



DESIGN AND IMPLEMENTATION OF AN AUTOMATED SOLAR STREET LIGHT SYSTEM

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Abstract Most of the street lights in Bangladesh use high-pressure sodium vapor lamps and energy saving bulbs running from the national grid electricity to light the street. Due to improper maintenance, most of the street lights are under the fault condition and roads are under dark condition. In this paper, an arduino based low-cost solar street light system has been designed. The objective of this work is to design an automatic control and fault and obstacle detection system for street lamps. The lighting system is based on renewable energy which is low cost. With the development of urbanization, the number of streets increases rapidly with high traffic density. This work includes three features: the sunlight sensing and control on/off of the street lights, the traffic sensing and fault reporting system. The microcontroller used is arduino mega 2560 which has to be programmed for these three tasks. This could be applicable in Bangladesh, which might provide a low-cost alternative to the existing street lighting system.

Keywords: Automatic control, use of solar energy, fault detection, energy saving.

1. Introduction

Street lighting system is an important issue should be designed well to allow users for traveling at night with good visibility in respect of safety and comfort. An efficient system ensure comfort tracking and reduces the accident during late night. On the other hand, poorly designed lighting systems can lead to poor visibility which may not be helpful for pedestrians who are passing through that street. Street Lighting can cost about 10–38% of the total energy bill in typical cities worldwide (D. A. Devi, 2012). Street lighting is a particularly critical concern for public authorities in developing countries because of its strategic importance for economic and social stability (L. Prasad Naik, 2013). Inefficient lighting wastes significant financial resources every year, and poor lighting creates unsafe conditions (L. Prasad Naik, 2013). Energy efficient technologies and design mechanism can reduce cost of the street lighting drastically (L. Prasad Naik, 2013). Manual control is prone to errors and leads to energy wastages as manually

dimming of lights during mid night is impracticable. Also, dynamically tracking the Obstacle or vehicle are imposed by manual control. The current trend is the introduction of automation and remote management solutions to control street lighting (J. Mohelnikova, 2008).

In this paper, two kinds of sensor are used which are light sensor and photoelectric sensor. The light sensor is used to detect darkness and to activate the ON/OFF switch, thus the streetlights will be ready to turn on. On the other hand, the photoelectric sensor is used to detect vehicle movement to activate the streetlights. LDR, which varies according to the amount of light falling on its surface (K. S. Sudhakar, 2013), gives an indications for whether it is a day-night time, the photoelectric sensors are placed on the side of the road, which can be controlled by Arduino Mega 2560. At the photoelectric sensor will be activated generally during the night time. Moreover, if any object crosses the photoelectric beam, a particular light will be automatically ON. By using this as a basic

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Smart Trends in Computing and Communications Yu-Dong Zhang, Tomonobu Senjyu, Chakchai So-In, Amit Joshi, 2021-10-25 This book gathers high quality papers presented at the Fifth International Conference on Smart Trends in Computing and Communications SmartCom 2021 organized by Global Knowledge Research Foundation GR Foundation from March 23 2021 It covers the state of the art and emerging topics in information computer communications and effective strategies for their use in engineering and managerial applications It also explores and discusses the latest technological advances in and future directions for information and knowledge computing and its applications Innovative Computing and Communications Aboul Ella Hassanien, Sameer Anand, Ajay Jaiswal, Prabhat Kumar, 2024-10-14 This book includes high quality research papers presented at the Seventh International Conference on Innovative Computing and Communication ICICC 2024 which is held at the Shaheed Sukhdev College of Business Studies University of Delhi Delhi India on 16 17 February 2024 Introducing the innovative works of scientists professors research scholars students and industrial experts in the field of computing and communication the book promotes the transformation of fundamental research into institutional and industrialized research and the conversion of applied exploration into real time applications *Smart Intelligent Computing and Applications* Suresh Chandra Satapathy, Vikrant Bhateja, J. R. Mohanty, Siba K. Udgata, 2019-10-03 This book presents high quality papers from the Third International Conference on Smart Computing and Informatics SCI 2018 19 organized by the School of Computer Engineering and School of Computer Application Kalinga Institute of Industrial Technology Deemed to be University Bhubaneswar from 21 to 22 December 2018 It includes advanced and multi disciplinary research on the design of smart computing and informatics focusing on innovation paradigms in system knowledge intelligence and sustainability that have the potential to provide realistic solutions to various problems in society the environment and industry The papers featured provide a valuable contribution to the deployment of emerging computational and knowledge transfer approaches optimizing solutions in varied disciplines of science technology and health care *Synergies in Smart and Virtual Systems Using Computational Intelligence* Shankar Babu, Mahesh Babu Kota, 2025-10-22 We are delighted to present the preface to the International Conference on Smart Systems Virtual Intelligence and Robotics Automation using Advanced Electronics and Computational Designs ICSVREC 2025 This conference was conceived with the aim of providing a robust interdisciplinary platform for researchers academicians professionals and students to share their research findings innovative ideas and technological advancements across **Biologically-Inspired Energy Harvesting through Wireless Sensor Technologies** Ponnusamy, Vasaki, 2016-04-05 The need for sustainable sources of energy has become more prevalent in an effort to conserve natural resources as well as optimize the performance of wireless networks in daily life Renewable sources of energy also help to cut costs while still providing a reliable power source Biologically Inspired Energy Harvesting through Wireless Sensor Technologies highlights emerging research in the areas of sustainable

