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Intelligent Streetlight Energy-Saving System Based On Power Line Communication Technology with RTOS

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Abstract: *Currently, in the whole world, enormous electric energy is consumed by the street lights, which are automatically turn on when it becomes dark and automatically turn off when it becomes bright. This is the huge waste of energy in the whole world and should be changed. This paper discusses an intelligent streetlight energy-saving system based on power line communication technology with RTOS. Here we are going to implement the intelligent streetlight energy saving system based on PLC (Power Line Communication) Technology and RTOS. From PC, we are controlling the Street Lights through microcontroller via PLC. Microcontroller will be placed in each street light. ON & OFF signal for each Street light will be given from PC*
Keywords: *RTOS, PLC,PC, Microcontroller*

I. Introduction

LIGHTING systems, especially in the public sector, are still designed according to the old standards of reliability and they often do not take advantage of the latest technological developments. The proposed remote control systems can optimize management and efficiency of street lighting. It uses power line Communication device which enable more efficient street lamp-system management.

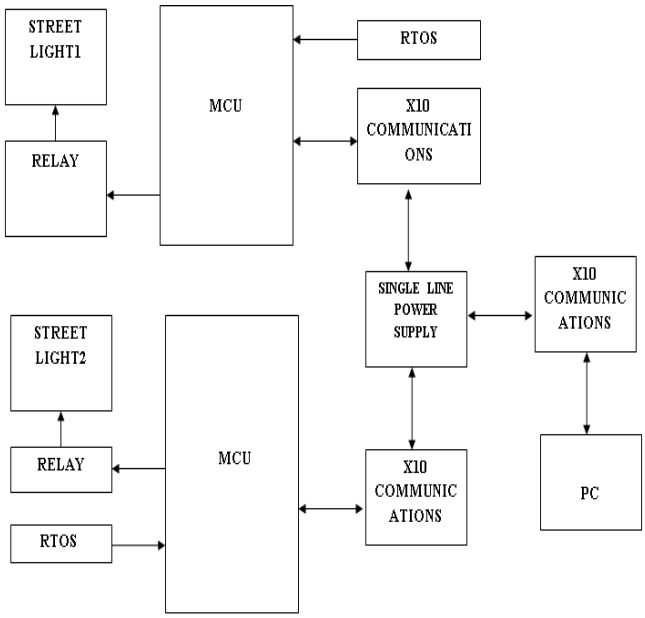


Fig.1 Block Diagram

The system compromises of server, GUI to display and nodes which are micro controlled processed with embedded sensors measuring different parameters. Each node in the network is linked to the main server via a protocol. The analog data sensed by the sensor is converted in digital form, processed by microcontroller and then sent to the server. The master controls all the slaves .The other nodes sends the data to master and the master collects the data and further sends to concentrator and server where the data is monitored and on necessary alterations process it to switch On/Off the nodes devices. This scenario increases life of streetlights, reduces power consumption, ease of monitoring and controlling and less installation cost are the various advantages achieved.

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 systems.

