IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Wireless Solar Robotic Vehicle

Intended for Civil Application

Onkar Ashokrao Pandav, Prof. Priti Rajput

Engineer, Professor

Master of Engineering Electronics

Dr. .D. Y. Patil School of Engineering, Ambi, Pune, India

Abstract: The intention of designing a robot would be used to facilitate the human beings through giving security and working as a helping hand through reprieving. Surveillance is one among the valuable system in the security-based monitoring. In association with, the automation system works a vital role in surveillance based security system. In this paper, the main need is to design and develop a portable and efficiently useful surveillance robot for civilian and military applications. It aims to utilize solar power for operation and embedded controller for control of the robot. Usually the powering of the robots for surveillance are based on conventional methods and shortest path algorithm based on increasing targets to reduce complexity. The paper shows the implementation of an obstacle avoidance system to produce the amicable solution. It consists of embedded controllers, H-bridge drivers and solar tracker system. It can be applied to multipurpose household and war field applications.

Index Terms – obstacle detector, Robot, Atmega328p, android mobile app, shortest path receiver and Night vision camera, high efficient...

I. INTRODUCTION

Intension for using rotating Robot usually observed as, it is hard to carry out manual civil areas in various situations where also the factors are hostile for sending in personnel (valuable products, numerical scenario) or the available manpower is not enough to dispatch workforce at our disposal also the recharge times of robots in Warfield or surveillance robots in a way off destinations often becomes problematic. In these situations it becomes beneficial to have a platform that may negotiate these challenges while still remaining economically viable. A moving microcontroller based surveillance technique is one such option. Solar energy tracking for robot/vehicles is normally done by using fixed solar panels which can be disadvantageous. This paper provides the hardware design and implementation of a system which succeeds intelligent solar tracking and operating the automatic robot with solar energy that can be used for surveillance and watching the operations .This development aims to present a microcontroller depending surveillance platform that is helpful as a surveillance tool in both civilian and armed forces applications.

The aim of our paper is to make the panel to rotate in accordance with the sun's direction from morning to evening time without human intervention so that the panel grabs the solar energy to the maximum extent achievable throughout the day. The solar based surveillance Technique is used to power (F .Y .C. Albert, C .H .S Mason 2014). This system of power generation is easy and is taken from a natural resource .Obstacles could be present in and around the home environment, e .g. Walls, furniture, body of a human, etc. These kinds of physical obstacles can hamper the data transmission direction between sensor nodes any BS.

Therefore, data reception problems or data inconsistency issues have been occurring in home automation networks. An obstacle avoidance data direction-finding scheme can alleviate and minimize reception problems and increase the performance of the home monitoring network. Newly, a mobile sink based data collection technology has become an important research topic in best home network design. The mobile sink depending data collection scheme tremendously develops the network performance and lifelong.

The Zig Bee traditional has offered a simple solution for a scalable and then flexible home automation network design due to its advantages in low power, low cost, low two way communication overhead (Zualkernam I, Jabbar M 2009) proposed another power efficient targeted traffic scheduling algorithm for IEEE 802 .15 .4 based on home automation networks, where an efficient plan method was implemented to increase the network lifetime. This technique implemented a multi-hop Zig Bee network as well as single hop star topology developing an efficient scheduling scheme. However, the above approaches are unable to detect the presence of obstacles within the watching environment.

Therefore, these kinds of techniques are unable to avoid data reception failures in the presence of obstacles. Besides, Zig Bee based systems only support static sink based data routing strategies (K .Gill, S. H. Yang 2009). The mobile sink moves along the minimum path to collect data from deploying fixed sensor nodes. The work has clear applications to intelligent pervasive mobile devices, for instance, robotic vacuum cleaners and security robots.

II. LITERATURE SURVEY

This concept is a rotating 360 deg wireless robot based on mobile android applications. It is very helpful of automatic smart home monitoring system for this research which consisted of sensor and a rotating robot-type mobile sink. Static sensor node 1 to node 9, scattered in different locations in the home. The main principle of our project is to save energy sources in day today life. This concept is very essential for smart home monitoring system.

