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Street Lamp Novel Hybrid Energy

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ABSTRACT: In this proposed system, we discuss the universal issues about energy management for renewable resource, Wind / Photovoltaic (PV) hybrid power system in order to improve energy efficiency with LED's as the light source and placing the wind turbine in addition to solar. The LED's are energy saving, high luminous efficiency and high useful life to the proposed system. And in the same way the position of the turbine plays a major role, we had overcome that design for effective power production. By placing the short armed two turbine in the horizontal path due to the too and for motion of the vehicles air pressure is developed on the blades of the turbine. The pressure is developed from both the directions keeps the turbine in continuous motion of all the vehicles such as Trucks, Lorries and Buses, etc., Due to this, an uninterrupted power generation by solar at day time and whenever the vehicles crosses the path both at day and night the turbine rotates and energy is generated. This would put down the electricity bill and reduce the pollution rate to a certain limit.

KEYWORDS: Natural Energy Sources, hybrid power, pollution, Dynamic Spectrum Access.

I.INTRODUCTION

One of the primary objectives of cognitive radio (CR) ad-hoc networks is to facilitate an efficient utilization of spectrum resources without interfering with the primary user networks. CR-Network allows intermittently connected mobile unlicensed nodes to exploit temporarily available contacts and idle licensed channels for end-to end message delivery. Cognitive Radio (CR) is a key technology to realize Dynamic Spectrum Access (DSA) that enables an unlicensed user (or, secondary user) to adaptively adjust its operating parameters and exploit the spectrum which is unused by licensed users (or, primary users) in an opportunistic manner. However, the realization of CR-Networks also brings crucial research challenges that must be addressed. In particular, due to different node mobility and spectrum availability patterns, CR-Networks is frequently divided into unpredictable partitions. These partitions are essentially intermittently-connected and deficient in complete end-to-end paths. Hence, spectrum-aware flooding (SAF) is more relevant for CR-Networks. In SAF, a message is first copied to a set of path nodes using available channels. Then, one of these path nodes delivers the message to the destination provided that it encounters. Clearly, if the message is tried to be copied to all paths that do not have the message the end-to-end message delay can be minimized. However, such a forwarding strategy is energy-inefficient and may cause a severe interference to primary user system. Hence, it is necessary to decide which path nodes and licensed channels should be used to mitigate the energy consumption and high interference for an efficient communication in CR-Networks.

In this paper, General Man has needed and used energy at as increasing rate for his substance and well. Human Being ever since came on the earth a few million years ago. Primitive man required energy primarily in the form of food. He derived this by eating plants or animals which he hunted subsequently he discovered fire & his energy need increased as he started to make use of wood & other biomass to to supply the energy needs for cooking as well as for keeping himself warm with further demand for energy man began to use the wind for sailing ships & for driving windmills, & the force of falling water to turn water wheels. Till this time it would not be wrong to say that the sun is supplying all the energy needs of man either directly or indirectly & that man was using only renewable sources of energy.



Since 1973, the word “energy” has been continuously in the news. There have been shortages of oil in many parts of the world & the price of the commodity has increased sleepily. It is by now clear that the fossil fuel of non-renewable resources is gradually coming to an end, oil & natural gas will be depleted first, followed eventually by coal. One of the promising options is to make more extensive use of renewable sources of energy derived from the sun. Solar energy can be used both directly & indirectly. It can be use directly in a variety of thermal applications like heating water or air, drying, distillation & cooking .The heat fluids can in turn be used for applications like power generation or refrigeration second way in which solar energy can be used directly is through (solar cells)the photovoltaic effect in which it is converted into electrical energy.

Solar energy utilization:

Solar energy is very large inexhaustible source of energy. The power from the sun intercepted by the earth is approximately 1.8¹⁰11 mw which is many thousands of times larger than the present consumption rate on the earth of all commercial energy sources. Thus in principle solar energy could supply all the present & future energy needs of the world on a continuing basis. This makes it one of the most promising of the unconventional energy sources.