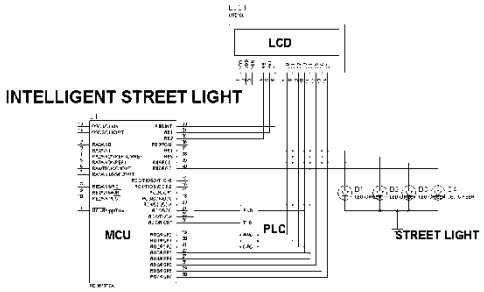


Fig.2. Circuit Diagram

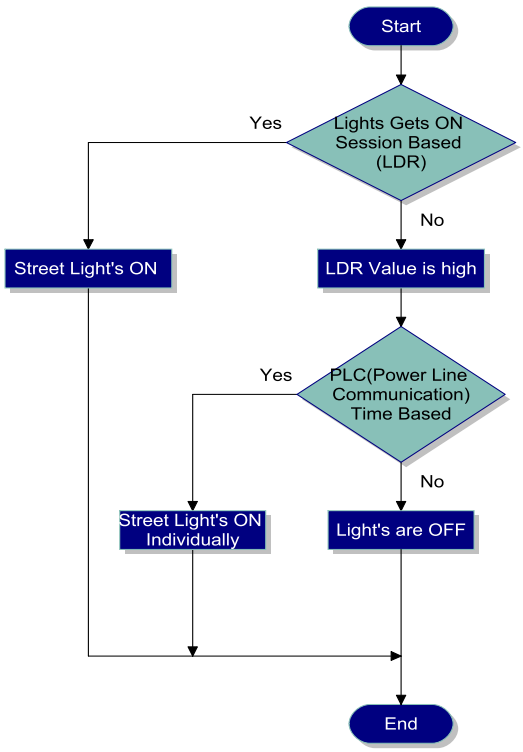
III. Software Requirement

- MP LAB IDE
- PROTEUS(Simulation)

IV. Hardware Reqirements

- PIC Microcontroller
- Street Light Model
- PC
- Power Line Communication
- Relay

Flow chart



Modes of Operation:

- Auto mode
- Manual mode

A. Auto mode In auto mode, according to the light intensity, slot of times and also monitoring the weather conditions the nodes are being switched on/off .It monitors the complete locality and thus saving power. It has following four cases:

B. Manual mode In Manual mode, system stores the parameters in computer about changes in environmental conditions continuously like heavy rain visibility, faults ,more or less traffic congestion or during foggy conditions. User can manually define each node with specific intensity factor as per the requirement and can take any suitable corrective measure.

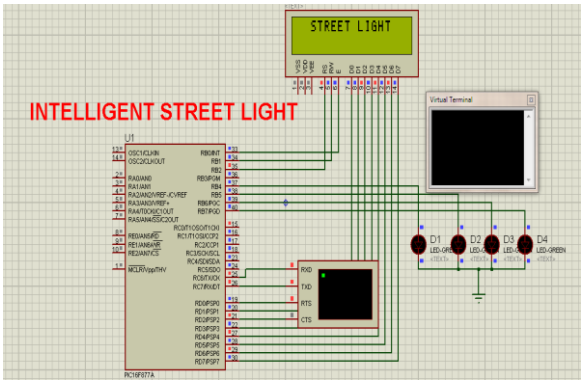


Fig.3. Simulated Output

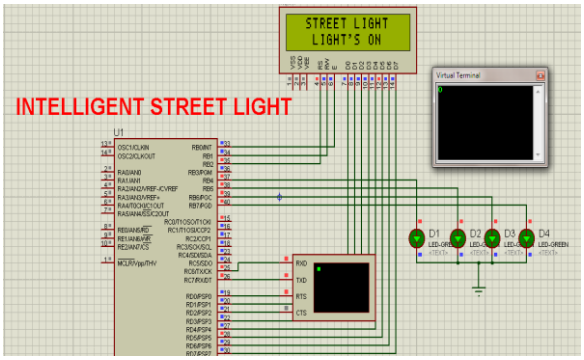


Fig.4. Simulated Output

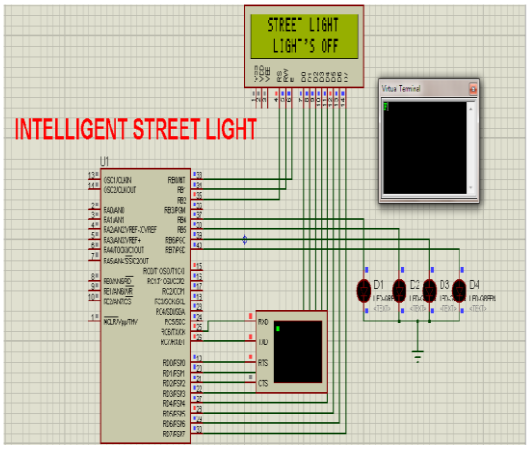


Fig.5. Simulated Output

V. Conclusion:

This project describes a new intelligent street lighting system which integrates new technologies available on the market to offer higher efficiency and considerable savings. This situation is particularly interesting in the case of economic incentives offered to clients that enable remote control of their loads and can be useful

Result: The result of the project is to develop Intelligent street light energy saving system at street light using power line communication and RTOS through microcontroller via PLC

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