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Nano Leaves Application in Intelligent Wirless Street Ligthing System

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Abstract- **Harvesting energy from the environment responsibly is important, natural trees and plants do this efficiently already for millions of years. Our invention is the mimicking of this ingenious concept also referred to as bio mimicry or bio mimetic. In particular this invention relates to the shape and form of leaves and needles and their incorporated non-materials that allows the NANO leaf to harvest, capture environmental energies like solar radiation, wind and sound and turn this into electricity, the NANO leaves made from a flexible substrate, is exploited on both sides, using a process called thin-film deposition which will incorporated thermo and photovoltaic material for the purpose of converting solar radiation (light and heat) in addition we introduce piezoelectric connective elements that connect/affix the leaf to the plant or tree, this not only allows quick and secure assembly but it also serves for turning wind energy into electricity. It uses many sensors to control and guarantee the optimal system parameters the information is transferred point-by-point using ZIG Bee transmitters and receivers and is sent to a control terminal used. It proposes an innovative wireless street lighting system with optimized management and efficiency. Wireless communication uses ZIG Bee-based system which allow wireless devices more efficient street lamp management to street lamps and to take appropriate measures, in case of failure. The system allows substantial energy. The main purpose of this project is to switch ON and OFF street lights without manual operation.**

- **By using this system energy consumption is reduced.**
- **IR sensors and micro controller are the main components of the project.**

IR sensor is like our eye which detects the presence of an object.

Index Terms— NANO leaves, ZIB transmitter, piezoelectric, photovoltaic cell, IR sensor etc.

1. INTRODUCTION

Today much debate has been going on in scientific circles about how real is the phenomenon of global warming and what would be mankind's response in averting the consequence of it. Realizing this, steps have been taken to reduce the use of fossil-based energy and substituting the same with renewable sources such as solar and wind energy etc. Till now we are producing the electrical energy with the means of either wind mills (only the effect of wind) or solar panels (only the effect of solar energy). So, far but all the two forms of these energies we are not using in same system. If we will do so then surely we can get the more efficient system than ever we had. So here in this paper we will demonstrate how an artificial tree will produce the electrical energy by using both (wind as well as solar) energies .For constructing the artificial tree the first step is to construct the NANO leaves .The NANO leaf will consist of two transparent conducting layers one at the top and other one at the bottom .Between these two layers we are placing thin film photo voltaic layer to convert the sunlight into electrical energy and thin film thermo voltaic layer to convert the thermal radiation into electricity. The NANO leaves then connected to twigs and branches using tiny piezoelectric elements that convert the movements of the leaves caused by wind and rain into more electricity. It will be interesting to know that one tree depending on the size and location, can produce between 2000 and 12000 kHz per year plus the trees provide shade and function as a windbreak. In this project we mainly concentrate on to save the power in street lights. The heart of the project is ARM7 LPC2148. This controller will controls the all the street lights and all the processes. In our project we are doing automatic control of street lights by sensing the vehicles. If it there any vehicles entre at that time the IR sensor will sense the vehicle, and send the information to controller at that time the controller will on the particular street light by using relays. Once the vehicle is pass from the street light automatically previous street light will going to be OFF and next street light will ON. Also we are using LDR sensor to indicate day and night conditions. The day time all the street lights will off automatically, and night time turn on with more intensity and also we are checking fault detection in all the street lights by using LDR. If it is their any fault in street light inform to control room by using ZIG- Bee that is wireless communication. The other one application what we are adding in this project means Coin based mobile charging. Because now-a-days the usage of mobile will gradually increases, and charging is very important matter, so we can introduced this concept in society like coin based mobile charging. If we are inserting coin our mobile will start charging. The main important massage in our project is to save the energy, here we are using solar panels and sun light is naturally available to us. So we can generate the power from sun by using solar panels and that generated power is stored in rechargeable battery. From this battery we can supply the power to street lights as well as mobile charger.

1.Automatic controlling of street lights,and fault detection.

2. Especially in the field of electronics automated systems are giving good performance.
3. Day and night condition checking.
4. IR's which detects the vehicle and then Particular Street light will be ON.
5. Coin based mobile charging from generated power.
6. Solar energy we are use to generate the power.
7. Power will supply to street lights and mobile charger.

