

LIGHT INTENSITY MONITORING SYSTEM USING RASBERRY PI**¹YALLA RAMANA MURTY, ²KAMIDI PRASANTH, ³SWAPNA KUMARI PEETHALA, ⁴GUDDATI PALLAVI**^{1,2,3}Assistant Professor, Dept of ECE, B.V.C College of Engineering, Rajahmundry, A.P, India⁴B.Tech Scholar, Dept of ECE, B.V.C College of Engineering, Rajahmundry, A.P, India

ABSTRACT: Accurate and quantifiable measurement of light is essential in creating desired outcomes in practical day to day applications as well as unique applications such as Traffic lighting system, Poultry Industry, Gardening, Museum lighting system, at emergency exits etc. Hence, Light measurement and analysis is an important step in ensuring efficiency and safety. Many of the industries are burdened with limited number of resources and real shortage of experts on their fields; real time remote monitoring presents an effective solution that minimizes their efforts and expenditures to achieve the desired results within time. This paper introduces real time remote Light intensity monitoring system using Raspberry Pi which enables the user to track the lighting system remotely. Raspberry pi is a low cost ARM11 processor Linux based computer which acts as a server, and it communicates with clients with LAN or external Wi-Fi module. The key feature of this system is light intensity being monitored instantaneously.

KEY WORDS: Raspberry Pi, server, Lighting System, ARM11 processor, External Wi-Fi Module

I.INTRODUCTION

There are many applications available to measuring and maintain the sufficient light levels such as laboratories, hospitals, educational institute, etc. To sustain healthier and safety environment enough light levels in the premises are needed. Without any distraction of weather condition, the light intensity has to be adequate for light levels intensity some of important locations and light intensity. To ensure safety on the road, traffic lights need to be clearly visible for road users. The light intensity has to be sufficient under every

(weather) condition, which set in legal standards. Over the course of time, the luminous intensity of traffic lights slowly decreases. Possible reasons are pollution of lenses or reflectors, aging of the light source or individual LED failure. Remote monitoring enables the road authority to carry out timely services, in such a way that traffic lights keep satisfying the statutory rules for optimal traffic safety.

Light Intensity is an important management factor in poultry industry to obtain optimal production. The intensity depends upon the age and type of housing being used, and type of chicken, be it broiler, breeder or layer. With blackout housing both male and female can be exposed to 3.5 fc from day one to day six and then placed on 1 fc to 19 or 20 weeks. After 19 - 20 weeks the broiler breeders can be exposed to about 3.0 to 5.0 fc during the entire production period. Layers should be exposed to about .5 to 1.5 fc (One foot-candle = 10.76 lux) for better production.

Deficient light intensity tends to reduce plant growth, development and yield. This is because low amount of solar energy restricts the rate of photosynthesis. Below a minimum intensity, the plant falls below the compensation point. Compensation point is the metabolic point at which the rates of photosynthesis and respiration are equal so that leaves do not gain or lose dry matter. Photosynthesis significantly slows down or ceases while respiration continues. Likewise, excessive light intensity should be avoided.

Light intensity is a primary consideration in museums to protect historic artifacts from

damage. 5 to 10 foot-candles (approx. 50 to 100 lux) is currently considered to be the maximum allowable light level for very sensitive materials, such as prints, drawings, watercolours, dyed fabrics, manuscripts, and botanical specimens.

OpenCV is an open-source library for image and video analysis, originally introduced more than decade ago by Intel. Since then, a number of programmers have contributed to the most recent library developments. The latest major change took place in 2009 (OpenCV 2) which includes main changes to the C++ interface. Nowadays the library has >2500 optimized algorithms. It is extensively used around the world, having >2.5M downloads and >40K people in the user group.

Regardless of whether one is a novice C++ programmer or a professional software developer, unaware of OpenCV, the main library content should be interesting for the graduate students and researchers in image processing and computer vision areas. To master every library element, it is necessary to consult many books available on the topic of OpenCV. However, reading such more comprehensive material should be easier after comprehending some basics about OpenCV from this paper.

II.LITERATURE SURVEY

It focus on the necessity of automated street light system and the peculiar way of implementation with embedded system tools. As automation booming in the industry with a fast pace, the requirement of replacing the primitive operation of street lights with quite intelligence is necessary. The previous systems were implemented with LDR and IR sensors, here the presence of movement in the roads are sensed by IR

sensors and LDR powers the street lights only after evening.

The excess use of IR sensors and energy involved in the above operation are reduced in our prototype. Here we use piezo electric sensors to detect the movement in the roads instead of IR sensors. India is having numerous amounts of vehicle's owner and more than that 50% of vehicles are continuously running on a road. As a contrast, most of the vehicles are meeting with an accident, it causes human fatalities and generated a large amount of toxic ga sees are emitted out during vehicle running as well as meet into an accident. Hence, various technologies have deployed to preserve and encourage Intelligent Transportation Systems (ITS).

A numerous results were suggested the related challenges and current issues of vehicular networks as well as limitation related to the cost and accessibility of a resource. Vehicular Cloud Environments (VCE) is Vehicular Cloud Environments is a novel technology that point to impact on handing traffic unitary condition and providing road safety using various vehicular resources, such as computing units, storage devices and internet facility for correct decision making.

