Research Article

Smart Hybrid Renewable Energy System For Automation With Google Assistant And Ai

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Abstract-The combination of renewable energy sources, wind & solar used for generating power known as wind hybrid system. This method is intended in solar panels and little wind turbines generators for generating electricity. The alternative energy and wind energy are hold on in battery to operate the controller and therefore the load unit are controlled by Google Assistant (Voice command). It helps in checking weather report, power standing sensors with AI management load access. The hybrid methodology is in a position to estimate the associated work and convey the operation strategy to induce the effective utilization of star or wind yield. The electricity is generated from two renewable energies that's alternative energy and wind energy, the web is connected to local area network module with the assistance of hotspot, here three voltages used specifically V1, V2, V3. DHT-11 is employed to point out the temperature and wetness, Google help IOT could be an input command and therefore the temperature and wetness output is shown in digital display. It is easy to understand the wetness and temperature and also it saves lot of the electricity which is used here to switch on lights and fans with IOT.

Keywords: IoT, Wind energy, Solar Energy, Google Assistant, AI

1. Introduction

Renewable energy sources primarily have random behaviours. eg: Solar, Wind, etc. Power generating from these sources is freelance of human invention. Hybrid power systems contains controlled and uncontrolled energy sources and energy storage parts with applicable control systems. Complete hybrid power systems cash in of the complementary nature in profile of the renewable energy sources. Hybrid power systems guarantee continuous and reliable power production. Here we have a tendency to use the mixture of two renewable energies that helps to get electricity, by the assistance of buck-boost convertor the renewable energy are born-again to voltage, then this electricity are passes to lights, fans, AC, icebox etc. The google help is employed as a input command and atmospheric condition and wetness is set by victimization AI. Here the solar battery and turbine are two renewable energies, Buck-boost convertor is employed to convert renewable energy to voltage, reverse current is employed to manage the system, here IOT is employed as input command and output are displayed in digital display. The micro-controller that we have a tendency to use here is ATMEGA328P, the relay is employed as a switch and DHT-11 could be a temperature and wetness device, it helps in showing the temperature and wetness outside, then all are connected to Microcontroller. Large amounts of wind power requires additional flexibility, both physically and institutionally, to be efficiently integrated into power systems operation. In addition, variable generation sources contribute a relatively small fraction of their rated capacity to resource adequacy. Due to global warming new energy sources need to be used such as solar and wind energy. Renewable energy is becoming more important. Solar and Wind energy is pollution free and inexhaustible. All regions of the world have renewable resources of one type or another. Thus a study on renewable energies focuses more and more attention. Use of renewable energy sources for power generation many studies have been carried out.

2. Literature survey

Generator is employed to store the energy to the battery, within the middle of bring to a halt amount the hold on battery energy can pass to stack and can be operating by utilizing it. Energy consumption or energy scotch is

not been done. It doesn't have remote space watching system to beat these problems in existing, we have a tendency to on going for planned theme.

It has been achieved the planning looked and made panel will move with success with the acceptable angles by determinant Sun's position with its rule up to the mark unit beside the design in hardware, and therefore the rule between management unit and motors. Consequently this study is used from the package perspective for several applications and can also be developed for various comes associated with the position of the Sun. The outputs of this study would be applicable and sensible for the appliance of manufacturing electricity from panel to charge batteries. what is more the potency analysis is achieved by closing experimental study and scrutiny them with typical fixed/single axis panels. So different analysis studies are compared with the outputs and that they illustrate that double-axis tracking system are more efficient than the fixed and single axis tracking systems. It is inherent that theoretical calculations bolstered the new design for enhancing the usage of renewable sources, which is believed they will be more attractive in the future.

It is renowned that China has easy renewable resources, With the speedy development of Chinese economy, the exhortatory policy is established by government, and it is expected that the use of renewable energy and also the production of renewable energy can chop-chop increase because of a lot of and a lot of energy pressure in future. Consequently, the central government and native governments have complete the vital of renewable so as to realize the property development. moreover, the buying power of normal folks is chop-chop increasing with the booming development of Chinese society, and a lot of and a lot of normal folks notice the importance of atmosphere.

The potential of renewable energy application in China is massive within the predictable future. Wind energy and alternative energy in China square measure easy in massive soil, and renewable energy from wind and star square measure the foremost atmosphere friendly energy. However, the output power of standalone wind energy and alternative energy system rely on the unpredictable weather and environmental condition changes, and also the output power isn't going steady. The wind–solar hybrid system will partly overcome the issues. Some productions of hybrid system are used in China; the hybrid lighting system has been wont to town road lighting by many Chinese cities. The competition of hybrid system is increasing within the past ten years, and that is a lot of and a lot of well-liked. it's expected that the wind–solar hybrid system includes a massive potential in future China.

