Juni Khyat ISSN: 2278-4632 (UGC Care Group I Listed Journal) Vol-13, Issue-06, No.01, June : 2023 SMART BUS STATION IN RURAL AREAS

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Abstract—

The major goals of this initiative are to provide a common man bus service in rural areas and to prevent wasting money. Public transport in India frequently has issues, particularly in rural areas. It is challenging to schedule buses every day from town to village for the villages that are located distant from towns, cities, etc. By putting in place a system that counts the amount of people waiting for the bus at a stop and operating the buses accordingly, we can partially fix this issue. The number of passengers at the stop will be displayed on a screen at the bus depot, and if the number of passengers is below a certain threshold, the buses won't run that day because the expense of running them back and forth is higher. This system might offer a way to stop needless financial waste. We frequently see street lights blazing during the daytime in many locations. Although these lights are intended to be turned off early in the morning, linemen's negligence has led to inconsistent street light operation, especially in rural areas. In this sense, a significant amount of energy is lost daily; hence, automatic street light management tools are crucial. As a result, this project was created, which automatically turns on the lamps when natural light is present and turns them off when natural light is absent.LDR and a 555 timer were used in the design of the control circuit. Depending on the amount of light, an LDR optical sensor behaves as a variable resistor. In order to accurately count the number of passengers, the components utilized include an RF transmitter, an RF receiver, an 89C51 Microcontroller chip, an alarm, a bus release key, and an LCD to display the data. A bus stop and a key are offered at the receiver side in order to count the number of people who are travelling. At the bus stop, a camera will be placed, and live streaming will be used to follow people. A microcontroller that is intended to function as a wireless ID card is used to operate the entire device at the receiver side.

Keywords-Microcontroller, Liquid Crystal Display (LCD), Light Dependent Resistor (LDR).

I. INTRODUCTION:

Public transport in India frequently causes us a lot of issues, particularly in rural areas. It is challenging to schedule buses every day from town to village for the villages that are located distant from towns, cities, etc. The major goals of this initiative are to provide a common man bus service in rural areas and to prevent wasting money. The passenger's information is sent using a camera installed on the receiver side of this device, which has an RF transmitter and receiver. To manage the entire process, a microcontroller is employed on both the transmitter and receiver sides. Bus transport regulations must make sure that services are delivered in accordance with government policy, which may include public safety, the growth of the private sector, access to rural services, and the elimination of rural poverty. It must make sure that the public's need for mobility is met, that the services offered are of a sufficient standard of quality and secure for both users and the general public, and that the costs are reasonable and in line with the caliber of the services offered. Three axes make up regulation: fares, quality, and number of services offered.

In conclusion, quantity regulation should be routinely examined to see how much it hinders or supports good transport services, as well as to see if safety restrictions are suitable, effective, and enforceable. Innovative services, maybe using IMT modified for carrying passengers, are required in rural areas where demand is spread in order to connect villages to towns and rural bus circuits. In this situation, quantity regulation is not justified. Operators must have total freedom to decide on routes, schedules, and vehicle types. Village-level informal or semi-formal groupings should be supported because conventional operators are unlikely to be able to provide such services.

Juni Khyat (UGC Care Group I Listed Journal) II. LITERATURE SURVEY:

Public transport in India frequently causes us a lot of issues, particularly in rural areas. It is challenging to schedule buses every day from the town to the village for the villages that are located far from the towns, cities, etc. By putting in place a system that counts the amount of people waiting for the bus at a stop and operating the buses accordingly, we can partially fix this issue. The number of passengers at the stop will be displayed on a screen at the bus depot, and if the number of passengers is below a certain threshold, the bus won't run that day because it costs more to travel back and forth. This system might offer a way to stop needless financial waste. It is a major topic of contention, particularly in rural regions, because the person in charge of managing these lights is required to turn them on immediately before or during sunset and turn them off just before sunrise.

