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RFID-POWERED INTELLIGENT BUS ARRIVAL AND DEPARTURE ANNOUNCEMENT SYSTEM

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ABSTRACT:

The driver or conductor must get off the bus to enter the timings for confirmation in the current bus transportation system, which requires a lot of manpower to implement in numerous bus stops and requires one person in each bus station to enter the data of the bus' arrival timings. And occasionally. Some buses refuse to stop at designated stops even though they are required to, which causes issues for passengers, particularly at night. We are carrying out this project to make this process quick, automated, and manpower-efficient while also preventing missed stops. With the aid of technological innovation, this is simply achievable. These days, a plethora of technologies are emerging to improve our comfort, usability, and security. This is a fully functional stand-alone attendance system that uses an Arduino microcontroller to create an Excel file on an SD card that contains the arrival times of every bus, along with the time and date.

KEYWORDS:

Aurdino microcontroller, RFID, SD memory card, Embedded systems

1.INTRODUCTION:

The world is changing at a rapid pace, driven by technological innovation which reshaping the world faster than ever before. The fast development of innovation and hardware had changed our life from the most essential errand of flicking the change on to the most muddled assignment of substantial machining. Today's cities have become increasingly automobile-dominated where everyone is rushing to reach their destinations, which leads to in transport-related challenges such as public transport weakening, congestion and accidents. Efficient and reliable public transport is essential to economic growth of urban where for the majority of people, the public transport is the main means to access employment, education, and public services. As a result, the main concerns of persons who depend on public transit throughout their lives are the current location of the bus they are waiting for and the estimated time of arrival at the bus stop. They can make wiser travel choices if they are aware of the arrival time. Additionally, bus tracking.

Due to a lack of research in tracking and monitoring, the school bus monitoring system

ensures student safety by allowing parents and school authorities to track the bus's location and determine its speed, ensuring that the driver is not putting the students in danger systems. This study used an RFID module to create a real-time tracking and monitoring system for public transport.

2.LITERATURE SURVEY :

In order to create an appropriate bus scheduling model in the central business district, bus routes were reviewed and merged in 2006. Buses are the main mode of transportation for a sizable percentage of the 200,000 employees in the central business area (CBD). There is a greater demand for passengers during peak hours, and buses are packed. In order to alleviate traffic congestion and boost bus occupancy in the core business district, they suggested combining bus lines. Additionally, they acquired the passenger rate at various operating times throughout the day. They created a new bus operating method by combining routes that overlapped by more than 60%. The suggested approach might reduce the size of the fleet and the frequency of bus stops. Increased frequency and shorter travel times are also beneficial for passengers seeking peace of mind. From three perspectives. The advantages of the route mergers exceed the disadvantages, as can be seen by weighing the advantages and disadvantages. Advantages and disadvantages Society and traffic decrease in the number of bus excursions and stops Reduction of air pollution and traffic jams Land savings from being used as a bus terminal Operators of buses Extension of service from bus trip savings Operational expenses resulting from using the true distance-based fare Buses must be used less frequently since long routes are challenging to manage. Network Travellers Shorter wait times Using a smart card when leaving The inconvenience of a service change. Boarding and alighting could result in a minor increase in travel time. More crowded buses Yan and Chen (2002) investigated a scheduling model for inter-city bus carriers based on the link between passenger trip needs and bus trip supplies. They were able to reduce fleet size and travel time by adjusting bus frequency. They also discovered that operational costs can be decreased by modifying the frequency of buses during peak hours. Additionally, in 1995, van Oudheusden and Zhu introduced a trip frequency scheduling method for determining trip frequencies, which lowered the trip frequency duration throughout various time periods. They discovered that, in addition to fleet size and traffic congestion, inadequate planning can contribute to bus overcrowding (van Oudheusden and Zhu 1995). Chen et al. examined bus operation reliability in 2009 at the network, route, and stop levels. Reliability of bus service will decrease as a result of their increased distance between a bus stop and the origin terminal. Additionally, when this distance exceeds 30 km, bus service dependability significantly declines (Chen et al. 2009). examined a real-time scheduling technique for a variable-route bus in 2010. The suggested approach took into account both the passengers' needs and the cost. This model decreased expenses and passengers' average wait times.