energy management and transmission technologies Featuring technological advancements in green technology energy harvesting sustainability networking and autonomic computing as well as bio inspired algorithms and solutions utilized in energy management this publication is an essential reference source for researchers academicians and students interested in renewable or sustained energy in wireless networks *Electrical and Electronic Devices, Circuits, and Materials* Suman Lata Tripathi, Parvej Ahmad Alvi, Umashankar Subramaniam, 2021-03-24 The increasing demand for electronic devices for private and industrial purposes lead designers and researchers to explore new electronic devices and circuits that can perform several tasks efficiently with low IC area and low power consumption In addition the increasing demand for portable devices intensifies the call from industry to design sensor elements an efficient storage cell and large capacity memory elements Several industry related issues have also forced a redesign of basic electronic components for certain specific applications The researchers designers and students working in the area of electronic devices circuits and materials sometimes need standard examples with certain specifications This breakthrough work presents this knowledge of standard electronic device and circuit design analysis including advanced technologies and materials This outstanding new volume presents the basic concepts and fundamentals behind devices circuits and systems It is a valuable reference for the veteran engineer and a learning tool for the student the practicing engineer or an engineer from another field crossing over into electrical engineering It is a must have for any library **Proceedings of International Conference on Advanced Computing Applications** Jyotsna Kumar Mandal, Rajkumar Buyya, Debashis De, 2021-11-23 This book gathers selected high quality research papers presented at the 2nd International Conference on Advanced Computing Applications ICACA 2021 held virtually during 27-28 March 2021 The book is divided into four sections These are communication and computing signal processing and multimedia computational intelligence and data analytics and decision computing The topics covered are advanced communication technologies IoT based systems and applications network security and reliability virtualization technologies compressed sensors and multimedia applications signal image and video processing machine learning pattern recognitions intelligent computing big data analytics analytics in bio computing AI driven 6G mobile wireless networks and autonomous driving Integrated Renewable Energy for Rural Communities Nasir El Bassam, Preben Maegaard, 2004-06-30 More than two billion people worldwide have currently no access to grid electricity or other efficient energy supply This is one third of humanity and the majority live in rural areas The productivity and health of these people are diminished by reliance on traditional fuels and technologies with women and children suffering most Energy is the key element to empower people and ensure water food and fodder supply as well as rural development Therefore access to energy should be treated as the fundamental right to everybody Renewable energy has the potential to bring power not only in the literal sense to communities by transforming their prospects This book offers options that meet the needs of people and communities for energy and engage them in identifying and planning their own provision It describes updated renewable energy technologies

smart cities The book presents cutting edge and future perspectives of smart cities where industry experts scientists and scholars exchange ideas and experience about surrounding frontier technologies breakthrough and innovative solutions and applications

Translation and Processing of Light by the Non-Image Forming Visual System - Context, Mechanisms and Applications Fabian-Xosé Fernandez,Shadab Rahman,Manuel Spitschan,2021-10-18 **Information**

Security Handbook Noor Zaman Jhanjhi,Khalid Hussain,Mamoona Humayun,Azween Bin Abdullah,João Manuel R.S.