II. OBJECTIVES

The objective for this project is to design a smart lighting system which targets the energy saving and autonomous operation on economical affordable for the streets. Build an energy saving smart lighting system with integrated sensors and controllers. Design a smart lighting system with modular approach design, which makes the system scalability and expandability. Design a smart lighting system which compatibility and scalability with other commercial product and automation system, which might include more than lighting system.

III.LITERATURE SURVEY

The idea to utilize wind turbines on the highway is not entirely unique. There have been attempts by several individuals and groups to recycle energy from highways. The most impressive is a design displayed on a YouTube video entitled “Highway Helical Wind Turbine Project (Next Generation Highway's Potential For Wind Power).” In the video a group of Mechanical Engineering Students from YCET Kollam, Kerala display a prototype of their highway wind turbine as seen in Figures 4 and 5.

CONCEPTUALDESIGN(DESIGNALTERNATIVES)

There are several ways to approach this particular design problem. In literature surveys, we discovered different features of wind turbines which were appealing for different reasons. For example, the gear turbines in China were very inexpensive and the modular sections could easily be snapped together to form a bigger system.



FIGURE 2: Display of highway wind turbine



That particular design did not seem as environmentally friendly as the designs with larger propellers. Other designs include turbines built into highway dividers or on overhead poles as seen in the design by the Arizona State Student Joe (last name not provided) (Joe, 2007). Joe calculated that with cars moving at 70 mph, 9,600 kilowatts of electricity could be produced per year using his design.

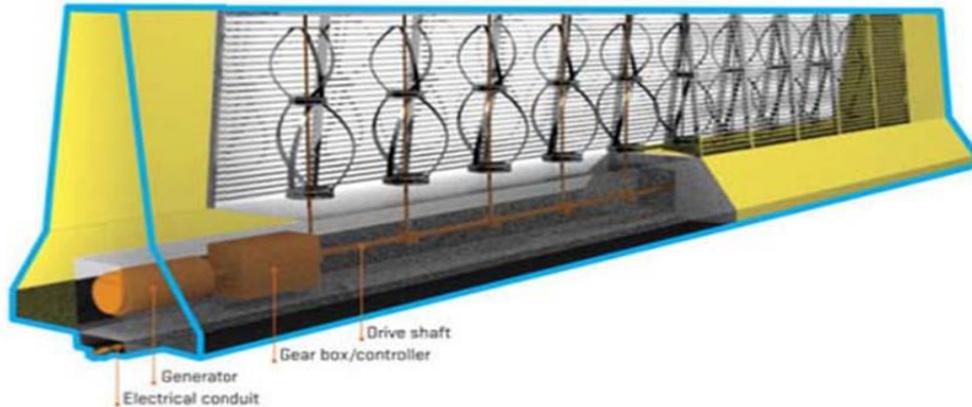


FIGURE 3: MARK OBERHOLZER, GUARDRAIL WIND TURBINE DESIGN



FIGURE 4: ARIZONA STATE UNIVERSITY STUDENT DESI

The rapid depletion of fossil-fuel resources on a worldwide basis has necessitated an urgent search for alternative energy sources. A standalone solar photovoltaic, wind system and hybrid systems were more emphasized in literatures. The improvement of performance of renewable energy systems and their economical viabilities were dealt in more detailed manner. The renewable power generating systems are more reliable and environmentally clean. The hybrid power generation systems are reliable and satisfy the load demand very closely in all seasons and also minimize the size of the system components and hence reduce the total capital cost. The hybrid power generating systems are cost effective compared to standalone systems. A great deal of research has been carried out on solar photovoltaic, wind, biogas based diesel generator, bio-diesel generator and hybrid systems. Various works have been cited in the area of design of standalone solar and wind systems and exclusively on hybrid systems for power generation. However, the recent progress is mainly focussed on optimization of such systems considering the techno-economical aspects and operating characteristics. In the literature survey presented, some of the earlier works pertaining to the present work on standalone, hybrid power generation systems and optimization methodologies have been reviewed.



