employing GSM (Global System for Mobile Communications) technology. The emphasis on "wireless" implies a connectivity solution that doesn't rely on physical cables. The incorporation of GSM technology suggests a mobile communication infrastructure, enabling remote control and updates for the display board. Being published in a journal focused on advanced technology indicates a technologically innovative approach. Readers can anticipate insights into the design, functionality, and potential applications of the wireless electronic display board, with specific attention to the role of GSM technology. The publication date situates the research within the technological landscape of 2016, providing historical context for advancements in wireless display systems.[5]

ANURADHA MUJUMDAR, VAISHALI NIRANJANE & DEEPIKA SAGNE, (2014): The collaborative work of Anuradha Mujumdar, Vaishali Niranjane, and Deepika Sagne, titled "Scrolling LED display using wireless transmission," is published in the International Journal of Engineering Development and Research. The paper, identified by ISSN 23219939, is part of Volume 2, Issue 1, and spans pages 475-478. The research likely focuses on the development of a scrolling LED display system with wireless transmission capabilities. The use of wireless technology implies a cable-free communication approach, enhancing flexibility in display placement. Published in an engineering development and research journal, the work signifies a contribution to the scholarly understanding and advancement of LED display systems. Readers can expect insights into the technical aspects, design considerations, and potential applications of the scrolling LED display with a specific emphasis on wireless transmission. The specified page range provides a reference for those seeking detailed information within the publication.[6]

GOWRISHANKAR KASILINGAM, MRITHA RAMALINGAM AND CHANDRA SEKAR (2014): The collaborative work by Gowrishankar Kasilingam, Mritha Ramalingam, and Chandra Sekar, titled "A Survey of Light Emitting Diode (LED) Display Board," is featured in the Indian Journal of Science and Technology. This publication, from February 2014, is part of Volume 7, Issue 2, spanning pages 185-188. The paper is likely a survey, indicating a comprehensive examination and analysis of the existing state of LED display boards. Given the focus on LED technology, the survey may cover various aspects such as design variations, technological advancements, and applications of LED display boards. Published in a reputable journal, the work signifies a scholarly contribution to the understanding and assessment of LED display technology. Readers can expect insights into trends, challenges, and potential areas of improvement in the field of LED display boards based on the survey conducted by the authors. The publication date provides a historical context for the state of LED display technology in 2014.[7]

R.RANADHEER REDDY, N PRASHANTH, G. INDIRA, M SHARADA(2018): The collaborative work of R. Ranadheer Reddy, N. Prashanth, G. Indira, and M. Sharada, titled "Electronic Scrolling Display Using Arduino Board," is published in the International Journal of Engineering Research in Electrical and Electronic Engineering (IJEREEE). The paper, part of Volume 4, Issue 2, dated February 2018, likely explores the development of an electronic scrolling display system with the utilization of Arduino technology. Arduino is a versatile open-source electronics platform known for its ease of use in various applications. The emphasis on "scrolling display" suggests a dynamic visual output. Published in an engineering research journal, the work signifies a contribution to the understanding and application of electronic scrolling displays. Readers can anticipate insights into the technical details, design considerations, and potential applications of the system based on Arduino technology. The publication date situates the research within the technological landscape of 2018, providing context for advancements in electronic scrolling display systems.[8]

ANURADHA MUJUMDAR, VAISHALI NIRANJANE & DEEPIKA SAGNE, (2014): The collaborative work by Anuradha Mujumdar, Vaishali Niranjane, and Deepika Sagne, titled "Scrolling LED display using wireless transmission," was published in the International Journal of Engineering Development and Research. The paper, with ISSN 23219939, is part of Volume 2, Issue 1, spanning pages 475-478. The research likely focuses on the development of a scrolling LED display system incorporating wireless transmission technology, enhancing flexibility and convenience in deployment. Published in an engineering development and research journal, the work indicates a contribution to the scholarly understanding and advancement of LED display systems. Readers can expect insights into the technical aspects, design considerations, and potential applications of the scrolling LED display, particularly with a focus on wireless transmission. The specified page range provides a reference for those seeking detailed information within the publication. The work adds to the growing body of knowledge in the field of LED display systems and wireless communication.[9]

