

RESEARCH ON EXPLORING THE CONTROL OF HIGHWAY LIGHT BY MONITORING WIND POWER PARAMETER.

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Abstract - The wind turbines are a planned project's built to harness wind power from the roadway because swift movement of vehicles. the rapidly expanding source of energy solar and wind power. In this, we're utilizing wind energy because is available anywhere for free. owing to the motion of vehicles, the amount of wind energy generated on the roads that aren't used. Consequently, we may use this. using energy to generate electricity and solve some issues electricity. The windmill or wind turbines can now be installed. because it can produce electricity, in the middle of the roadway. while the cars are moving from both sides. the created Streetlights close by are lit by electricity. These are all parameters.

Key Words: IOT, VAWT, LM7805, Streetlights Monitoring, ATMEGA328.

1. INTRODUCTION

Wind energy is a source that is quickly expanding. The main issue with wind energy is wind variability. Every time, energy will fluctuate. Thus, if we utilize wind motorway turbines, where there will always be wind because automobiles driving quickly. This energy is kept in rechargeable battery used to provide electricity at night We can observe the power statues automatically and base station through the IOT.

With an expanding population, there is a daily rise in the demand for power [1]. Energy sources that are either conventional or unconventional can be used to create electricity. The ecology is negatively impacted by the production of energy from traditional resources like coal, diesel, and nuclear power plants, among others. It degrades the land, pollutes the air, etc. The expense of using traditional resources is high [2]. The radioactive waste is dangerous and has a bad impact on health. The traditional resources may run out as time passes; thus, we must develop an alternate technique of producing power [4]- [5].

An alternate source for producing power is non-conventional resources. Non-conventional resources come in many forms, but the most common ones include wind, solar, tidal, etc. We are using wind in our project to generate electricity since it is completely free everywhere and there is no need to pay for the materials.

2. PROPOSED WORK

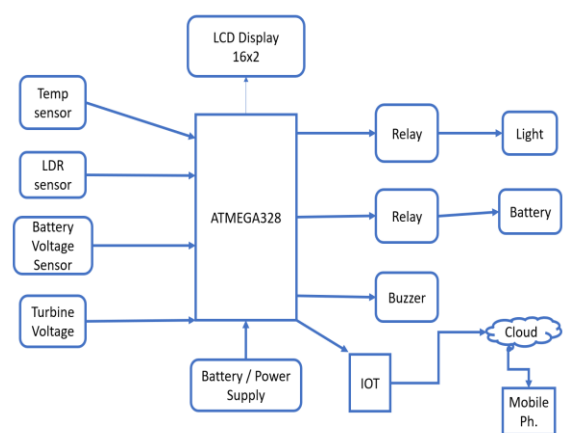


Fig 1: Block Diagram of Proposed Work.

Initially, the highway windmill's energy output arrives at ATMEGA328. This power is saved within a lithium-ion battery. The energy produced is employed to A voltage circuit is also linked to the ATMEGA328. temperature sensor, too. Circuit measuring voltage captures when the windmill's voltage drops to less than 8V. A temperature sensor is attached to monitor, the mercury rises beyond fifty degrees. Arduino is additionally linked. voltage and temperature are shown on an LCD screen.

It is operated through the internet or WIFI, and is connected to IOT to display the battery, temperature, and street light status. The energy generated by this device is utilized to power surrounding streets. light.

It mostly consists of several hardware parts,

1. LCD display
2. ATMEGA328
3. Rectifier
4. Sensor for Temperature
5. Device for measuring voltage
6. Li-ion battery

7. IOT

8. Street Light

9. A vertical-axis wind turbine

2.1 ATMEGA328

A microcontroller board called the Arduino Uno is based on the ATmega328. It contains a 16 MHz ceramic resonator, 6 analogue inputs, 14 digital input/output pins (of which 6 may be used as PWM outputs), a USB port, a power connector, an ICSP header, and a reset button. It includes every piece. The microcontroller may be powered or connected to a computer via a USB connection. either a battery or an AC-to-DC adaptor to get going.

2.2 INTERNET OF THINGS (IOT)

A hyper linked world in which items are connected to mobile devices and the Internet and speak with one another has been ushered in by the fast growth of information technology (IT). We desire constant access to everything in the twenty-first century, which is now reality in many parts of the globe. IOT, also known as Internet of Everything or Machine to Machine (M2M) communication, is the central element of this highly linked civilization (IOT).

2.3 LM7805

The three terminal positive regulators of the MC78XX/LM78XX/MC78XXA family come in the TO-220/D-PAK package and have a number of set output voltages, making them suitable in a variety of applications. Each kind uses safe operating area protection, internal current limiting, and thermal shut down to virtually invulnerable. They can provide more than 1A of output current if sufficient heat sinking is offered. These devices are primarily designed for use as fixed voltage regulators, although they may be used in combination with external components to provide adjustable voltages and currents.