Proposed system home monitoring ideas:

The main purpose of this research was to detect obstacle avoidance by forming an optimal object movement path under a smart home network. The optimal object moving scheme can efficiently improve network performance and lifetime. However, another goal is to design a mobile object based obstacle avoidance routing scheme, which can maximize the reliability of the network.

This paper presents the development and then optimization of a monitoring robot with advanced capabilities for home security. The proposed surveillance robot, which is composed of two wheels and a leg, can overcome obstacles up to 40cm in height and this wireless robot can rotate 360 deg .also use for home security in night vision also.

- Solar panel operated wireless robot.
- Requires small space obstacle for movement.
- Suitable product that can be used for home security, home automation.
- This can be used surveillance applications.
- Saving home precious security.

III. Overview of rotating robot for security applications:

3.1 ATmega328P Microcontroller:

The Atmel ATmega328P is a 32K 8-bit microcontroller base on the AVR architecture. Numerous instructions are executed in a single clock cycle providing a throughput of almost 20 MIPS at 20MHz. The ATMEGA328-PU comes in a PDIP 28 pin package and is suitable for use on our 28 pin AVR Development Board.

The computer on one hand is premeditated to perform all the general purpose tasks on a single machine like you can use a computer to run a software to carry out calculations or you can use a computer to store some multimedia file or to access internet through the browser, while the microcontrollers are meant to perform only the specific tasks, for e.g., switching the AC off mechanically when room temperature drops to a definite defined limit and again turning it ON when temperature rises above the defined limit.

There are number of well-liked families of microcontrollers which are used in diverse applications as per their capability and viability to perform the desired task, most common of these are 8051, AVR and PIC microcontrollers. In this we will bring in you with AVR family of microcontrollers.

3.2 Communication Options: ATmega32 has three data transfer modules embedded in it. They are

- Two Wire Interface
- USART
- Serial Peripheral Interface

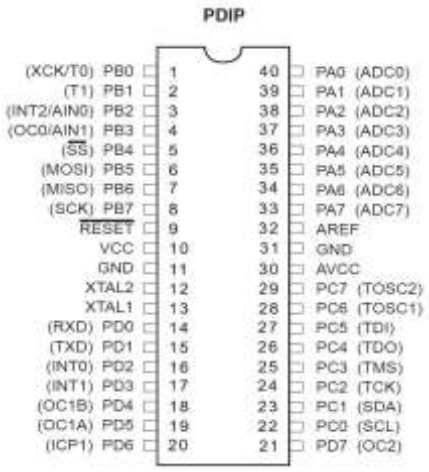

Fig.1. Pin Diagram

3.3 Analog comparator: On-chip analog comparator is obtainable. An interrupt is assigned for different comparison end result obtained from the inputs.

3.4 External Interrupt: 3External interrupt is accepted. Interrupt sense is configurable.

3.5 Memory: It has 32Kbytes of In-System Self-programmable Flash program memory, 1024 Bytes EEPROM, 2Kbytes Internal SRAM. Write/Erase Cycles: 10,000 Flash / 100,000 EEPROM.

3.6 Clock: It can run at a frequency from 1 to 16 MHz Frequency can be obtained from external Quartz Crystal, Ceramic crystal or an R-C network. Internal calibrated RC oscillator can also be used.

3.7 More Features: Up to 16 MIPS throughput at 16MHz. Most of the instruction executes in a single cycle. Two cycle on-chip multiplication. 32 × 8 General Purpose Working Registers

3.8 Debug: JTAG boundary scan facilitates on chip debug.

3.9 Programming: Atmega32 can be programmed either by In-System Programming via Serial peripheral interface or by Parallel programming. Programming via JTAG interface is also possible