E.FERRO and F.POTORTI(2005): The collaborative work by E. Ferro and F. Potorti, titled "Bluetooth and Wi-Fi wireless protocols: a survey and comparison," was published in the IEEE Wireless Communications journal, Volume 12, Number 1, in February 2005. The paper likely provides a comprehensive survey and comparison of Bluetooth and Wi-Fi wireless protocols, both of which are widely used for short-range and local wireless communication. The publication in IEEE signifies a rigorous and scholarly approach to the exploration of these wireless technologies. Readers can anticipate insights into the technical features, advantages, and limitations of Bluetooth and Wi-Fi, offering a valuable resource for researchers, engineers, and professionals in the wireless communications field. The specified volume, issue, and page numbers provide a clear reference for those interested in accessing detailed information within the publication, which contributes to the understanding of wireless communication protocols in the early 2000s.[10]

ANUPAMAKAUSHIK(2016): International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE), Volume 5, Issue 3, in March 2016. The paper provides a comprehensive overview of the Internet of Things (IoT), a paradigm that connects physical devices and enables them to communicate and share data. Anupama Kaushik explores the fundamental concepts, applications, and challenges associated with IoT technology. The author discusses the potential impact of IoT on various sectors, such as healthcare, agriculture, and smart cities. The paper delves into the underlying technologies that enable IoT, including sensors, communication protocols, and data analytics. Furthermore, it highlights the importance of security and privacy considerations in IoT deployments. Overall, Anupama Kaushik's paper serves as a valuable resource

for understanding the key aspects of IoT and its implications in the realm of computer and communication engineering.[11]

 ANDREA ZANELLA, LOREN ZOVANSELISTA(2014): The paper "Internet of Things for Smart Cities" authored by Andrea Zanella, Loren Zovanselista, and Michele Zorzi, all esteemed members of the IEEE, was published in the inaugural issue of the IEEE Internet of Things Journal in February 2014. The paper focuses on the application of the Internet of Things (IoT) in the context of smart cities. Zanella, Zovanselista, and Zorzi delve into the integration of IoT technologies to enhance the efficiency and sustainability of urban environments. They explore various aspects such as smart infrastructure, energy management, and intelligent transportation systems within the smart city framework. The authors discuss the potential benefits and challenges associated with deploying IoT solutions in urban settings, emphasizing the role of communication protocols, sensor networks, and data analytics. Overall, the paper contributes significantly to the early discourse on leveraging IoT for the development of smarter and more connected urban spaces, offering insights into the potential transformative impact of IoT technologies on the fabric of modern cities.[12]

 FORAM KAMDAN,ANUBBHAV MALHOTRA AND PRITISH MAHADIK (2013) : The paper authored by Foram Kamdan, Anubhav Malhotra, and Pritish Mahadik focuses on the implementation of a system to display messages on a notice board using GSM technology. Published in the Research India Publications, the paper is featured in Volume 3, dated November 7, 2013, with ISSN 2231-1297. The authors describe a novel approach to enable wireless communication via GSM for updating information on a notice board, offering a practical and efficient solution. The system likely involves the integration of GSM modules for remote message transmission. The research addresses the potential applications of such a system in diverse settings, such as educational institutions or public spaces, enhancing communication and information dissemination. The authors may discuss the technical details of their implementation, including hardware components, software protocols, and the overall functionality of the GSM-based notice board system. This paper contributes to the field of wireless communication and information display systems, providing insights into practical applications of GSM technology for effcient message dissemination on notice boards.[13]