However, on occasion the linemen's sleepiness causes these streetlights to remain on during the day as well. In this regard, a significant amount of energy is wasted daily. In order to conserve this important resource, automatic street light control devices are necessary and should be put everywhere. As a result, this project work is created, which automatically turns on the lamps when natural light is present and turns them off when natural light is absent. The LDR (Light Dependant Resistor) is a type of opticalsensor nowadays. Such lamps offer the most illumination for the least amount of electricity use.

which can be used as variable resistor based on light intensity, and the control circuit is created with a 555 timerIC. This device, which is wired with a timer IC, is used to continuously monitor natural light. Depending on the availability of natural light, in order to control streetlights autoatically a circuit is built.

Moving on to the project work, its goal is to automatically energise exterior lights such as streetlights by detecting the sun's brightness. For distant areas like parks, solar outside lighting are perfect. It is typically too expensive to extend a grid connection to remote security, street, or parking lot lighting. But in many metropolitan locations, solar-powered lights are more cost-effective than grid connections since they don'trequire digging up asphalt or digging trenches beneath it. High-intensity discharge lights, frequently HPS (high pressure sodium lamps), are a common choice for street lighting.

III. HARDWARE IMPLEMENTATIN:



When the button is not pressed by the passengers the count is "zero" and the status of the bus is "not started".



When the button is pressed at one of the bus stop. The value of the counter gets increased

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The value of the counter gets increased when the button is pressed, and as aresult count and status of the bus are displayed.

CASE 4:



When the value of the count is higher or equal to the thresholdvalue. The total count is displayed and the status of the bus is shown as "Started"

CASE 5:



When the natural light is on then the street light is off near the bus stop.

CASE 6:



When the natural light is off then the streetlights are on at the bus stops.

IV.HARDWARE SPECIFICAINS: AT89C51MICROCONTROLLERS :

	/ /001	0	
	0	-	1
RST/VPP	1	20	D VCC
(RXD) P3.0 [2	19	D P1.7
(TXD) P3.1	3	18	□ P1.6
XTAL2	4	17	P1.5
XTAL1	5	16	D P1.4
(INTO) P3.2	6	15	D P1.3
(INT1) P3.3 [7	14	D P1.2
(TO) P3.4 [8	13	P1.1 (AIN1)
(T1) P3.5 🗆	9	12	P1.0 (AINO)
GND [10	11	🗆 P3.7

The AT89C52 is a highly efficient 8-bit CMOS microcomputer that utilizes Atmel's advanced nonvolatile memory technology to provide 8K bytes of Flash PEROM for program storage. This microcomputer is fully compatible with the widely-used 80C51 and 80C52 instruction set and pinout, making it a popular choice for a wide range of embedded control applications.

Juni Khyat (UGC Care Group I Listed Journal) NE555 TIMER:



A very dependable device that may produce exact time delays or oscillation is the NE555 monolithic timing circuit. The external resistor and capacitor precisely control the time in time delay mode. With two external resistors and one external capacitor, the NE555 can produce a stable free-running frequency and duty cycle as an oscillator. The output of the circuit can source or sinkup to 200mA, and it can be triggered and reset on falling waveforms.

LCD DISPLAY:



The system uses two LCD units, one in the transmitter and the other in the receiver. The first LCD panel displays information generated by the PC keyboard, while the second panel displays received information.

LDR SENSOR:

The image below illustrates light dependent cadmium sulphide resistors, which were a practical way to measure light intensity at a low cost. In strong light, LDRs have a resistance range of about 50 ohms and can reach up to 2 mega-ohms in complete darkness.



ESP 32 CAMERA:



The ESP32 Cam is a highly compact camera module with an ESP32-S chip, which is available at a low price point of under \$10. It has several GPIO pins that can be used to connect peripherals, as well as an OV2640 camera. The module also comes equipped with a microSD card slot, which can be used to store data intended for clients or images captured by the camera.

Juni Khyat (UGC Care Group I Listed Journal) RESISTORS:

A resistor is an electronic component that utilizes electrical resistance in a circuit and has two terminals. It is used for various purposes in electronic circuits such as dividing voltages, terminating transmission lines, reducing current flow, adjusting signal levels, biasing active elements, and dividing voltages.

PUSH BUTTON:

Switches are essential components in electronic circuits, and their design and operation depend on the intended use and the circuit's requirements. Switches can be classified based on their type of contacts, such as normally open (NO) or normally closed (NC), or based on their mode of operation, such as manual or automatic.

