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Hybrid Power Generation System and Data Monitoring through Web Page

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Abstract: ***Now a days electricity is most required facility for the human being. All the conservative energy capitals are reducing day by day. So it is important to use non-conventional rather than conventional energy resources. As the population is increasing which will increase energy consumption, so it is important to save the energy for future generation. The proposed system consists of grouping of three power generation methods those are solar, dynamo and piezoelectric sensor. This process criticize the sustainable energy resources without destructing the nature. By using hybrid power production system a nonstop power can be given to the user. This electrical power can be utilized for various purpose. The use of combination of three power age group leads to production of electricity with sensible cost and without harming the nature stability. The voltage generated using three methods is stored in a storage unit and the loads will be run using this stored energy. All the data such as three voltage values, energy and cost of the used energy are monitored on webpage. The proposed system deals with both electricity generation and its saving.***

Keywords: Microcontroller (Arduino Mega 2560), Solar Panels, Dynamo, Piezoelectric Sensor, Adafruit IO.

I. INTRODUCTION

Hybrid energy system is the gathering of two power hotspots for offering power to the load. In other word it tends to be characterized as "Power framework which is created or proposed to haul out power by utilizing two power sources is called as the half and half power framework." Hybrid power framework has great consistency, productivity, less release, and lower cost. In current society, the usage of electricity in the open and private spots has ended up being more well ordered. Power has now transformed into a part of our life and one can't consider a world without-electricity. It is now a huge bit of homes and adventures. For all intents and purposes whole the devices at homes, associations and adventures are running an immediate consequence of electricity. The basic usage of electricity depends upon where it is used and the possibility of the workplace. Power is must for mechanical advancement and action. Without a effective power neither is possible. There are various major issues when considering modern power use and the economical development of enterprises especially in creating nations. Such issues go from the extra expense of power forms because of wasteful use, defencelessness to value stuns of imported-energizes and wide scale wasteful and unclean use of power, both at the nearby and national dimension, just as the provincial and worldwide dimension.

In this paper an arduino based hybrid power generation system is designed by combining three sources of energy such as solar energy, dynamo and piezoelectric sensor. Photograph voltaic cells or sun oriented boards are utilize toward modify in excess of the sun oriented power to electrical-power, dynamo is utilized to change over mechanical revolutions into electrical power and piezoelectric sensor is utilized to change over the mechanical vibrations or weight connected on its piezo plates into electrical power. The power produced by three techniques are controlled and checked by Arduino mega microcontroller and put away in a battery unit. The combination of three types of power generation helps in maximum power generation without harming the environment.

With the rise of power cost, saving energy and cutting down the cost of electricity becomes more and more common everyday. This problem has always been considered that the concept of saving power is important and essential because the world is in a current state of emergency with regard to this feature. It's the need of the hour that people should start giving some serious care about the matter to conquer this confusion and provocation. Because of development and in detail research about the industry, many experts and professionals have proposed different approaches in solving the problem. To save the power is a type of tough task for each and every person. Saving energy is more necessary than reducing the electricity cost.

II. EXISTING SYSTEM

Generation of electricity using any combination of three methods such as solar, wind or piezoelectric sensor. The existing system only explains about the power generation using naturally available resources but not about how to save it.

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III. PROPOSED SYSTEM

Generation of electricity by combining three electricity generation methods such as solar, dynamo and piezoelectric sensor. Proposed system explains about effective power saving method by setting a power consumption limit to the load. The user can get the information about the power consumption cost of the load on his mobile phone by connecting to a web server.

IV. FUNCTIONAL BLOCK DIAGRAM AND DECRIPTION

The Functional Block diagram of the entire system is as shown in the Figure 1. The framework can be named monitoring and control units. Monitoring unit comprises of different parts including sun oriented boards, dynamo and piezoelectric sensor. These segments are principle utilitarian squares of the framework. Power produced by these three techniques are checked and constrained by the microcontroller (which is modified in ARDUINO IDE programming) and put away in a capacity unit. LCD is utilized to show the comparison estimations of electricity produced by three strategies.