 JADHAV VINOD,NAGWANSHI TEJAS(2016): The paper authored by Vinod Jadhav and Tejas Nagwanshi titled "Digital Notice Board using Raspberry Pi" is featured in the International Journal of Computing and Technology (IJCAT), Volume 3, Issue 2, in February 2016. The research focuses on leveraging Raspberry Pi, a single-board computer, to create a digital notice board system. The authors likely explore the integration of Raspberry Pi with display technologies for efficient and dynamic information dissemination. The paper is expected to discuss the hardware and software components employed in the implementation, including programming languages and protocols utilized for communication. The digital notice board system could provide advantages such as real-time updates, remote management, and the potential for multimedia content. The research contributes to the field of computing and technology by showcasing a practical application of Raspberry Pi for enhancing traditional notice board functionalities. This paper likely serves as a valuable resource for individuals interested in the intersection of embedded systems and communication technologies for information display purposes.[14]

 N.JAGAN MOHAN REDDY AND G.VENKATESH(2014) : The paper by N. Jagan Mohan Reddy and G. Venkatesh, titled "Wireless Electronics Display Board using GSM Technology," is featured in the International Journal of Electrical, Electronics, and Data Communication. The publication, with ISSN 2320-2084, likely explores the implementation of a wireless display board system using GSM technology. The

authors may delve into the integration of GSM modules to enable remote communication and control of the electronic display board. The paper may discuss the advantages of such a system, including real-time updates, ease of information dissemination, and potential applications in various contexts. Technical aspects such as hardware components, communication protocols, and programming languages are likely addressed. The research contributes to the field of electrical and electronics engineering by showcasing a practical application of GSM technology for wireless communication in display systems. This paper serves as a resource for those interested in the intersection of wireless communication and electronics display technologies, providing insights into the implementation and potential benefits of GSM-based electronic display boards.[15]

MR. RAMCHANDRA K. GURAV, MR. ROHIT JAGTAP(2015): The paper authored by Mr. Ramchandra K. Gurav and Mr. Rohit Jagtap introduces a "Wireless Digital Notice Board Using GSM Technology," published in the International Research Journal of Engineering and Technology (IRJET) in December 2015. The system focuses on leveraging GSM technology for remote notice board updates. It enables real-time information dissemination, allowing users to wirelessly update notices. The emphasis is on enhancing traditional notice boards by incorporating wireless communication, providing an efficient and convenient means of sharing information. The paper likely discusses the technical aspects of implementing GSM technology, emphasizing its application in the context of digital notice boards. The objective is to improve communication efficiency and ensure timely updates through the integration of GSM technology in the notice board system.[16]

PROF. SUDHIR KADAM , ABHISHEK SAXENA , TUSHAR GAURAV(2015):The paper authored by Prof. Sudhir Kadam, Abhishek Saxena, and Tushar Gaurav presents an "Android-Based Wireless Notice Board and Printer," published in the International Journal of Innovative Research in Computer and Communication Engineering in December 2015. The system integrates Android technology to enhance the functionality of a wireless notice board. Additionally, the paper introduces a printer component for physical copies of notices. The focus is on providing a user-friendly and efficient platform for remote notice updates using Android devices. This innovative approach leverages the prevalence of Android technology to improve accessibility and convenience in managing notice board information. The integration of a printer expands the system's capabilities, allowing users to obtain hard copies of important notices. The work contributes to the advancement of electronic notice board systems by incorporating Android-based solutions and addressing both digital and physical notice dissemination.[17]

C.N.BHOYAR , SHWETAKHOBRAGADE , SAMIKSHA NEWARE(2017): Authored by C.N. Bhoyar, Shweta Khobragade, and Samiksha Neware, the paper titled "Zigbee Based Electronic Notice Board" was published in the International Journal of Engineering Science and Computing in March 2017. The research focuses on implementing Zigbee technology for the development of an electronic notice board system. Zigbee, known for its low-power and reliable communication, is employed to establish a wireless network for efficient notice board management. The system aims to provide a robust solution for real-time updates and information dissemination. The paper likely discusses the technical aspects of Zigbee integration, emphasizing its suitability for low-energy communication and its role in ensuring a dependable electronic notice board system. This work contributes to the exploration of Zigbee technology in enhancing communication systems, particularly in the context of electronic notice boards.[18]