3. Proposed system

Features a smart hybrid innovation with solar and wind energy. The energy consumption of hybrid unit will be seen through LCD and webpage. The energy from sun light and wind turbine is used to charge battery. The voice command i.e; Google Assistance acts as an input, here the power status and weather report also be checked via cloud with AI control load access. Use of Renewable energy. To reduce electricity consumption. It is an User-friendly & Eco-friendly system. Here the solar panel and wind turbine are two renewable energies, Buck-boost converter is used to convert renewable energy to electrical energy, reverse current is used to control the system, here IOT is used as input command and output will be displayed in LCD. The micro-controller that we use here is ATMEGA328P, the relay is used as a switch and DHT-11 is a temperature and humidity sensor, it helps in showing the temperature and humidity outside, hence all are connected to microcontroller, here the input command is google assistance, firstly we need to connect this device through hotspot. In google assistance we will give input command as "TURN ON THE BULB" then the bulb will be turned on again to turn off the bulb the input command we give is " TURN OFF THE BULB" then the bulb will be turned off.

Hence, the electricity is generated from two renewable energies that is solar energy and wind energy, the internet is connected to WIFI module with the help of hotspot, here there are three voltages used namely V1, V2, V3. Here DHT-11 is used to show the temperature and humidity, Google assistance IOT is a input command and the temperature and humidity output is shown in LCD. The humidity and temperature is measured effectively and the electricity is saved and used to control lights and fans with IOT. Brief block diagram is shown in Fig 1.

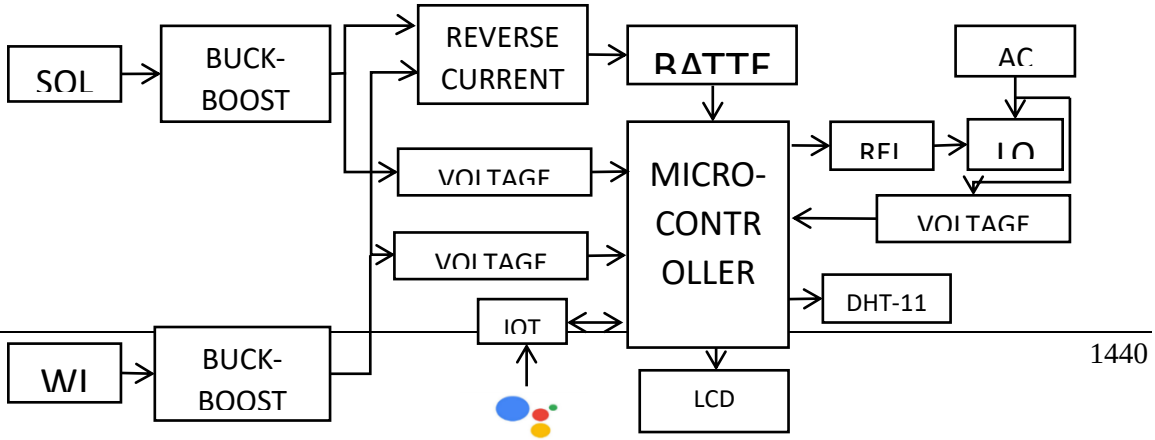

Fig 1- Block diagram

3.1 HARDWARE REQUIREMENTS

3.1.1 ARDUINO MICROCONTROLLER:

Arduino is associate ASCII text file circuit that makes microcontroller-based circuit for digital devices and interactive objects that may sense and management physical devices. These systems offer sets of digital and analog input/output (I/O) pins that may interface to varied growth boards and different circuits. The boards feature serial communication interfaces, as well as Universal Serial Bus (USB) on some models, for loading programs from personal computers.

For programming the microcontrollers, the Arduino provides associate degree integrated development setting (IDE) supported a programing language named process, that additionally supports the languages like C and C++. Arduino Uno may be a microcontroller board supported the ATmega328P. it's fourteen digital input/output pins, six analog inputs, a sixteen MHz quartz, a USB affiliation, an influence jack, associate degree ICSP header and a push button. The microcontroller ATMEGA328P is shown within the Fig 2.