Tavares,2022-02-17 This handbook provides a comprehensive collection of knowledge for emerging multidisciplinary research areas such as cybersecurity IoT Blockchain Machine Learning Data Science and AI This book brings together in one resource information security across multiple domains Information Security Handbook addresses the knowledge for emerging multidisciplinary research It explores basic and high level concepts and serves as a manual for industry while also helping beginners to understand both basic and advanced aspects in security related issues The handbook explores security and privacy issues through the IoT ecosystem and implications to the real world and at the same time explains the concepts of IoT related technologies trends and future directions University graduates and postgraduates as well as research scholars developers and end users will find this handbook very useful *Saturday Review of Literature* ,1924 *ICT with Intelligent*

Applications Jyoti Choudrie,Parikshit N. Mahalle,Thinagaran Perumal,Amit Joshi,2023-09-22 This book gathers papers addressing state of the art research in all areas of information and communication technologies and their applications in intelligent computing cloud storage data mining and software analysis It presents the outcomes of the Seventh International Conference on Information and Communication Technology for Intelligent Systems ICTIS 2023 held in Ahmedabad India The book is divided into two volumes It discusses the fundamentals of various data analysis techniques and algorithms making it a valuable resource for researchers and practitioners alike **Cybersecurity and Evolutionary Data Engineering** Raj

Jain,Carlos M. Travieso,Sanjeev Kumar,2023-09-19 This book comprises the select proceedings of the 2nd International Conference on Cybersecurity and Evolutionary Data Engineering ICCEDE 2022 The contents highlight cybersecurity and digital forensics evolutionary data engineering and data management for secure contemporary applications It includes papers on data models semantics query language AI driven industrial automation ERP CRM data security authentication and access control cyberspace structure and models and drone large data filtration cleansing and security among others This book is of immense interest to researchers in academia and industry working in the fields of electronics and data engineering

Data-Driven Ocean Environmental Perception with its Applications Jianchuan Yin,Yu Jiang,Phoebe Koundouri,Hongde Qin,2025-05-27 Data driven ocean environmental perception refers to the various data driven methodologies used by researchers to study understand and explore the ocean for sustainable marine ecosystem the blue ocean economy and other ocean related activities Ocean environment perception techniques also pave the way for deep insight and full exploration of ocean resources such as coastal and marine ecosystem protection ocean vehicle operation and

management and ocean energy utilization However it is hard for traditional data processing techniques to get comprehensive understanding of the ocean environmental information attributed to the complex characteristics of environmental information The traditional data processing techniques are facing challenges such as Unable to fully capture the non linearity and intrinsic uncertain of complex ocean systems Isolated systems are involved and make it difficult to integrate data from various sources Overwhelming for handling enormous amounts of data leading to performance issues and long processing times Costly in scalability both in terms of hardware and operational expenses Advances in data driven methodologies Highly dynamic nonlinearity and uncertainty mapping capability in complex system evolution Leveraging vast amounts of data collected from various sources effectively Flexibility in handling various types of data including structured semi structured and unstructured data Handling big data efficiently by making use of distributed computing and storage Data driven technologies are a set of techniques dealing with complex systems which can mine valuable potential relationships from measurement data through intelligent computational approaches such as machine learning data mining data fusion reinforcement learning etc Data driven applications on the aspect of Remote Sensing Autonomous Underwater Vehicles AUVs Remotely Operated Vehicles ROVs Acoustic Sensing Buoy Networks Internet of Things IoT for the oceans and Ocean Digital Twin are becoming increasingly crucial for ocean environmental perception leveraging vast amounts of data collected from various sources to monitor analyze and predict oceanic atmospheric and marine ecological conditions This helps us to identify and monitor environmental changes and better understand the complex relationships between different components of the ocean ecosystem It also provides essential ways to explore how people understand value or engage with marine environment and the Blue Economy such as renewable wind wave energy marine ranching industry for sustainable food energy etc The focus of this research topic is dedicated to recent advances in data driven technologies implemented for the field of ocean environment perception and their applications for the blue ocean economy sustainable marine ecosystem and other ocean related activities This topic also aims to extend the future implications of data driven techniques in the field of ocean research It calls for original and novel research related to ocean environmental perception based on data driven techniques Potential topics of interest include but are not limited to the following Monitor Analysis and Prediction of Oceanic Conditions ML and AI algorithms Ocean Monitoring system Buoy Networks Satellite Remote Sensing and Acoustic Sensing Applications Big Data Internet of Things IoT Digital Twins for ocean and Smart Ocean Ocean Environmental Data Processing and Information Fusion Methods Data Driven Control Operation and Management of Ocean Vehicles AUV ROV USV et al for Ocean Environment perception and marine ecosystem monitoring Coastal and Marine Ecosystem Evaluation Protection and Management Based on Data Driven Techniques Data Driven Assessment and Effect Analysis of Climate Change and Human Activities on Oceans Global Marine Governance and Ocean Management in the Principle of Blue Economy Sustainable Development Goals SDGs and UN Ocean Decade Utilization Management and Governance of Renewable Ocean Energies