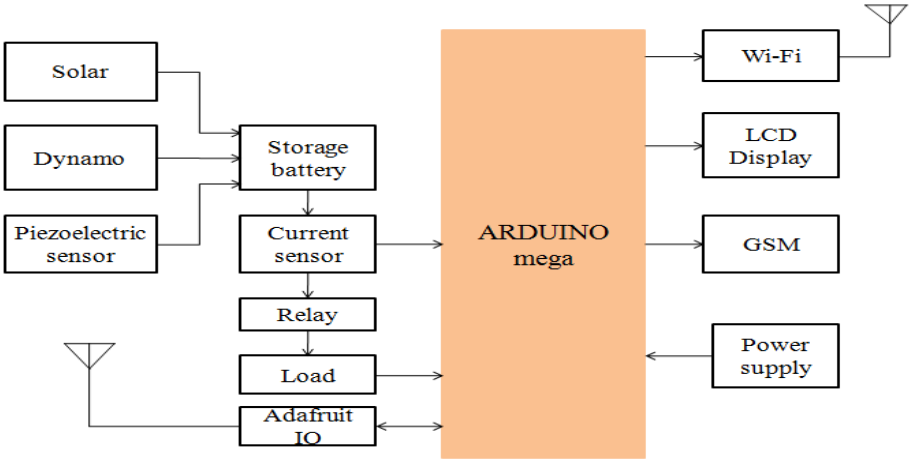


Fig 1: Functional block diagram

V. ORKING METHOD

Above fig-1 shows shows sunlight, dynamo and piezoelectric sensor based electricity generation system. At the point when the framework is turned on it will begin producing the voltage by making daylight to fall on the sunlight based cell, by giving mechanical pivots to dynamo and by applying the mechanical vibrations on piezoelectric sensor. The voltage created by three techniques is put away in a capacity battery. The three sources those are sunlight based board, dynamo and piezoelectric sensor are associated with both battery and the controller.

Each power sources are associated with the microcontroller through a transistor driver circuit, these driver circuits are utilized to produce the voltage signals from power source and it is given to the microcontroller analog pin where the controller changes over this simple analog value to computerized and show the relating voltage esteems on the adafruit io site page. A nodeMCU 8266 module is utilized to convey or exchange the information to the website page by interfacing it to a web association. From battery positive, voltage is given to the current sensor & current sensor's certain yield voltage is given to the load through transfer. A similar positive voltage is first given to the relay's NC pole. The NC pole of the relay is associated with the load so the load will be in a consistent on condition, when the load is turned off it is associated with the NO pole of the relay. Subsequently we can say that the relay is utilized to switch the load among ON and OFF condition. A current sensor will examine the present esteem current going through the load. The yield of the current sensor will be in simple structure which will be changed over to computerized values by ADC present in the controller as the current sensor is associated with the controller.

To save the power, a power usage limit is set to the load. Here the load may be considered as user. A GSM is serially interfaced with the microcontroller to send the SMS to the user. To send the SMS through GSM, first the controller will send the information to the GSM than the GSM will send the corresponding SMS to the specified phone number. The data transfer between controller and GSM will happen through the attention command. Whenever the user consumes 50% of its power limit an alert message is sent to the user saying that "more power consumption" have limit on the power consumption. When the user crosses the power consumption limit again the GSM module will send a ,message to the user saying that "power limit exceeded power cut off and automatically it will cut the power line and the load will be turned off.

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All the power utilization esteems and voltage estimations of three sources are shown and checked on the adafruit io page with the assistance of NodeMCU 8266 module. Then again these qualities are shown likewise on the LCD. Indeed, even the power bill dependent on the power utilization is shown on the website page. After resetting the entire framework the load will be turned on once again. By utilizing this strategy or approach we can accomplish greatest power sparing.