Fig 2 Arduino Micro-controller

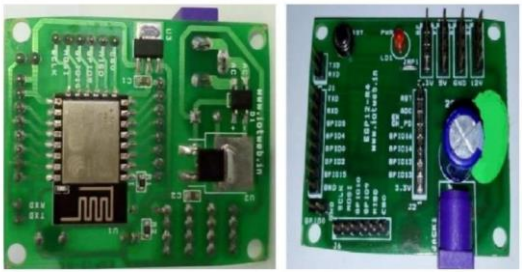

Fig 3 IOT

3.1.2 IOT

The Internet of things (IOT) is that the network of physical things embedded with software, sensors, and property sanctioning information exchange. Basically, a bit networked laptop is connected to a physical factor, permitting information exchange to and from that factor. Be it lightweight bulbs, toasters, refrigerators, flower pots, watches, fans, planes, trains, cars, or the rest around you, a bit networked laptop will be combined with it to simply accept input (especially object control) or to assemble and generate informational output (typically object standing or different sensory data). The diagram of IOT is shown in Fig 3.

3.1.3 DRIVER CIRCUIT

The ULN2003(Fig 4) is a monolithic high voltage and high current Darlington electronic transistor. It consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diode for switch inductive hundreds. The collector current rating of one Darlington combine is 500mA. The Darlington pairs could also be paralleled for higher current capability. 500mA rated collector current (Single output) High-voltage outputs: 50V Inputs compatible with numerous forms of logic.

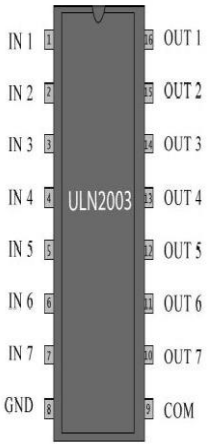

Fig 4 Driver circuit

Fig 5 Voltage sensor

3.1.4 VOLTAGE SENSOR

A voltage sensor(detector) able to confirm and even monitor and live the voltage offer. It's then able to take those measurements and switch them into a proof that one can then be able to scan. The signal can usually go in a specialised device for recording. Under-voltage, over-voltage, or voltage band models. battery-powered from sensing input lines or from separate DC offer. It is offered with time delays on coffee bar and/or drop-out or with bespoke voltage-time trip curves. The diagram is shown in Fig 5. V1, V2, V3 are three voltages where V1, V2 are input voltages and V3 is the total voltage, here v1=5; v2=5; v3=12.

3.1.5 SOLAR PANELS

Solar panel (Fig 6) area unit accustomed convert lightweight from the sun, that consists of particles of energy referred to as "photons" into electricity which will be accustomed power electrical masses. Star panels represent the solar battery of a electrical phenomenon system that generates and provides star electricity in industrial and residential applications. Every module is rated by its DC output power beneath customary check conditions. Star modules use lightweight energy from the sun to come up with 5W power through the electrical phenomenon impact.

Fig 6 Solar panel

Fig 7 Wind turbine

3.1.6 WIND TURBINE

The wind turbine is a renewable energy, wind turbines are used to convert wind energy into electrical energy, the turbine having wheels that rotated by wind is known as wind turbine. A wind turbine consists of movable blades. These blades move when air strikes to them. These blades are mounted on a rotor. The rotor moves when the blades move due to air speed. An electrical alternator is mounted on this rotor shaft. The electrical alternator converts the rotary movement of the rotor shaft into the electrical energy. The diagram of wind turbine is shown in Fig 7.

3.1.7 BATTERY:

A battery may be a device that converts energy on to voltage. It consists of variety of galvanic cells; every voltaic cell consists of two cells connected serial by a conductive solution containing anions and cations. One half-cell includes solution and `the conductor to that anions (negatively charged ions) migrate, i.e., the anode or negative

conductor; the opposite half-cell includes solution and also the electrode to that cations (positively charged ions) migrate, i.e., the cathode or positive conductor. within the oxidoreduction reaction that powers the battery, cations area unit reduced (electrons area unit added) at the cathode, whereas anions area unit oxidised (electrons area unit removed) at the anode. The electrodes don't bit one another however area unit electrically connected by the solution. Some cells use two half-cells with completely different electrolytes. A apparatus between half-cells permits ions to flow, however prevents admixture of the electrolytes. The diagram is shown in Fig 8.

Fig 8 Battery

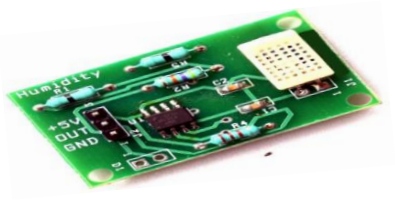

Fig 9 Humidity sensor

3.1.8 HUMIDITY SENSOR

A **humidity sensor**(Fig 9) senses, measures each wet and air temperature. The device consists of 2 metal plates and contains a non-conductive chemical compound film between them. This film collects wet from the air, that causes the voltage between the two plates to alter. These voltage changes area unit born-again into digital readings showing the amount of wet within the air.