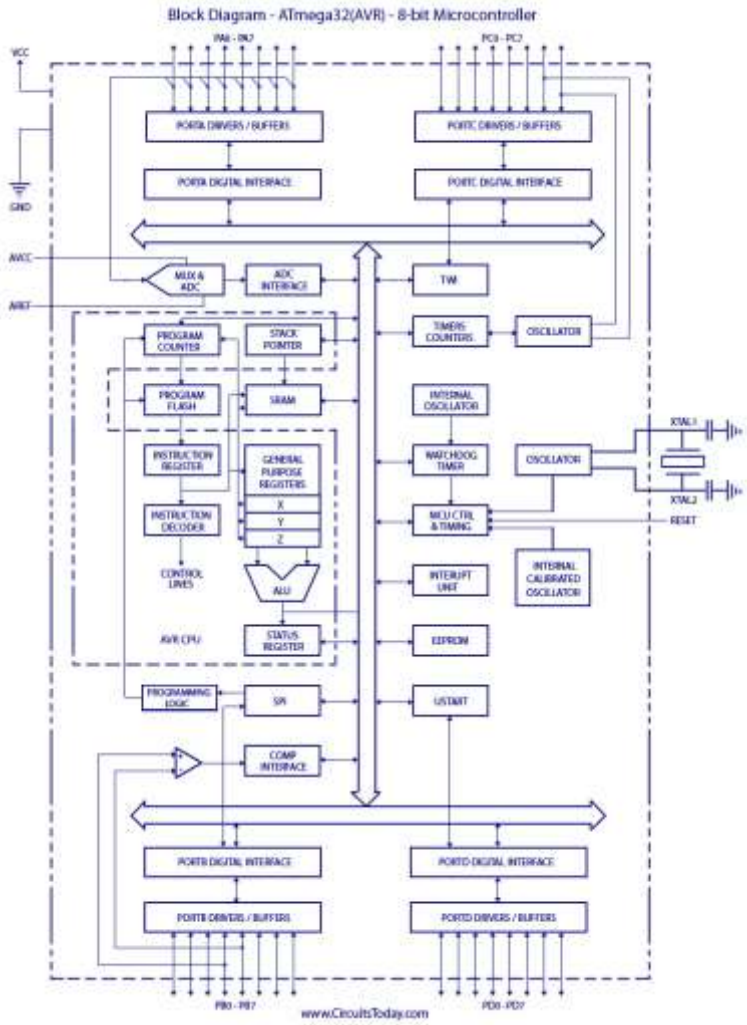

Fig.2. Block diagram of Atmega328P microcontroller

IV. PROJECT BLOCK DIAGRAM:

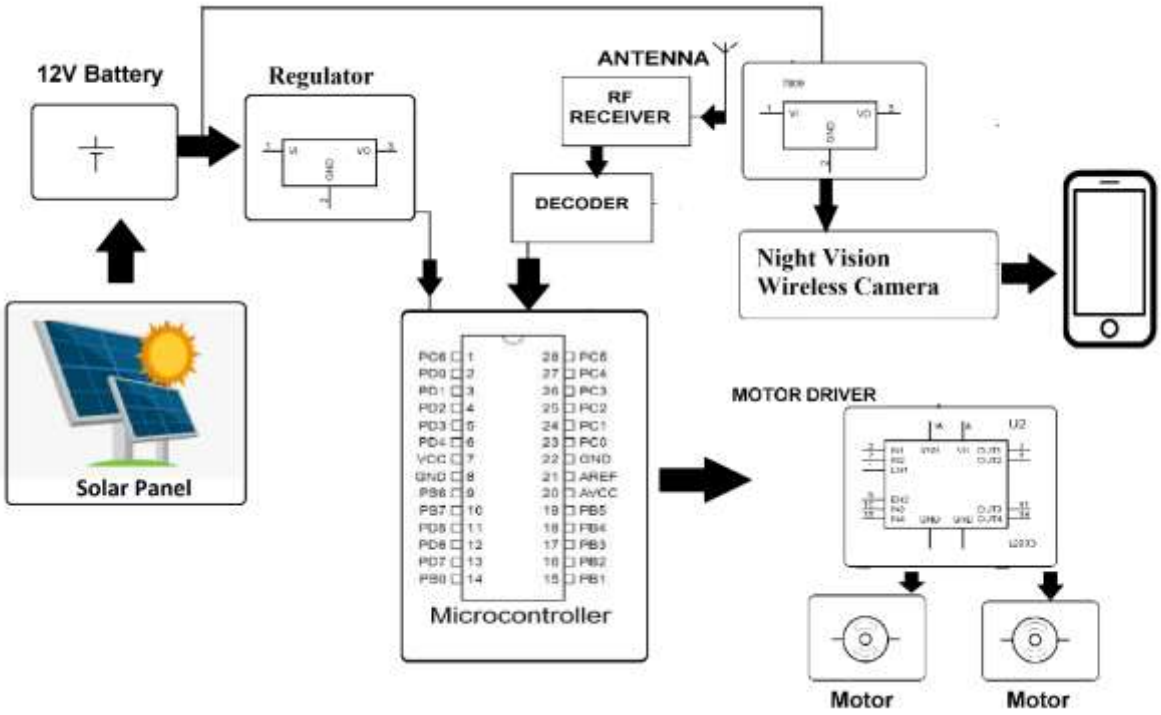

Fig 3: Block Diagram

The Atmega328P microcontroller is the brain of our composition that takes all the judgment as per the inputs that are provided to him from the gears like voltage regulator, RF receiver, and antenna & so on. The motor is linked to the microcontroller via DC motor driver and our wireless robot consists of robot & scrutiny camera that used for security purpose. The heart of our system is crystal circuit, and the procedure speed of machine is dependent on the frequency provided by the crystal.

V. SOFTWARE:

Arduino is an open-source prototyping stage based on easy-to-use hardware and software. Arduino boards are talented to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing a little online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language and the Arduino Software (IDE), based on Processing.

- A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their assistance have added up to an incredible amount of easy to get to knowledge that can be of great help to novices and experts alike.
- Arduino was instinctive at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, meant at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments.
- All Arduino boards are completely open-source, empowering users to build them independently and eventually adapt them to their fastidious needs. The software, too, is open-source, and it is growing through the hand-outs of users worldwide.
-

VI. Why Arduino?

- There are many other microcontrollers and microcontroller platforms existing for physical computing. Parallax Basic Stamp, Netmedia's BX-24, Phidgets, MIT's Handyboard, and many others offer analogous functionality. All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to-use package. Arduino also simplifies the process of working with microcontrollers, but it offers some gain for teachers, students, and interested amateurs over other systems:
- Low-cost - Arduino boards are relatively inexpensive compared to other Microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than $50

- Cross-platform - The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.

• Easy, clear programming environment - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's expediently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.

• Open source and extensible software - The Arduino software is published as open source tools, to be had for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. In the same way, you can add AVR-C code directly into your Arduino programs if you want to.

• Open source and extensible hardware - The plans of the Arduino boards are published under a inventive Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can put up the breadboard version of the module in order to understand how it works and save money.