POWER SUPPLY:

A power supply is an essential piece of electrical equipment that is used to provide electrical power to an electrical load. The main function of a power supply is to convert electric current from a power source into the voltage, current, and frequency required to power a load.

CONNECTING WIRES:



The connecting cable is frequently forgotten when creating electronics-related products. Although virtually anything can "get away with" being used in many projects, there are occasions when connecting the various electronics components with the proper wire is vital.

V. WORKING PROCEDURE :

The proposed bus facility system that uses an RF transmitter and receiver to monitor the number of passengers at bus stops is an interesting concept. This system can be beneficial in rural areas to reduce financial waste and save passenger's time by optimizing the operation of buses. The use of a button for passengers to indicate their presence at the bus stop is a simple and effective way to count the number of passengers. The incrementing count can provide the driver with valuable information about the number of passengers at each stop, allowing them to make informed decisions about bus operations. The addition of a camera to monitor the passengers waiting at a particular stop and live streaming at both the transmitter and receiver side is a good way to ensure the safety and security of the passengers. The use of a critical value to determine whether the bus should operate or not is an excellent way to optimize the operation of the bus.

The microcontroller present at both the receiver and transmitter side can efficiently control the entire system. Overall, this system can improve the efficiency and effectiveness of bus operations in rural areas while reducing financial waste and saving passenger's time.

LDR is used to measure the intensity of natural light, as stated in the abstract. LDRs are typically preferred for monitoring light intensity due to their wide range of resistance. For many applications, measuring light intensity is a crucial management tool. Since Lux is the most often used unit for measuring light intensity, the light measuring device can alternatively be referred to as a "LUX METRE" since light intensity is typically measured in Lumens or Lux, though in certain places it is also measured in Foot candles.

The 555 timer IC is a highly adaptable electronic component that has many potential uses, such as

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generating timing signals, creating oscillators, and operating flip-flop circuits. For this particular undertaking, the 555 timer has been set to operate in monostable mode, whereby it produces a solitary pulse of a predetermined length in reaction to a triggering input. In this scenario, the triggering signal originates from the voltage output of a potential divider network linked to the trigger pin ofthe timer. The duration of the resulting output pulse is governed by the values of a resistor and capacitor that are connected to the timing pins of the timer. For this particular project, a 100uF capacitor and a 10k resistor have been implemented, resulting in a pulse duration of one second. 555 timer output is then used to control a relay that switches the street lights on or off. Overall, the system works by continuously monitoring the light intensity falls below a certain threshold. The use of the 555 timer and the relay allows for a simple and reliable control mechanism for the street lights, with minimal power consumption.

The use of this system in poultry management is to control the lighting duration and intensity in breeder poultry farms. It is important to provide adequate lighting for poultry to maintain their health and productivity. By controlling the lighting, the system can simulate natural daylight to induce breeding in poultry. The system can also control the lighting to reduce stress in birds and prevent cannibalism. The light intensity can be measured and displayed to monitor the lighting conditions and adjust them accordingly. This can save energy and reduce unnecessary lighting during the day, while ensuring that the lights are on when needed at night. Overall, this system can be modified and adapted to various applications where light intensity measurement and control is required.

The LDR is a light-sensitive resistor that can sense the brightness of light falling on it and convert it into variable resistance. The dark resistance of the LDR is more than $100k\Omega$, and the light resistance is less than $1k\Omega$. The design of the circuit involves the use of the 555 timer IC, which has been set up in the Schmitt trigger mode.. The Schmitt trigger is a comparator- based circuit that provides hysteresis or memory to the input signal. In this mode, the 555 timer IC has two built-in comparators that monitor the voltage levels at pins 2 and 6. The 555 timer IC in this circuit is configured as a Schmitt trigger, with the output becoming high when the voltage at pin 2 drops below 1/3Vcc and low when it rises above 2/3Vcc. To create a potential dividing network, the LDR is connected to pins 2 and 6 of the 555 timer IC, with a $10k\Omega$ resistor connected in series with the LDR. The midpoint of the network produces the reference voltage, which varies based on light intensity. When the LDR is exposed to bright light, its resistance drops below $1k\Omega$, causing the voltage at pins 2 and 6 to fall below 1/3Vcc and triggering the 555 timer IC. This activates the output transistor, which powers the relay. The relay contact provides supply to outdoor lights, such as street lights, corridor lights, main gate lights, portico lights, and terrace lights. The normally closed contact opens automatically if the relay is energized, disconnecting the suply. This provides an automated way of controlling outdoor lighting based on natural light/sunlight.