Two integer linear programming formulations based on real pollutants dispersion modeling to deal with the minimum cost WSN deployment for air pollution monitoring. We depicted the concept by applying our models on real world data, namely the Nottingham City Street lights. We proposed two ILP optimization models that ensures both pollution coverage and network connectivity.

We implemented and compared the two models in terms of execution time; the results showed that the second flow-based formulation is much better. We also conducted extensive simulations and derived some results to guide the choice towards an optimal deployment.

III. BLOCK DAIGRAM

Graphical User Interface (GUI) is used to monitor and control connected devices through an android application. The communication protocol provides monitoring and controlling the power with more than just ON/OFF functionality. Sensors are used for sensing and monitoring environment and microcontroller is used to process the sensed data and control as well as to monitor the appliances. The microcontroller is also interfaced with the LDR sensor in order to light intensity. The appliances are connected to the board through a relay which acts as an electrical switch.

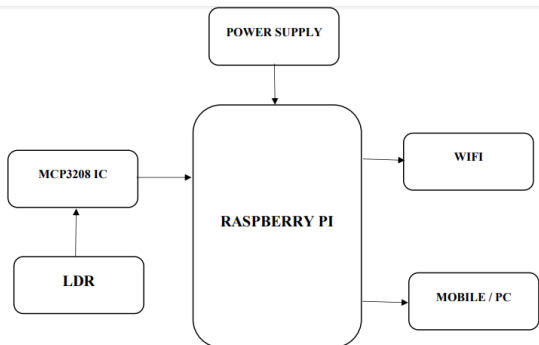


Fig. 1: Block Diagram of proposed system

RASPBERRY PI: The Raspberry Pi foundation is working on yet another model of the popular Raspberry Pi boards, as the Raspberry Pi 3 model B board. The new board looks very similar to Raspberry Pi 2 model B, but adds on-board Wi-Fi 802.11 b/g/n (2.4GHz only) and Bluetooth 4.0. Let’s play “spot the difference” with Raspberry Pi 2 at the top and Raspberry Pi 3 under.

We’ll find the WIFI/BT chip antenna on the top left corner, and two through holes on the right of the 40-pin connectors, likely the RUN header for reset that can be found on the RPi2 where the chip antenna is now placed on RPi 3. So the through holes are not new, they’ve just moved it. All connectors have the exact same placement between the two versions.

The wireless module (likely Broadcom based) can be found just above the micro-SD slot, and J5 connector is soldered. J5 is the JTAG connector, so it will probably not be soldered with the version that ships. The picture is not very clear but it looks like they’ve used the same Elpida B8132B4PB-8D-F RAM chip (1GB) as on Raspberry Pi 2.

LDR SENSOR

Light Dependent Resistors (LDR) is also called photo resistors. They are made of high resistance semiconductor material. When light hits the device, the photons give electrons energy. This makes them jump into the conductive band and thereby conduct electricity. Light dependent resistors, LDRs or photo resistors are often used in circuits where it is necessary to detect the presence or the level of light. They can be described by a variety of names from light dependent resistor, LDR, photo resistor, or even photo cell, photocell or photoconductor.

A Light Sensor is something that a robot can use to detect the current ambient light level, how bright/dark it is. There are a range of different types of light sensors, including 'Photo resistors', 'Photodiodes', and 'Phototransistors'. A photo resistor is a light-controlled variable resistor. The resistance of a photo resistor decreases with increasing incident light intensity; in other words, it

exhibits photoconductivity. A photo resistor is made of a high resistor's semiconductor.

MCP3208 IC

The MCP3208-CI/P is an 8 channel, 12bit Analogue to Digital Converter (ADC) with SPI interface in 16 pin DIP package. This ADC combines high performance and low power consumption in a small package by making it as an ideal for embedded control applications. The MCP3208 features successive approximation register (SAR) architecture with onboard sample and hold circuitry allowing 12bit ADC capability to be added to any PIC microcontroller. It is programmable to provide four pseudo differential input pairs or eight single ended inputs. Differential nonlinearity (DNL) is specified at $\pm 1\text{LSB}$ and integral nonlinearity (INL) is $\pm 2\text{LSB}$. Communication with devices is accomplished using simple serial interface compatible with SPI protocol.

IV. RESULTS



Fig. 2: Project Kit



Fig. 3: A Display of Project Kit



Fig. 4: Minimum Intensity



Fig. 5: Maximum Intensity

V. CONCLUSION

The Facility manger will have skill, training and experience but lagging with lack of information to take action immediately. In the paper, we have proposed and developed cloud based light intensity, temperature and smoke monitoring system. This helps to Facility manger to take necessary action at right time, with proper controlling with can

achieve desired results and we can monitor live streaming by camera. To evaluate the system, we have considered laboratory as an example but it can be used at various applications like traffic light monitoring, poultry lighting and museum lighting etc to avoid damages.

VI. FUTURE SCOPE

An idea about advancements in energy saving of street lights and to reduce the power consumption. The programming terminology for building up the product to the Arduino board at long last, the framework has been effectively outlined and executed. Mainly using two sensor IR and LDR sensor to implement intensity control of street light. IR sensor is use to detect the motion of the objects and LDR (light dependent resistor) used to recognize day-evening. When light falls on the LDR depending on resistance of light the intensity of light is decreased or increase. The street light is automatically ON in evening 6pm and OFF till morning. Through mobile app also we can operate the street light. Using Arduino board for implementing the intensity control of street light.

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