V.P.PATI, ONKAR HAJARE, SHEKHAR PALKHE,BURHANUDDIN RANGWALA (2014): The paper authored by V.P. Pati, Onkar Hajare, Shekhar Palkhe, and Burhanuddin Rangwala, titled "Wi-Fi Based

Notification System," was published in The International Journal Of Engineering And Science (IJES) in Volume 3, Issue 5, 2014. The research focuses on the development of a notification system utilizing Wi-Fi technology. The system aims to provide efficient and rapid communication for the dissemination of notifications. Wi-Fi infrastructure is leveraged to establish a wireless network, ensuring seamless connectivity for timely updates. The paper likely discusses the technical details of implementing Wi-Fi for notification purposes, emphasizing the advantages of using existing Wi-Fi networks. This work contributes to the exploration of Wi-Fi technology in enhancing communication systems, particularly in the context of notification systems. The emphasis is on utilizing Wi-Fi's ubiquity to create an accessible and effective platform for information dissemination.[19] **S.ARULMURUGANP P,S.ANITHAP P,A.PRIYANGAP, S.SANGEETHAPRIYA (2016)**:Authored by S. Arulmurugan P P, S. Anitha P P, A. Priyanga P P, and S. Sangeethapriya, the paper titled "Smart Electronic Notice Board Using Wi-Fi" was published in the International Journal of Innovative Science, Engineering & Technology in March 2016 (Vol. 3, Issue 3, ISSN 2348 – 7968). The research focuses on the implementation of a smart electronic notice board system utilizing Wi-Fi technology. The system aims to provide an advanced platform for efficient notice updates and information dissemination. Leveraging Wi-Fi connectivity, the paper likely discusses the technical details of creating a smart and accessible notice board, emphasizing the advantages of Wi-Fi in terms of speed and accessibility. This work contributes to the integration of modern technology, specifically Wi-Fi, to enhance traditional notice boards, ensuring rapid and convenient updates for users. The emphasis is on creating a smart electronic notice board that aligns with contemporary communication needs.[20]