3.EXISTING SYSTEM:

The Sri Lankan government only concentrates on building highways and other transportation

infrastructure, but maintaining adequate surveillance is also essential. The timekeepers stationed at the major bus stops in major cities keep track of and document bus movements. These timekeepers record the buses that arrive and depart from the Stand. However, many villages only have passenger halts or shelters and lack bus stops. The remainder of the massive road was not well monitored. Due to human error, the manual approach may experience incorrect recording; also, this paper-based technique is frequently useless. Passengers no longer find these records useful either. A number of systems for guiding the blind have been proposed. We will only discuss the ones that .
The majority of the current public transportation assistance solutions for the blind and visually handicapped rely on smartphone apps, auditory announcements at bus stops, or tactile markers. Although some buses have automatic announcements, these systems can be unreliable and frequently call for further assistance from companions or transport employees. Additionally, finding the right bus or stop might be challenging for many blind or illiterate people, which could cause confusion and delays. All things considered, these technologies may not provide the individualised, real-time support required to enable users to travel with confidence and independence. This system connects a processing subsystem to Bluetooth devices deployed in the bus and the bus station. The two Bluetooth devices on the bus and the station will pair up when a bus pulls up to the station. The Bluetooth gadget on the bus will then send a message. comprising bus data for the processing subsystem of the station. A text-to-speech converter that is connected to the bus station's processing subsystem will read the transmitted message. The bus details will then be included in an announcement message that is produced via speaker. However, this technology has two drawbacks: it only permits two devices to be connected simultaneously, and in some circumstances, the link between devices may be lost.

4.PROPOSED SYSTEM:

There are essentially two main components to the suggested bus scheduler. A web-based interface system is the first, followed by a sensing device. There are several bus stops along the road,each of which has an RFID reader and an Arduino serial connection. The reader will detect the tag's data from the font unit and the bus's departure from the platform. The GSM/GPRS shield will then send the timestamp and ID to the central bus scheduler via GPRS. Anyone can access the bus movement details for their own use via the Internet. Two parallel active RFID subunits, one in the front and one in the rear, will be installed in bus units. By combining voice modules with radio frequency technology, the proposed Bus Identification System for the Visually Impaired improves accessibility. In order to identify incoming buses in real time, this system uses RF transmitters on buses to broadcast signals to receivers at bus stops. Users are given clear information when a bus comes because the microcontroller interprets the signal and audibly announces the bus number. This creative method greatly enhances the confidence and travel experience of blind and illiterate people by enabling them to use public transport on their own.

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4.1 BLOCK DIAGRAM:

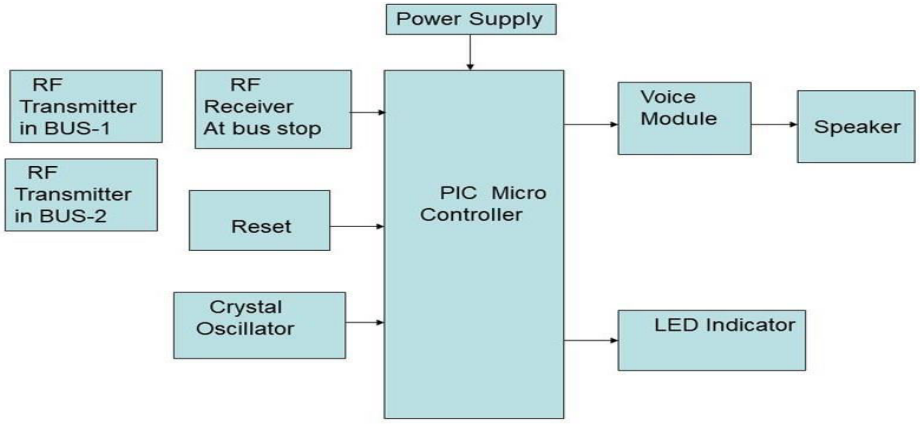

FIG: 4.1 BLOCK DIAGRAM

5.HARDWARE DESCRIPTION:

5.1 PIC MICROCONTROLLER:

Microchip Technology created the popular PIC microcontroller family, which is renowned for its ease of use, adaptability, and effectiveness in embedded system applications. Originally standing for "Peripheral Interface Controller," the term PIC has come to refer to a broad category of microcontrollers that serve a variety of purposes, from industrial automation to small-scale hobby projects. The Harvard design, on which PIC microcontrollers are based, divides program memory from data memory to enable quicker and more effective processing. They can carry out commands faster and with less power consumption because they use a RISC (Reduced Instruction Set Computing) instruction set.