II. LITERATURE SURVEY

The literature review gives brief idea about the existing system and why we are introduced new street lighting system. The main issues associated to the existing systems are increased raw material cost and social sensitivity to the environmental issues. So the manufactures develop three solutions to solve this problem.LED technology, remote control technology and solar technology. The newly proposed system combined three technologies such as LED technology, Remote control technology and solar technology and forming a good power save system. The newly proposed system offer higher efficiency and considerable savings in power that The objective of this project is to form an intelligent lamp post using ZIG bee network of devices can be achieved by using high efficient LED technology and also helpful to inform any accidents through ZIG bee to the concerned base station. Early days, the street lighting systems are controlled manually. So there was much more power consumption not only that if we forgot to switch off the light means that will be glowing entire day.

III. METHDOLOGY

The use of Piezo-voltaic, Thermo- voltaic and Photo-voltaic cells does effectively convert an amalgamation of energy sources into electricity. Artificial energy trees can be used for both domestic and even industrial purposes. According to research, erecting an approximate of six meter area of NANO leaves can produce enough energy for an average household. More, intricate is that, artificial trees can be constructed at various areas.

3.1 Desert

The earth has large areas of unexploited deserts which can be used to generate a massive amount of electricity, if artificial trees were planted. Te energy produced could be used to solve the most predominant challenge in desert; provide electricity to power desalination. The desalinated water could thereafter be used for irrigation and drinking purposes. The fragile desert environment would hardly be affected by such a project yet the benefits are extensive. To further minimize the environmental impact on desert, the artificial trees could be planted alongside roads, coasts and other areas where it would protect inhabitants from sandstorms and provide constant shade form the sun.

3.2 Golf courses, Recreation ground and parks

Artificial golf courses, recreational grounds and parks could have artificial plants and trees planted to supply electricity for at least a portion of recreational parks. For golf course, the Nano leaves could fuel ground maintenance

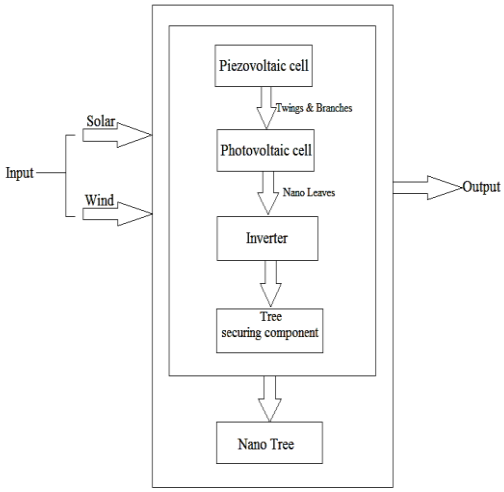

Fig.1. Block diagram of automatic wireless streetlight using nano-leaves

1. The working of the project can be clearly explained by considering the street light.
2. The main aim of the project is to automatic switch ON/OFF the street light by sensing the vehicle.
3. In this project IR's sensors are used for sensing the vehicles.
4. Initially the street lights are in OFF state by using the LDR's.
5. As the IR sensor senses the vehicle, the street lights associated with respect to that sensor will switch ON and OFF after certain time.
6. Automatic control of vehicle beam when they approach each other.

IV. HARDWARE REQUIREMENT FOR THE PROPOSED SYSTEM

1. ARM7(LPC 2148) Microcontroller
2. Relay
3. Display panel (LCD)
4. ZIG-Bee module
5. IR Sensors

V. SOFTWARE REQUIREMENTS FOR THE PROPOSED SYSTEM

1. Kei l IDE

VI. ADVANTAGES

1. This circuit uses LED bulbs, so it is very low cost and it has more life span. Maximum energy can be saved.
2. Low maintenance.
3. Low power consumption.
4. Less manpower required.
5. Light sensors have high sensitivity and are easily implementable.

VII. DISADVANTAGES

1. Construction difficulties.

VIII. APPLICATIONS

1. Power theft identification
2. Meter reading
3. Remote monitoring and control
4. Fault identification
5. Transformer monitoring

IX. FUTURE SCOPE

The number of channels can be increased to interface more number of light sensors which is possible by using advanced versions of microcontrollers. Further the project can be enhanced by using appropriate sensors for detecting the failed street light and then sending an SMS to the control unit department via GSM- MODEM for appropriate action. This system can be connected to communication devices such as GSM, cellular phones or satellite terminal to enable the remote collection of recorded data or alarming of certain parameters.

X. CONCLUSION

In this project we allow the users to set the conditions appropriate to the crop is growing. The more accurate sensor is better and it will perform better comparing to the existing system. The unit will monitor the conditions of various parameter considerations and to take the appropriate action. If sun light is lower than the set sensitivity, switch ON only a block of street lights before of vehicles and to switch OFF the behind lights. If sun light is vehicles moving on the road, turn OFF the LED and if the vehicles moving on the road turn ON the bulb.

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