3.1.9 LCD

This is an LCD Display(Fig 10) designed for E-blocks. it's a sixteen character, 2-line alphamerical show LCD digital display connected to one 9-way D-type connective. this enables the device to be connected to E-Block I/O ports. The LCD digital display needs information in an exceedingly serial format, that is elaborated within the user guide below. It needs a 5V power . Please lookout to not exceed 5V, as this can cause injury to the device. The 5V is best generated from the E-blocks Multipogrammer or a 5V mounted regulated power provide.

Fig 10 LCD

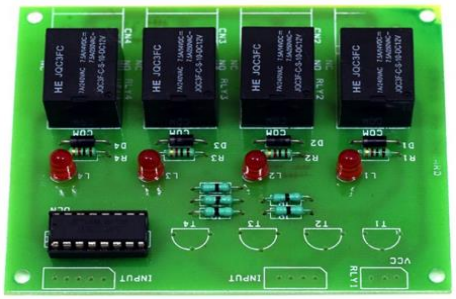

Fig 11 Relay Board

3.1.10 RELAY BOARD

A relay is an mechanical device switch that is activated by an electrical current. one relay board arrangement contains driver circuit, power provide circuit and isolation circuit. A relay is assembled therewith circuit. the motive force circuit contains transistors for shift operations. The electronic transistor is use for shift the relay. AN isolation circuit prevents reverse voltage from the relay that protects the controller and electronic transistor from injury. The input pulse for shift the electronic transistor is given from the microcontroller unit. It's used for shift of a four devices. The diagram is as shown in Fig 11.

4. Hardware output and software simulation result

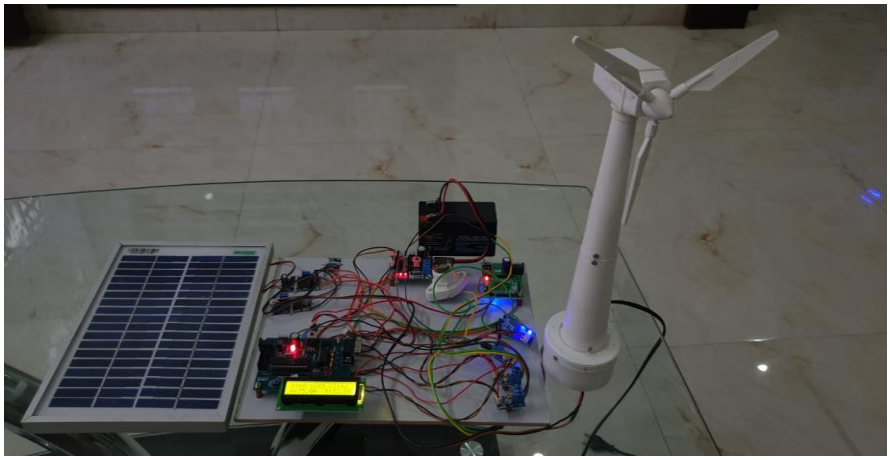

Fig 12 Overall Hardware image

Firstly connect the Battery to the power supply, the device will be turned on, three voltages namely v1, v2, v3 and H- Humidity, T- Temperature will be displayed in the software, next DHT-11 sensor is used to determine the temperature and humidity the output will be displayed in the LCD(Fig 13) as well as in created IOT webpage in laptop/computer(Fig 15). Here we use Google assistance as a input voice command to control the bulb(Fig 14).

Fig 13 LCD image

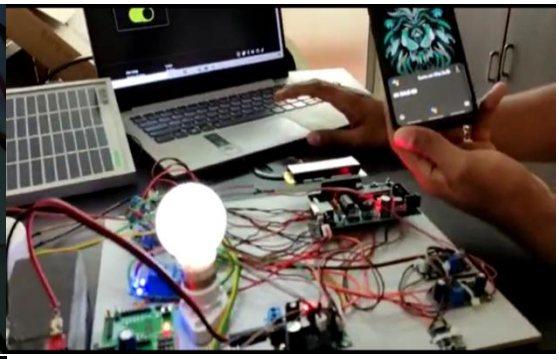

Fig 14 Controlling Bulb with Google Asst.

Here, the main agenda is to generate electricity from solar panel and wind turbine this process is called “Smart Hybrid Renewable Energy System Using Google Asst. and AI” through this we can determine humidity and temperature, control the bulbs using google asst. and to save electricity. It is a USER-FRIENDLY & ECO-FRIENDLY system. The overall image of the project is shown in Fig 12.