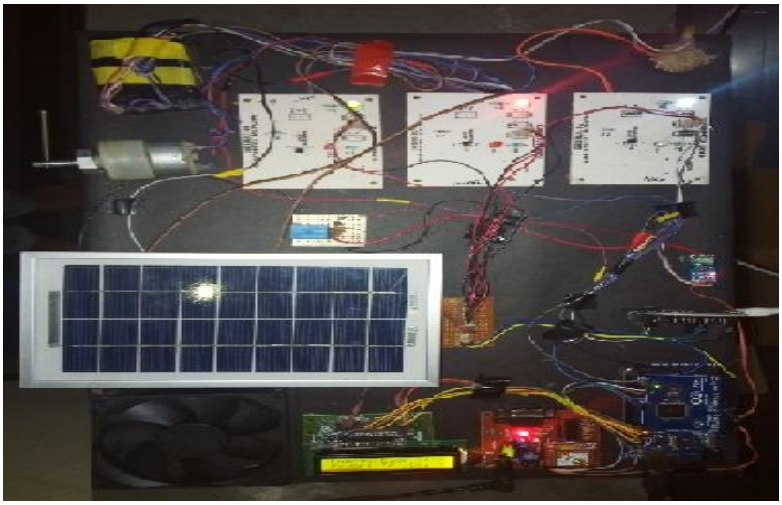


Fig 2: Picture of Implemented Hybrid power generation system

VI. RESULTS

The system is implemented by programming in arduino IDE software and the corresponding output values are displayed on LCD as well as on adafruit web page as shown in the fig 3 and fig 4 respectively. As the power usage limit is set for every user we can achieve an effective power saving.



Fig 3: All monitored data displayed on LCD

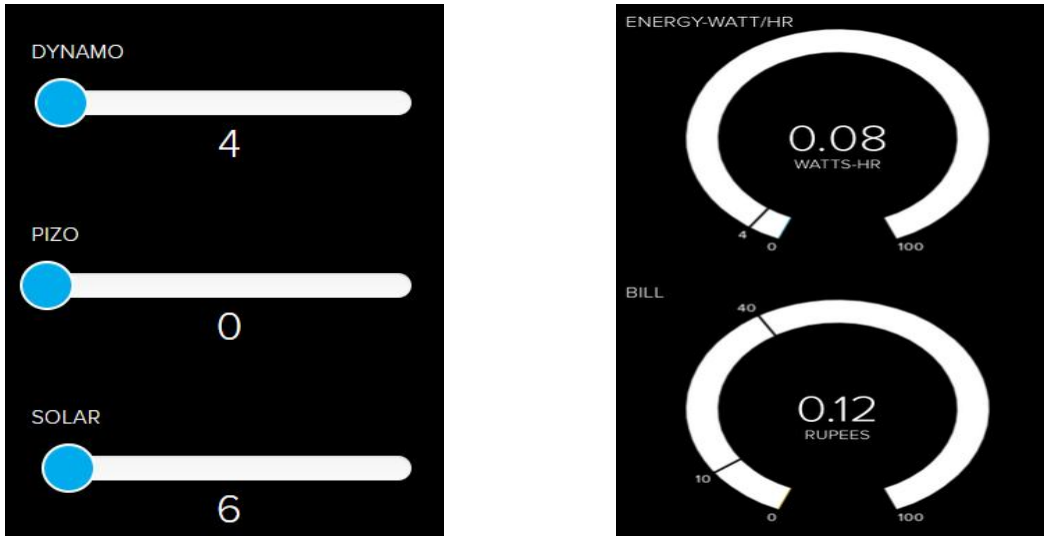


Fig 4: Three voltage, energy and cost values displayed on Adafruit web page

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VII. COCNCLUSION AND FUTURE WORK

Electrical power demand be expanded within everyday. Hybrid power generation is the answer for compensate forthcoming interest. This system is better and effective answer for power generation than traditional power assets, It has bigger effectiveness. It can provide to remote the spots where government is unfit to reach. With the goal that the power be capable of being used where it is created, so it will reduce the communication misfortunes plus charge. By expanding the manufacturing of the supplies reduces the expense of the framework. It is cost effective solution for power-generation. Just the initial investment is required. Overall it is good, predictable and cheap answer for power generation. The proposed technique assumes a crucial job in power generation as well as successful sparing of that produced power.