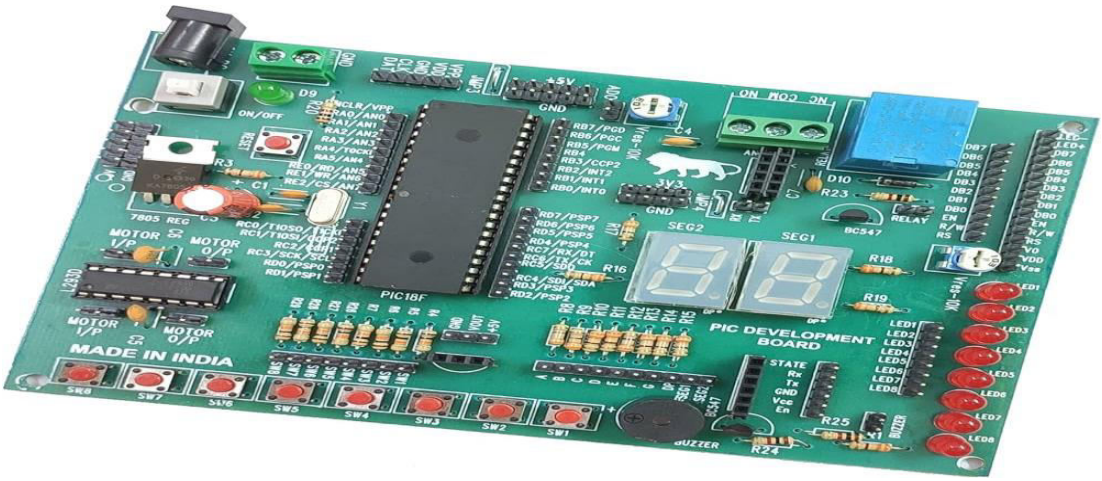

Fig 5.1:PIC MICROOCONTROLLER

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5.2 RFID READER MODULE:

An RFID reader module is an electrical gadget made to use radio frequency signals to read data from RFID tags. The most widely used frequencies for these modules are 13.56 MHz for high-frequency (HF) systems and 125 kHz for low-frequency (LF) systems. Longer read ranges are possible with certain advanced modules that operate at ultra-high frequencies (UHF), which range from 860 to 960 MHz . RFID reader modules can be easily integrated into a variety of embedded systems, such as Arduino, ESP32, or Raspberry Pi, because they usually connect with microcontrollers using standard interfaces like SPI (Serial Peripheral Interface), I2C, or UART. Although extra antennas can be used for increased sensitivity and range, the majority of RFID modules have an antenna built right in. The frequency, antenna size, and kind of tag all affect the reading distance, which typically ranges from a few centimeters to several meters. These modules can scan passive RFID cards, key fobs, or stickers because they support a number of RFID standards, including ISO/IEC 14443 and ISO 15693. Contactless payments, inventory management, time and attendance monitoring, access control systems, and several Internet of Things applications all make extensive use of RFID reader modules. Their quickness, dependability, and capacity to recognize objects or persons without needing direct contact or line of sight make them highly prized.

Fig 5.2 : RFID MODULE

5.3 RASPBERRY PI :

Because it combines computational power, connectivity, and adaptability, the Raspberry Pi excels in Internet of Things (IoT) projects. The Raspberry Pi, in contrast to conventional microcontrollers, is capable of handling sophisticated tasks like edge computing, real-time data processing, and even AI-based decision-making because it runs a complete Linux operating system. It can multitask and operate numerous services at once, including web servers, databases, and IoT communication protocols like MQTT, thanks to its multicore ARM processors, accessible RAM (up to 8GB in newer models), and support for a variety of programming languages.

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Fig 5.3: Raspberry Pi

6.RESULTS:

The purpose of the bus location indication system is to allow passengers to accurately plan their trips by providing them with the bus stops' arrival and departure times. The Arduino UNO was used in the design of this system. An RFID card bearing a distinct ID number is attached to every bus. The entry RFID readers will be installed at the bus stop sites for entry and exit. The RFID scanner reads the card number when the bus reaches the bus stop, and the bus number and arrival time are entered into the database. The bus number, arrival time, and departure time are shown on an LCD. The SD card will be written with the bus's arrival and departure times as well as its number. This will ensure that the bus records are kept for a long period and that the data is never lost. The study's findings demonstrate that the RFID-based bus identification system for the blind is successful in enhancing their self-reliance and self-assurance. Using the RFID method, 90% of participants were able to recognise the right bus and its destination. 85% of the participants said that using the approach made them feel more self-assured and autonomous. Eighty percent of participants said that their entire trip was made better by the system. These findings show how well the system works to give blind people the knowledge they require to move freely and safely.

7.CONCLUSION:

In conclusion, it has been demonstrated that the RFID-based bus identification system for the blind is a successful way to increase the self-reliance and self-assurance of those who are blind or visually impaired. The system's high accuracy, affordability, and ease of use make it a good option for enhancing public transportation's accessibility. The study's findings show how the system could help blind people live better lives by giving them the knowledge they need to travel independently and safely. The use of RFID technology in the bus identification system for blind people has the potential to significantly improve the lives of those who are

blind or visually impaired by giving them more autonomy and self-assurance when they travel. The system's capacity to deliver information in real time .It is a useful tool for blind people because it provides information on bus arrival and departure timings as well as the bus's destination. Public transit systems can become more inclusive and accessible for those with vision impairments by putting this approach into place.

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