Available onlinewww.ejaet.com

European Journal of Advances in Engineering and Technology, 2022, 9(4s):513-518
International Conference on Tech Trends in Science & Engineering (ICTTSE) 2022
Suryodaya College of Engineering & Technology, Suryodaya Polytechnic, Nagpur, Maharashtra, India

Research Article ISSN: 2394 - 658X

Implementation of Solar Coolar using Sensor

[1]Sakshi Talmale, [2]Priyanka Waghmare, [3]Dr. Rushikesh Bankar

Department of E&TC Engineering, Suryodaya College of Engineering & Technology, Nagpur, India
[1]sakshitalmale1998@gmail.com, [2]priyankawaghmare57@gmail.com, [3]rushi.shivbaba@gmail.com

ABSTRACT

Cooling process is very important to maintain the foods, fish and many items at constant temperature to avoid the effect of viruses. Cooling process employs the different methods to cool the air. But considering the lower application and cost effective the water cooling system is considered for our project. The main aim of our project is to supply the cooled air with the help of water circulation. It consists of Solar panel, Battery, Fan, Water tank and Pump. The present air cooling methods are evaporative coolers, air conditioning, fans and dehumidifiers. But running these products need a source called electricity. The producing of electricity is ultimately responsible for hot and humid conditions i.e. global warming. In hot and humid conditions the need to feel relaxed and comfortable has become one of few needs and for this purpose utilization of systems like air-conditioning and refrigeration has increased rapidly. These systems are most of the time not suitable for villages due to longer power cut durations and high cost of products. Solar power systems being considered as one of the path towards more sustainable energy systems, considering solar-cooling systems in villages would comprise of many attractive features. Despite increasing performance and mandatory energy efficiency requirements, peak electricity demand is growing and there is currently no prevalent solar air cooling technology suited to residential application especially for villages, schools and offices.

Key words: Cooling, Power Cut Problems, Solar Power Systems, Sustainable Energy Systems, Water Circulation.

INTRODUCTION

As the energy demand and the environmental problems increase, the natural energy sources have become very important as an alternative to the conventional energy sources. The renewable energy sector is fast gaining ground as a new growth area for numerous countries with the vast potential it presents environmentally and economically. Solar energy plays an important role as a primary source of energy. With the impending scarcity of nonrenewable resources, people are considering using alternate sources of energy. From all other available resources sun energy is the most abundant and it's comparatively easy to convert it to electrical energy.

The project is divided into two stages, which are hardware and software development. In hardware development, solar panel has been used for capturing light source and to charge the battery, NodeMCU use to detect the signal from iot to control the cooler from mobile phone as well as water pump timer controller. The wireless controller gives the user the sophisticated way to operate the cooler from long distance. The timer uses to on the pump for 5 min and off the pump for 5min it will save water as well as the water consumption time will increase. This will help to save water.

There is a growing trend for peak electricity demand to occur during the day in the height of summer in many countries. This demand is coming predominantly from the use of air-conditioning systems, both in the commercial and domestic

sectors, and is resulting in summer-time peak loads on electricity grid networks matching or even exceeding winter-time peaks.

There is a place, therefore, for technologies that provide cooling without increasing electricity consumption. Solar cooling is a promising technology that uses the energy from the sun to provide cooling. This approach has the advantage of being 'in phase' with the demand for cooling. Therefore, increased solar radiation during summer leads to an increased cooling requirement due to warmer temperatures. The system responds to the increased solar radiation by providing a greater cooling effect. This is in contrast to the better-known technology, solar water heating, where the hot water heating demand decreases during the summer months due to an increase in incoming cold-water temperature. Typically, the systems also provide significant quantities of waste heat that is available for use. With the resource depletion as well as environmental issues, the fuel and coal consumption are one of the major global concerns. In South East Asia, power consumption from the cooling system alone contributes more than half of the overall total power usage in the region. Hence, the introduction of cooling system based on renewable energy such as wind or solar could benefit this region.