Utilizing sun oriented power, mechanical turns and pressure energy together helps in most extreme power generation. In future this hybrid system can be implemented in large occupied zones, for example, railroad stations, shopping centers, transport stops, and occupied pathways with the goal that a greatest productivity in the power generation can be accomplished. In future we can likewise improve this framework by making it double sun following sun based boards so as to increase the yield.

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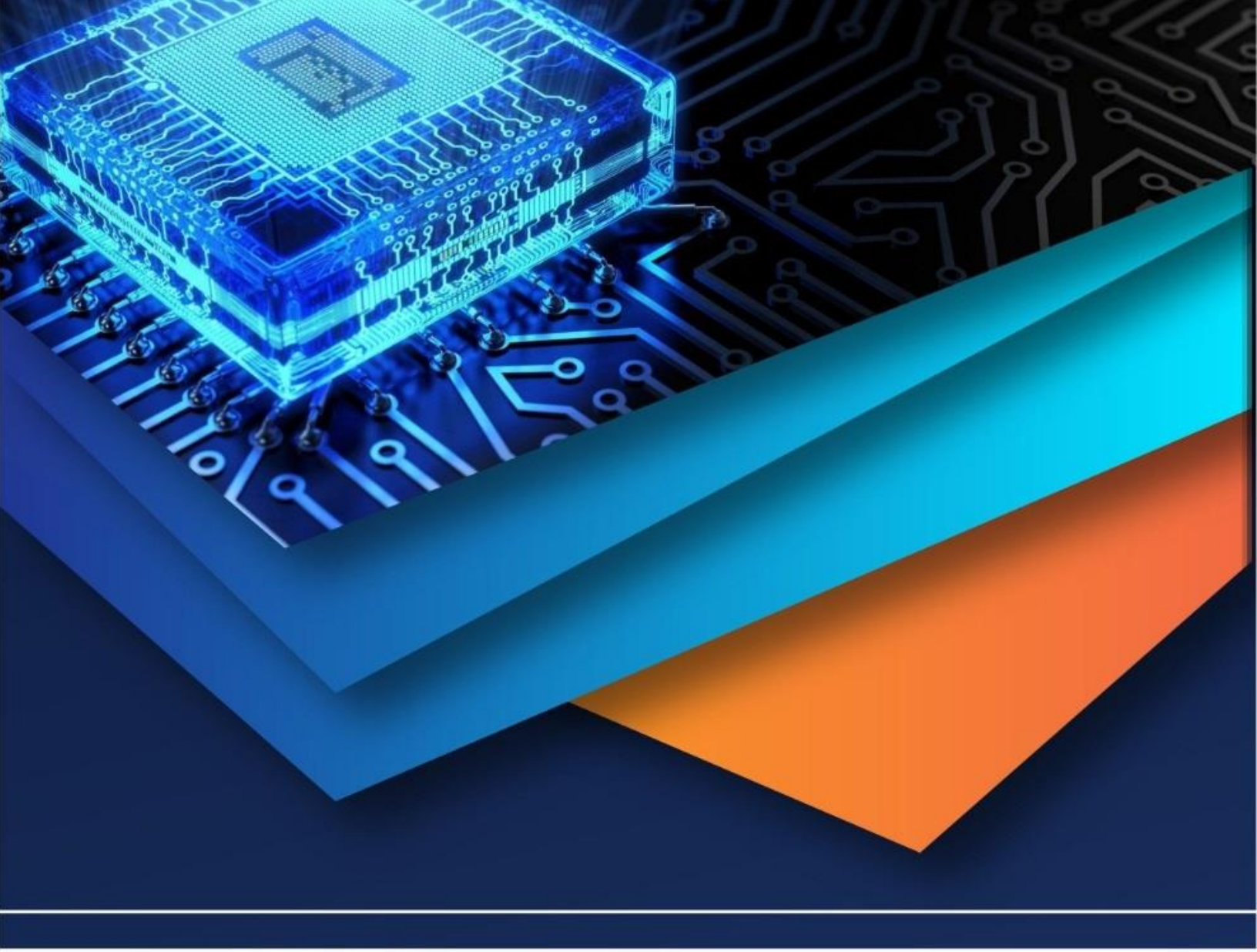
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