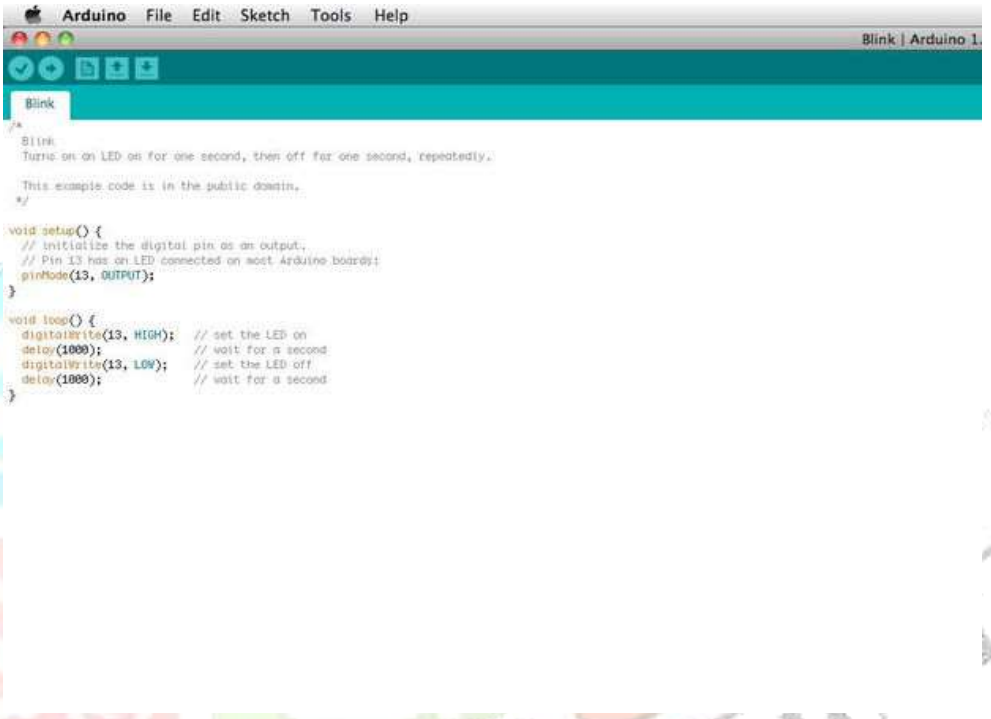

Fig 4. Arduino software program

Fig.5 Android App for operation

VII. HARDWARE SET UP

VII. FUTURE SCOPE:

The wireless robot shows robotic vehicle the progression that can be completed to perk up the automation and thereby provide an improved control on importance and stabilizing power networks by providing & monitoring superfluous power supply:

- Robotic vehicle monitoring tools in order to set free the networks from offline for longtime.
- It is possible to avoid barrier as direction of object & movement.
- Night vision surveillance camera.
- Mechanically rotating & movement direction.

Our next future task is to execution this robotic vehicle with wireless communications in disaster areas in order to assist object in dissimilar direction for management maneuver in military application, home automation.

VIII. CONCLUSION:

The concept planned is a programmed android based wireless revolving 360 deg robot vehicle for security & automation purpose. The thoughts is capable of protect and locked the all object of home without light source. The system can work without much failure of human physical energy. The process is provided with an android control which uses Bluetooth communication. The android application can be used to take delivery of the robot forward, left, right or back. By using the application microcontroller reads the value from the Bluetooth module sends equivalent data to the wireless robot. To be in charge of the robot used Android-device.

IX. REFERENCES

[1] Alireza Ghaffarkhah, Yasamin Mostofi "Path Planning for Networked Robotic Surveillance", IEEE Transactions On Signal Processing, Vol. 60, No. 7. Pp. 1457-1465 (2012).

[2]. Chih-Yung Chang, Jang-Ping Sheu, Yu-Chieh Chen, Sheng-Wen Chan "An Obstacle-Free and Power- Efficient Deployment Algorithm for Wireless Sensor Networks", IEEE Transactions on Systems, Man, and Cybernetics Part A: Systems and Humans, Vol. 39, No. 4, pp. 291-306, (2009),.

[3]. C. -Y. Chang, C. -T. Chang, Y. -C. Chen, S. -C. Lee, "Active route-guiding protocols for resisting obstacles in wireless sensor networks", IEEE Trans. Veh. Technol., Vol. 59, No. 9, pp. 4425-4442, (2010).

[4]. C.H. Kuo, C.C. Chen, W.C. Wang, Y.C. Hung, E.C. Lin, "Remote control based hybrid-structure, robot design for home security applications", In IEEE/RSJ Int. Conf. On Intelligent Robots and Systems, Vol. 55, No. 2, Pp. 4484-4489, (2006).

[5]. Dongsheng Guo, Yunong Zhang, "Acceleration-Level Inequality-Based MAN Scheme for Obstacle Avoidance of Redundant Robot Manipulators", IEEE Transactions on Industrial Electronics, Vol. 61, No.12. Pp. 6903-6914, (2014).

[6]. F.Y.C. Albert, C.H.S Mason, C.K.J. King, K.S. Ee, K.W. Chang ,"Remotely Operated Solar Powered Mobile Metal Detector Robot", Elsevier Medical and Rehabilitation Robotics Vol. 42, No.4, pp. 232-239, (2014).

[7]. Guangming Song, Hui Wang Jun Zhang and Tianhua Meng, "Automatic Docking System for Recharging Home Surveillance Robots", IEEE Transactions on Consumer Electronics, Vol. 57, No.2, pp. 428-435, (2011).

[8]. G. Song, K. Yin, Y. Zhou, X. Cheng, "A surveillance robot with hopping capabilities for home security", IEEE Trans. Consume. Electron, Vol. 55, No. 4, pp. 2034-2039, (2009).

[9]. J. Zhang, G. Song, G. Qiao, T. Meng and H. Sun, "An Indoor Security System with a Jumping Robot as the Surveillance Terminal", IEEE Trans. On Consumer Electronics, Vol.57, No. 4, pp. 1774-1781, (2011).