The potential dividing network consisting of the LDR and 10K resistor is connected across the +5V DC source. The mid-point voltage across the network is taken as the reference voltage for the timer IC. In case, when the LDR is exposed to bright light, its resistance drops to less than 1K. Assuming the LDR is considered R2 in the potential dividing network, the reference voltage calculation would be 0.45V.

VI.CONCLUSION AND HARDWARE ARRANGEMENT

With this suggested strategy, we can avoid the additional unneeded costs associated with getting from the depot to the various destinations while also saving money on public transit. We can also spare the passengers valuable time when they would need to know if the bus would be running at that particular moment. In remote locations, where it is particularly beneficial for passengers to use the transportation system effectively and efficiently, this technique is used. There is little hope of saving the bus transit system money or the passengers' time when compared to the current systems. This allowed us to meet both of these criteria. It is primarily applicable in distant places and is quite effective. The bus driver gives the passengers waiting at the bus stops a good acknowledgment

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regarding the schedule of the transportation. By employing the idea of automatic street lighting, we would also save energy and the linemen would not be required to check the lights every day or turn the switch on and off on a regular basis, which would fully eliminate this issue.

The "Bus Facility in Rural Areas to Reduce Unnecessary Financial Waste" project work has been successfully planned, tested, and a demonstration module has been constructed., as the module is protypr, the system simply created with two bus stops and a main bus station where two streetlights are provided at the bus stops, and results are determined to be satisfactory. Each bus stop has a button that passengers can touch to report their number to the main station. A camera is mounted nearby for live streaming, and two lamp holders are available in the demonstration module to represent street lights.

A buzzer is available and will sound once the count figure reaches the threshold at the main bus station, where it is used to show passenger information. Additionally, we have relays in place, and the bus' motion is controlled by a motor. Any number of street lights can be managed and effectively monitored for use in practical applications. The same system can be used to accomplish this with the necessary adjustments and upgraded technologies. The arrangement of the LDR is very crucial. Care must be taken to ensure that the intensity of the street light does not fall on this LDR, otherwise the entire system may malfunction. The LDR used to sense natural light can be maintained in a suitable glass container and kept outside.



Fig : Final setup of Hardware

REFERENCES

1. Suresh Sankaran Narayanan "Submitted to Modern, Education Society's College of Engineering, Pune", Vol. 4, August 2012.

2. He W, Godkind D, Kowal P. An Aging World: 2015 International Population Reports.; 2016. Doi: P95/09-1.

3. Bousquet J, Kuhn D, Berwick M, Strandberg T, Farrell et al. J. Operational definition of Active and Healthy Ageing (AHA): A conceptual framework. J Nutra Heal {&} aging. 2015;19(9):955-960. doi:10.1007/s12603-015-0589-6.

4. Day L. Falls in Older People: Risk Factors and Strategies for Prevention. In Prev. 2003;9(1):93-94. doi:10.1136/ip.9.1.93-a.

5. Checkout K, Darain R, Hassan AH El, Andres E. From Fall Detection to Fall Prevention: A Generic Classification of Fall-Related Systems. IEEE Sens J. 2017;17(3):812-822. doi:10.1109/JSEN.2016.2628099.

6. Ma X, Wang H, Xue B, Zhou M, Ji B, Li Y. Depth-Based Human Fall Detection via Shape Features and Improved Extreme Learning Machine. IEEE J Biomed Heal Informatics. 2014;18(6):1915-1922. doi:10.1109/JBHI.2014.23043

7. Seminice, J. Vermeulen and E. Huang, from today's augmented houses to tomorrow's smart

ISSN: 2278-4632

(UGC Care Group I Listed Journal)

Vol-13, Issue-06, No.01, June : 2023

research, in Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing. 2. ACM, 2014 pp. 105-115

8. The et al. Vigil net: An integrated sensor network system for energy-efficient surveillance. ACM Transactions on Sensor Networks (TOSN), 2(1):1-38, 2006.

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