III. PROPOSED SYSTEM

In below block diagram we present an hybrid energy system for smart street light . here input energy source is selected using LDR sensor.

The relay is been used as the connector between solar panel ,wind and battery.

Solar panel is connected to NC pin of relay,while dynamo is connected to NO pin of relay and battery is a connected to COMMON pin of relay.

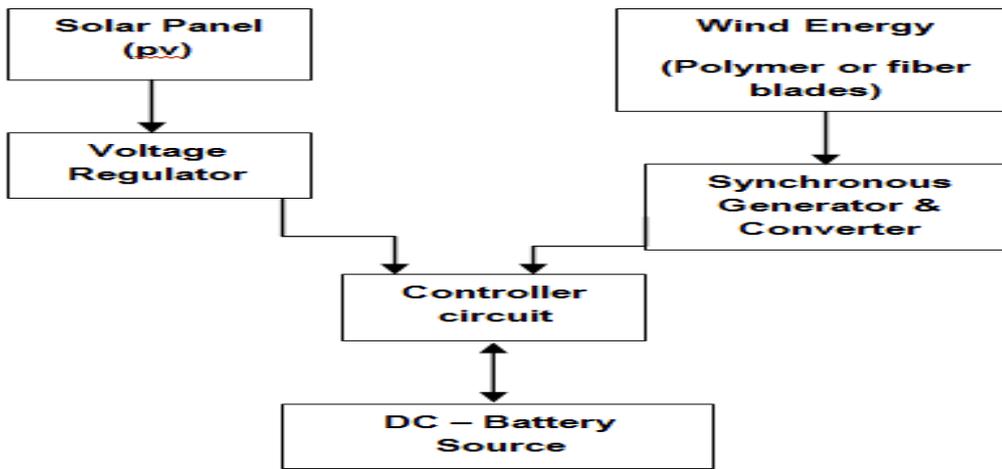


Figure no 5:Block Diagram

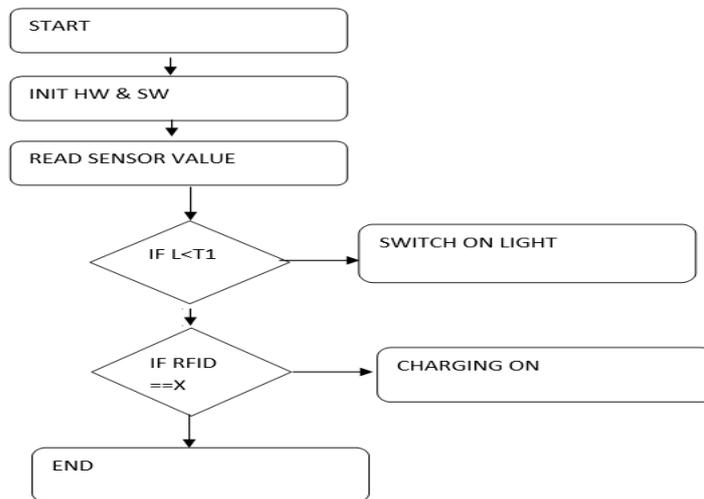


Fig 6 Flow Diagram

Hardware used

1. Atmega 16
2. Solar panel 6v
3. Ldr sensor
4. Dynamo
5. Relay
6. battery

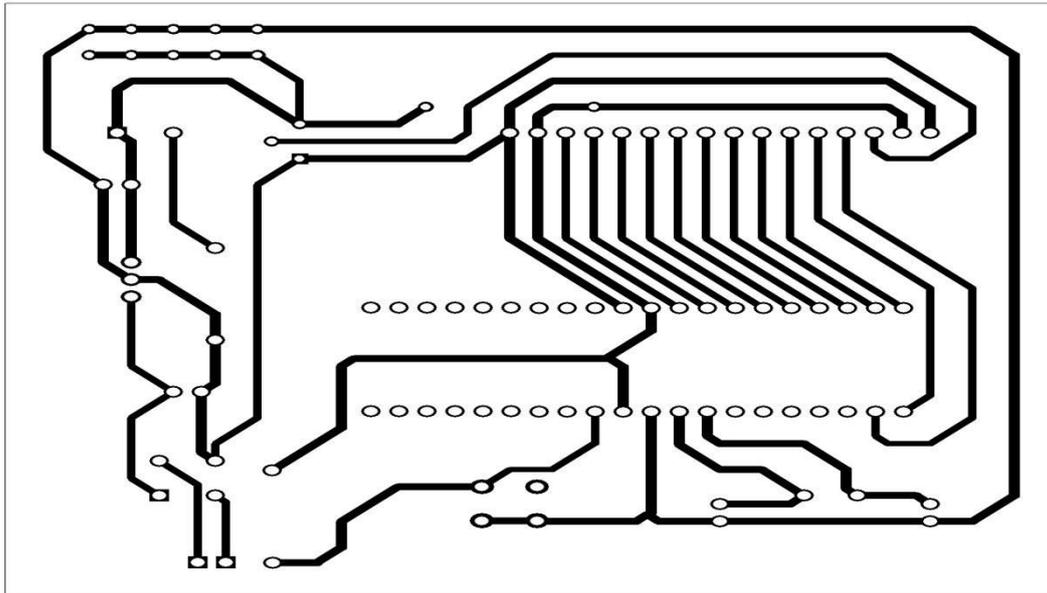


Figure No. 7. PCB Layout

IV. ASSEMBLY

Assembly of the Hybrid Energy Street Lamp

First the one M.S Steel rod is used to the frame structure of the lamp. The later more 4 steel rods are taken to create the base for the rod to stand it upright. Those 4 rods are the welded forming a base structure for the lamp

Three more M.S Steel rods are take to form a base for the solar panel , circuits and the LED lamp. After welding of the rods a base is formed for the circuits and step by step the mounting is done. After the connecting of the solar cells, circuits and the lamp a DC motor is mounted at the top of the lamp for the wind energy.

The wind mill is made with two metal discs and it is welded together and around that disc metal panel are welded. This wind mill is then mounted at the top of the DC motor

This DC motor is also connected to the circuit powering up the battery and simultaneously the battery is powered by the solar.

A sensor is also connected at the top of the lamp, which helps the lamp to turn on and off as per brightness (i.e. is it day or night)