Tidal Currents Waves Wind Thermal and Salinity Gradients etc based on Data Driven Ocean Environment Perception Management of Marine Infrastructure and Maritime Shipping Based on Ocean Environment Perception **Sustainable Smart Computing and Green Energy** Prashant Kumar,Bhargav Prajwal Pathri,S Bhanu Prakash,Aditi Saxena,Debasish Mishra,2025-05-29 Sustainable Smart Computing and Green Energy explores the fusion of advanced technology and environmental sustainability offering a detailed look at sustainable computing practices and green energy solutions As technology advances and climate change intensifies the book provides innovative approaches that balance efficiency with sustainability It features research from leading experts on topics like low power hardware design energy aware algorithms and the integration of renewable energy in data centers The book highlights practical strategies and emerging trends driving energy efficiency across sectors An essential resource for researchers practitioners and policymakers it addresses not only the technical aspects but also the ethical and environmental considerations of smart computing in the age of climate change Through a mix of theoretical insights and real world applications the book paves the way for eco friendly technology development *Development of Renewable Energy in Emerging Economies* Jose Amaya,2009-01-07 This dissertation demonstrates a breadth and depth of knowledge about its subject that can only come from a truly experienced businessman Drawing upon his life experience as well as scholarly sources Dr Amaya clearly and precisely sheds a fresh light of insight upon such subjects as renewable energy market conditions and operations and the effects of government policies on emerging economies Dr Amaya rigorously develops his argument that the so called energy problem has implications for the whole structure of modern society Fully documented and persuasively argued this dissertation has merit on several levels as a primer on renewable energies a record of existing government policies throughout the world and a practical feasible strategy for addressing 21st century energy needs and demands He cogently concludes that Through research I have concluded that there is no single source of renewable alternative source of energy that can replace our use of fossil fuels within a five year period The combination of the different sources would be our best alternative Although there are many experts fairly well versed in the subject of renewable energy important knowledge can be found here and new truths rediscovered Ultimately Dr Amaya believes that Renewable and alternative energy technologies have to be explored in more detail in the United States like they have in other countries of the world Although the society sees the need to address expanded technology in respect for alternate and renewable energy lack of support from federal government is sending a different message **Light Metals—Advances in Research and Application: 2012 Edition** ,2012-12-26 Light Metals Advances in Research and Application 2012 Edition is a ScholarlyEditions eBook that delivers timely authoritative and comprehensive information about Light Metals The editors have built Light Metals Advances in Research and Application 2012 Edition on the vast information databases of ScholarlyNews You can expect the information about Light Metals in this eBook to be deeper than what you can access anywhere else as well as consistently reliable authoritative informed and

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hebrew bible balaam and the angel 1836 by gustav jäger the angel in this incident is referred to as a satan 6 the hebrew term šāṭān hebrew שָׂטָן is a generic noun meaning accuser or adversary 7 8 and is derived from a verb meaning primarily to obstruct oppose 9

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feb 1 2018 alan whiticker is the co author of the satin man which first revealed harry phipps as a possible suspect mr whiticker believes harry phipps gained the children s trust by giving them a one pound note before luring them to his house which was just hundreds of metres away

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