LITERATURE SURVEY

Design and Implementation of Arduino Based Control of Solar Powered DC Motor Pump Load, in this paper, an investigation into the design of a stand-alone Photo Voltaic (PV) water pumping system for supplying rural areas is presented. The work is about increasing energy extraction by improving maximum power point tracking (MPPT) to provide continuous water supply to their needs. The PV source output power and the speed of the DC pump motor are used as input variables. Arduino controller is used for generating the signal and the relay to operate. MPPT technique is used for the maximum power generation with respect to atmospheric condition.

Solar Panel Powered Cooling Unit Using Buck Converter" This paper aims to develop the circuit model of a cooling unit called Peltier unit which is powered by a solar panel using a DC-DC step down converter is known as buck converter. The cooling unit is which is portable and requires less power can be used anywhere to keep certain things cool especially in areas where electricity shortage is a big problem and so using this module in such areas can be highly beneficial.

"Room Temperature Based Automation on Air Conditioning" This paper started out as a classic A/C modification by adding a thermo regulator and maintaining a comfort temperature in our surrounding with respect to the room temperature. There are lots of techniques implemented to control the combination of cooling and heating element, which makes it more automated. The air conditioning with the help of this proposed system makes us more comfort throughout the year irrespective to the climatic condition. The combination of heating and cooling unit into a single air conditioner makes our device to be a portable one.

"Climate Control System for Air Conditioner" This paper a DHT11 sensor is used as temperature and humidity sensor. The DHT11 temperature device is interfaced to the pin of the NODEMCU board, through its built-in ADC, which converts these reading and displays that on the LCD, to indicate temperature of the device. The push buttons in the NODEM**CU** board the user defined temperature settings can be done. Through a motor driver IC this output is fed to a DC fan. If the fan speed increases, then the temperature measured is also increases.

BLOCK DIAGRAM

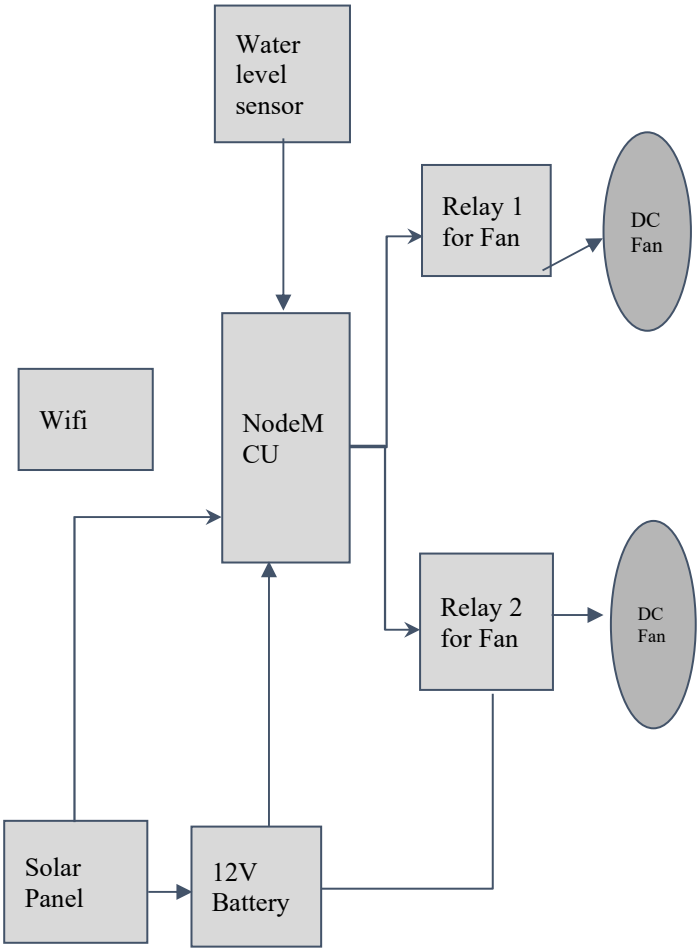

Fig. 1 Block Diagram of the System

WORKING

As shown in the diagram, NodeMCU the main microcontroller ESP12 which is use to connect with the android app. Relays are controlled by the IoT signal given to nodemcu via pp to on /off the cooler. The pump is triggered as per the timer we programmed in the controller. The water level sensor will give signal to the controller to monitor. The system will run on 12V battery which is recharge using solar panel