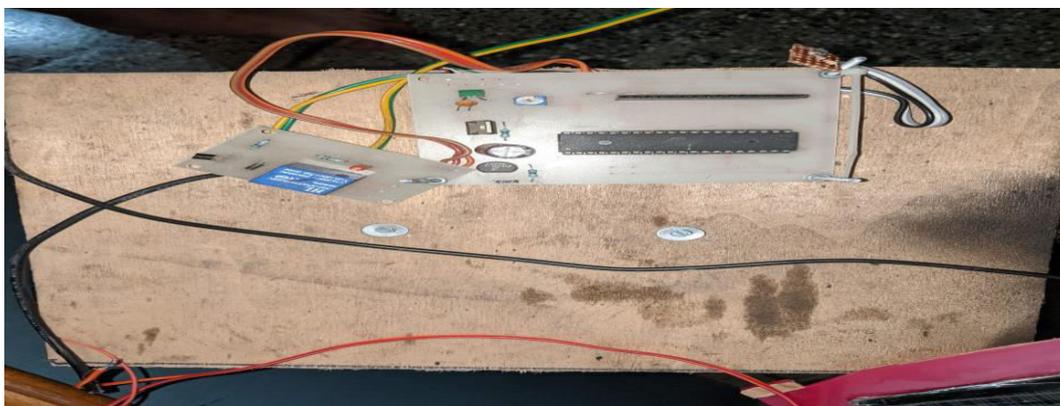


Figure 7: Circuit Assembly



Figure No. 8: Wind Mill

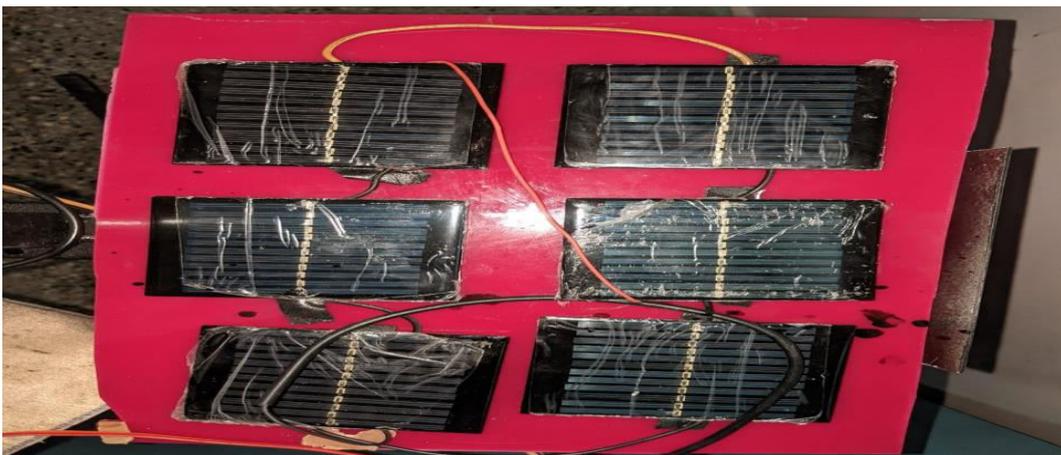


Figure no 9: Solar Cells

VLCONCLUSION

In this paper Intelligent street lighting system is described that integrates new technologies offering ease of maintenance and energy savings.