3. PROPOSED SYSTEM

The proposed system aims to develop a smart IoT-based LED notice board using the ESP32 microcontroller, enabling real-time wireless communication for displaying messages remotely. This system integrates Wi-Fi connectivity, allowing users to update notices via an IoT app, eliminating the need for physical intervention. Additionally, environmental parameters such as temperature and humidity are monitored using dedicated sensors, and real-time clock (RTC) functionality ensures accurate time-based scheduling of messages. This approach enhances efficiency, accessibility, and automation in information dissemination, making it ideal for educational institutions, offices, and public spaces. The block diagram represents the architecture of the proposed system, illustrating how different components interact with the ESP32 controller. The power supply unit (RPS) provides stable voltage to the system. The ESP32 serves as the core processing unit, receiving input from an IoT application via Wi-Fi for remote message updates. Environmental data is collected through temperature and humidity sensors, while RTC ensures time-based operations. The processed information is displayed on an LED notice board, providing real-time updates. This structured design enhances the functionality, automation, and accessibility of the notice board system.
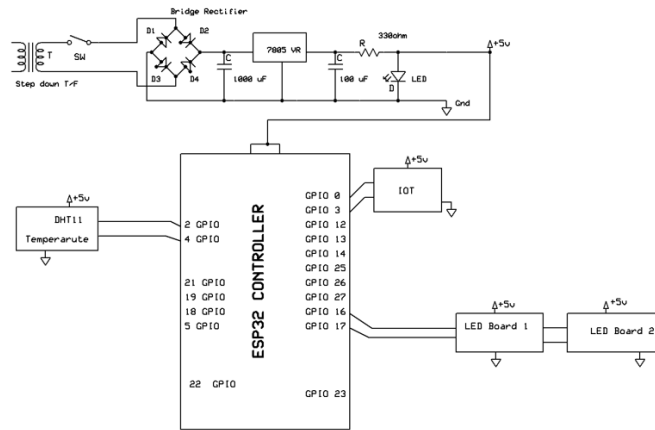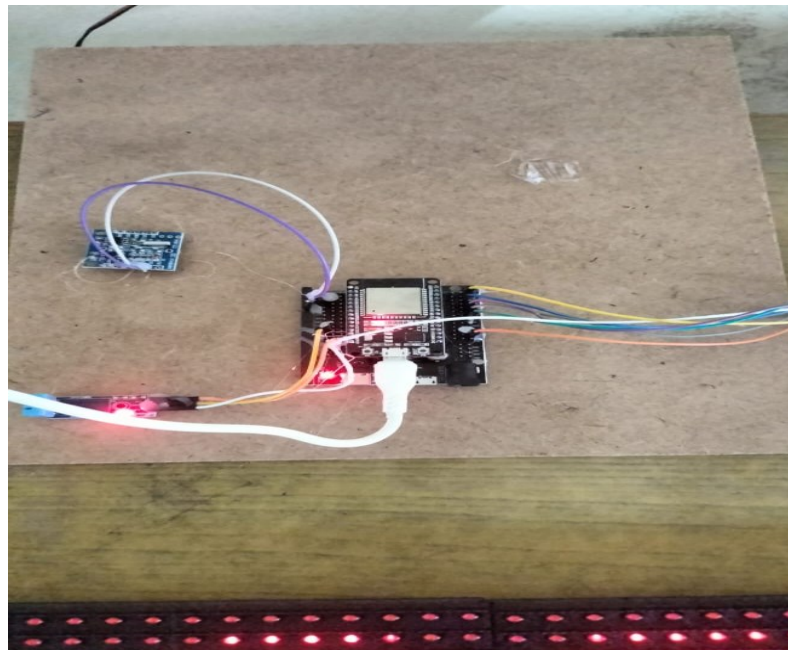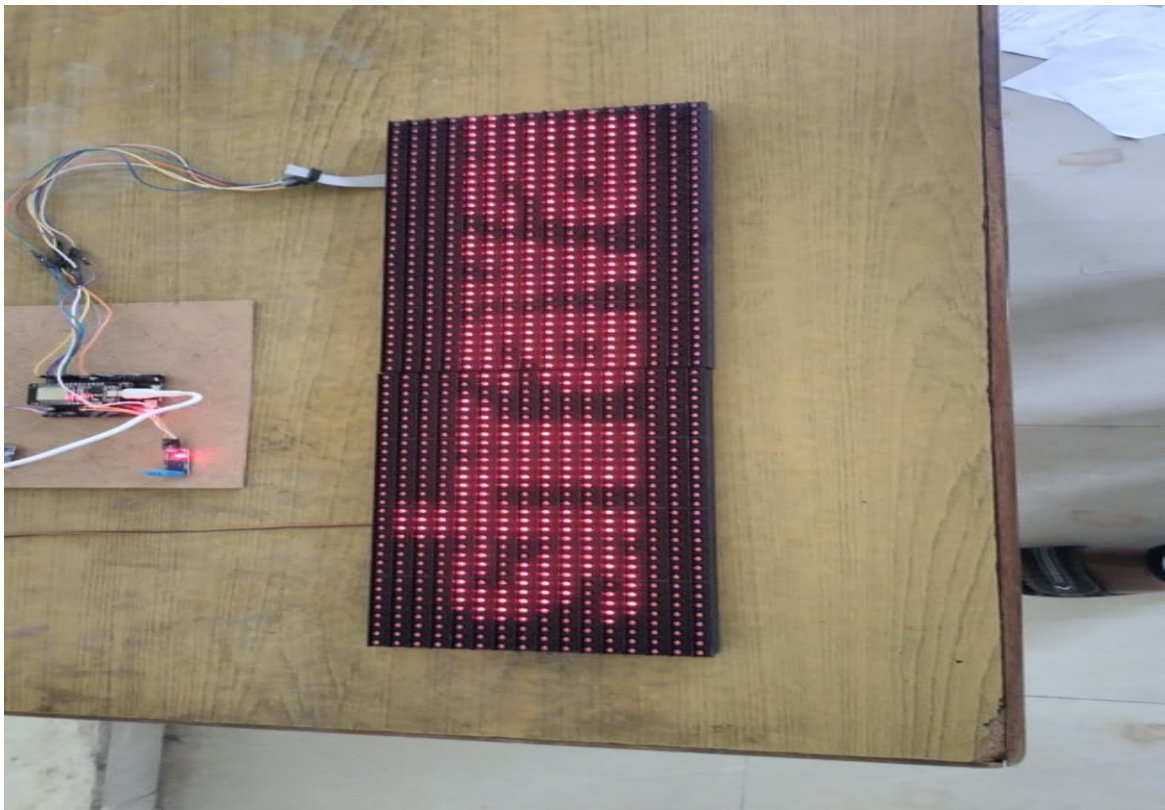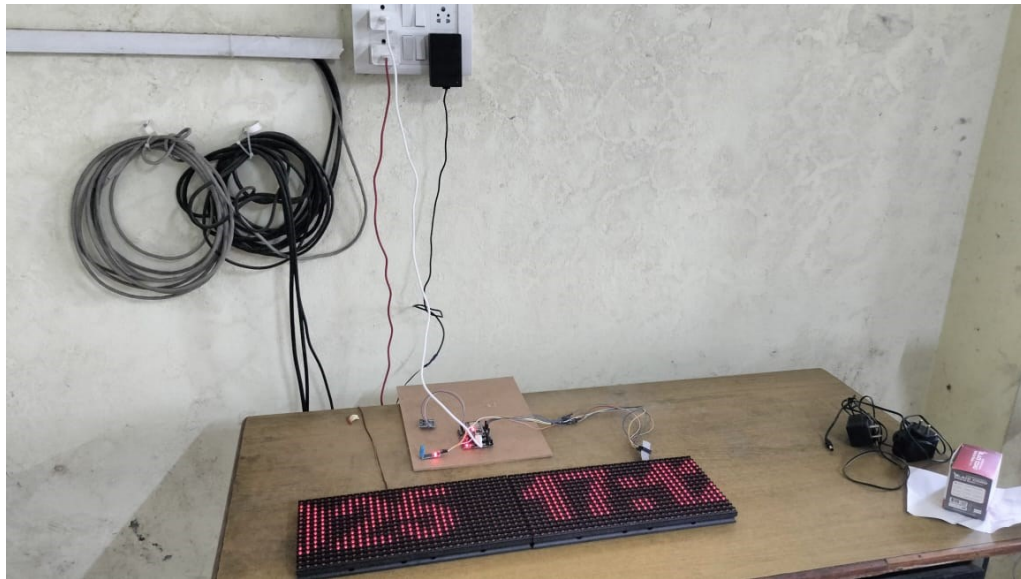
Fig 1; Block diagram

4. RESULTS

5. CONCLUSION

The project successfully demonstrates an IoT-based LED notice board system using the ESP32 microcontroller. By integrating temperature sensing and remote communication via IoT, the system provides an efficient and real-time solution for displaying messages on LED boards. The ESP32 acts as the central unit, interfacing with sensors and display modules, while the IoT connectivity allows seamless updates from remote devices. The power supply circuit ensures stable operation, making the system reliable for various applications, including public announcements, smart classrooms, and industrial notifications. Overall, the project enhances traditional notice board systems by enabling wireless and automated message updates, improving efficiency and accessibility.

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