HARDWARE USE

NODE-MCU
ESP12 Based Microcontroller
4KB memory 8bit controller
2.4GHz wi-fi connectivity
1 Analog pin
9 Digital Pin

Program via Arduino IDE

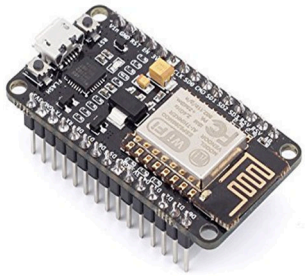

Fig. 2

Fan Motor

RPM: 1000.
Operating Voltage: 12V DC
Current: 1 Amp

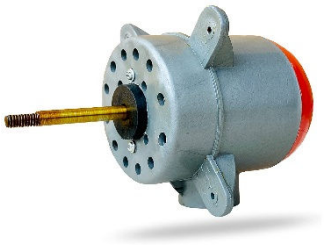

Fig. 3

DC Pump
Maximum head :3 m
Working voltage: DC12V
Waterproof
Maximum flow :280L/H
Load power :5W

Fig. 4

Level Sensor
Operating voltage: 3.3v~5v: dual output mode, analog & digital output
With power indicator (red) and digital switching output indicator (green):
having lm393 comparator chip

Fig. 5

Relay
5 Volt DC Single Pole Double Throw Relay
Supports 250V AC / 10Amp
Supports 110V DC / 15Amp

Fig. 6

Solar Panel
5W SOlar panel: 12V

Fig. 7

Battery
12V 2AH Battery

Fig. 8

SOFTWARE USE

Arduino Compiler to program NodeMCU
Language: Embedded C for Arduino
MIT app inventor

FUTURE WORK

The main issue of the water-based air cooler is water consume more due to regular pump is on and if power failure then it will not work and it is experienced in summer days Also, we have to off the cooler when we experience the water is empty and in night time specially we failed to off the cooler and so the pump is burn due to dry run. So, we propose to have a cooler using solar power as well as timer-based water pump controller and we can control it from our mobile phone using IoT.

REFERENCES

[1]. Tanaka, E. Sakoguchi, Y. Fukuda, A. Takeoka and H. Tokizaki, "Residential solar-powered air conditioner," 1993 Fifth European Conference on Power Electronics and Applications, Brighton, UK, 1993, pp. 127-132 vol.8.

[2]. Singh, Raman Kumar. "DESIGN AND FABRICATION OF THREE IN ONE AIR CONDITIONING." (2015).

[3]. Garud Akhilesh Ravindra, Dolas Nikhil Rajendra, Mahajan Sumit Prakash, Jadhav Rahul Devidas, Prof. Thakare Rakesh Balwant, “Review Study of Portable Air Conditioner,” Volume-6, Issue-2, March- April 2016, International Journal of Engineering and Management Research, Page Number 40-43.

[4]. Dauta, I & Aie, Injiniyer & Irwanto, Muhammad & Ibrahim, Pungut & Zambak, Muhammad. (2013). Solar Powered Air Conditioning System. Energy Procedia. 36. 10.1016/j.egypro.2013.07.050.

[5]. Maheshwari, Madhuri, Gaurav Shrivastava, and Bhanu Choubey. "Study on Refrigeration System Designed for Low Temperature." International Journal of Scientific and Research Publications 3.2 (2013): 1-3.