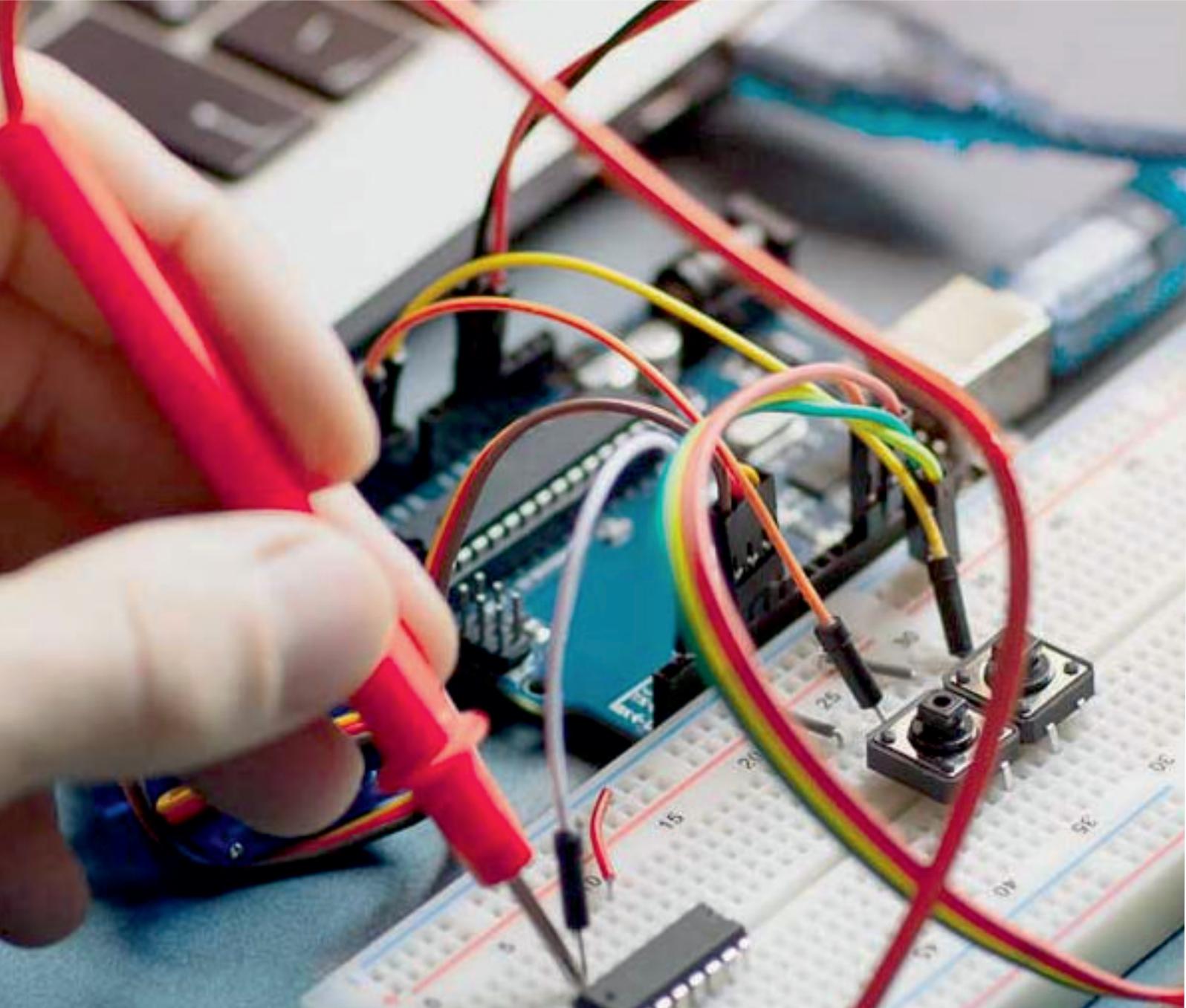
The proposed system is appropriate for street lighting in remote as well as urban areas where traffic is low at times. It is capable of taking corrective actions in case of unprecedented events of climatic change.

REFERENCES

- [1] K. R. Chowdhury, M. Di Felice, “Search: a routing protocol for mobile cognitive radio ad hoc networks,” Reza Mohamaddoust , Abolfazl Toroghi Haghighat, Mohamad Javad Motahari Sharif and Niccolo Capanni, “A Novel Design of an Automatic Lighting Control System for a Wireless Sensor Network with Increased Sensor Lifetime and Reduced Sensor Numbers”, Sensors (2011) ,Volume No.11(9), pp. 8933-8952.
- [2] De Dominicis, C.M.; Flammini, A.; Sisinni, E.; Fasanotti, L.; Floreani, F.; “On the development of a wireless self localizing streetlight monitoring system “, Sensors Applications Symposium IEEE, pp. 233 -238 ,2011.



- [3] Gustavo W. Denardin, Carlos H. Barriquello, Alexandre Campos, Rafael A. Pinto, “Control Network for Modern Street Lighting Systems”, IEEE symposium on Industrial Electronics (ISIE), (2011), pp. 1282 –1289.
- [4] Jing Chunguo, Wang Yan Sun, Wenyi Song, “Design of Street Light Pole Controller Based on WSN”, The Tenth International Conference on Electronic Measurement & Instruments, ICEMI (2011), pp. 147 –150.
- [5] Shentu, Xudan; Li, Wenjun; Sun, Lingling; Gong, Siliang, “A new streetlight monitoring system based on wireless sensor networks”, International Conference on Information Science and Engineering, pp. 6394 –6397,
- [6] Wu Yue; Shi Changhong; Zhang Xianghong; Yang Wei; “Design of new intelligent street light control system “., 8th IEEE international Conferences on Control and Automation (ICCA), (2010) , Page(s): 1423



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