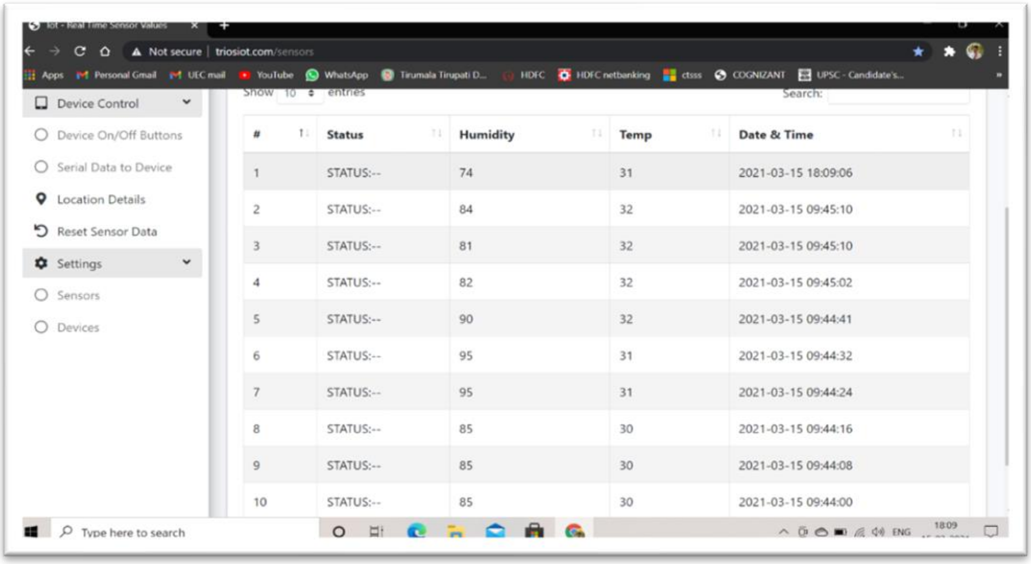

Fig 15 Temperature & Humidity Display in software

The software program we use in this project is Embedded C, this program will be interface to arduino and by Iot the temperature and humidity values will be auto-updated in the software device, the compilation output of the Embedded C is shown in the Fig 16.

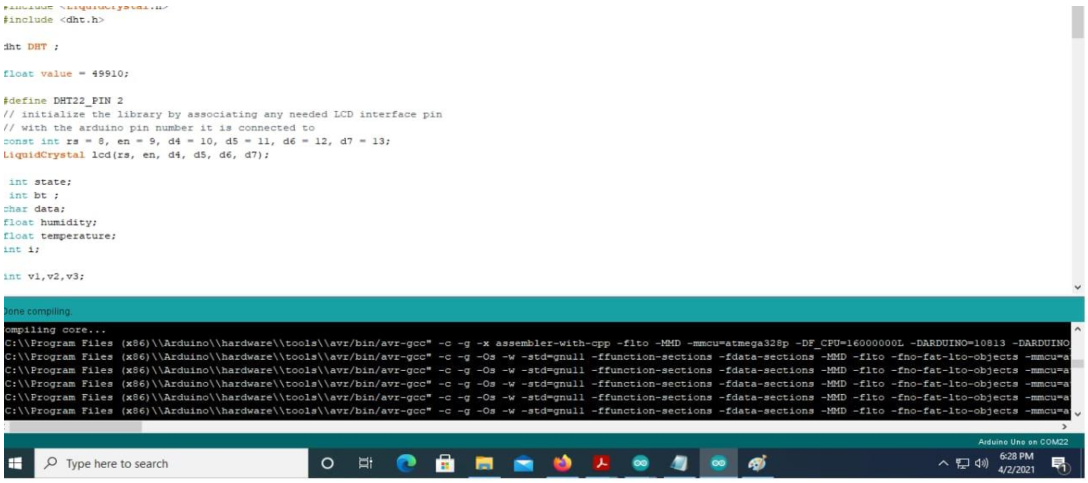

Fig 16 Embedded C compilation output

5. Conclusion

The generation of electric power from hybrid system is cost effective and efficient. This system is scalable as if more energy is required the system can be extended by connecting one or more batteries or wind turbines and make it useful for practical purpose. The hybrid system can eliminate the problem faced by energy generation due to individual energy source and helps to improve reliability and performance.

Here we use the combination of two renewable energies that helps to generate electricity, by the help of buck-boost converter the renewable energy will be converted to electrical energy, hence this electricity will be passes to lights, fans, AC, refrigerator etc. The google assistance is used as a input command and weather conditions and humidity is determined by using AI.

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