3. DESIGN OBSTACLES

As the wind speed increases, the price of wind turbines rises. mill becomes bigger. The windmill must have a storage space for the efficiently utilize this information for the neighboring street lighting and towns. The main issue with this deal's design the location of the wind turbine. as we install the wind turbine Extra caution must be used to protect the traffic area. A few examples of the safety precautions include warning labels and constructing a fence to around the windmill.

4. CIRCUIT DIAGRAM

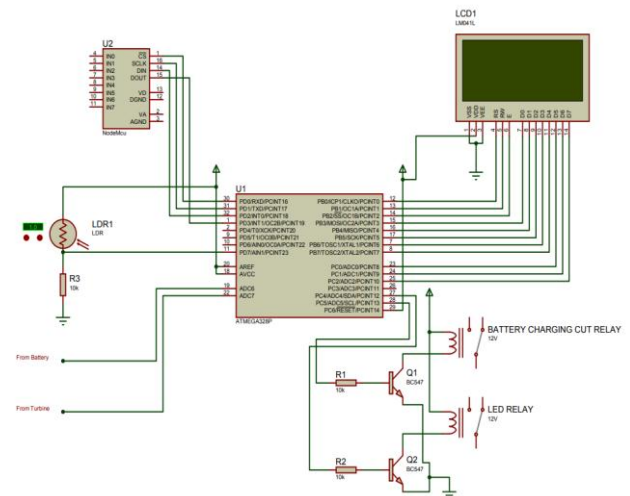


Fig 2: Circuit diagram of the project

The planned work involves the following steps.

1. A windmill is first positioned on the highway's meridian.
2. The windmill rotates and produces electricity as a result of traffic on the roadway.
3. Nearby communities and street lights utilise this power.
4. The information that the wind turbine is not operating will be sent to the base station if there is an issue with the wind turbine's ability to generate electricity. IOT is used for this, and the entire procedure is repeated.

The creation of wind-powered energy is the goal of developing a highway wind turbine. Wind is a natural, renewable resource that is widely accessible. In this specific concept, wind turbines are deployed in cities rather than the typical hill stations and city edges where they are created. The primary goal of this initiative is to lessen the pollution that is created when fossil fuels are used to generate power.

5. ADVANTAGES

- wireless transmission.
- reduction of personnel.
- automatic streetlight switching.
- conserving energy.
- has more effectiveness.
- Both urban and rural locations can use this.
- effective power production.
- small in size and less expensive.

6. APPLICATIONS

The following uses of wind energy are currently being made

- Telecommunications
- Radar
- Air traffic management
- Cathodic safety
- Weather monitoring and seismic surveillance
- Pipeline management
- Aids to navigation.

7. RESULT

IOT is mostly used at the base station to regulate the energy that wind turbines produce as a result of the fast traffic on the roadway. The quantity of the energy produced by wind turbines is used for roadway lights nearby and surrounding settlements. This environmentally friendly technique Roadway lights can either manually or automatically controlled. Whenever the temperature is more than 50°C the temperature sensor will sense it and controlling of street light is done by using the LDR, LDR will turn on when the darkness appears and turn off when the light falls on it. Both are controlled by IOT and forwards the information to the base station in order to check the temperature and street light control. This is done by the program code which is stored in the IOT.

The windmill generates electricity whenever it spins as a result of vehicle movement, which is utilized for automated street light control.



Fig 3: VAWT Model.

During the night, the windmill produces dc power that is stored in the battery and utilized for street lighting as well as adjacent communities' lighting needs. From the base station, you can keep an eye on this system. The suggested system's hardware implementation is shown in Fig. 4.

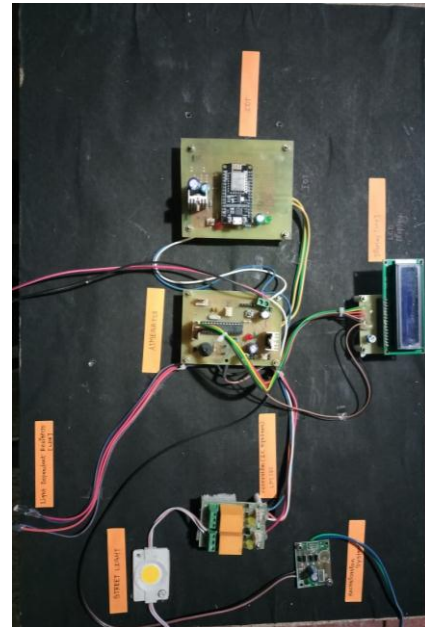


Fig 4: Hardware Implementation



Fig 5: IOT Result 1

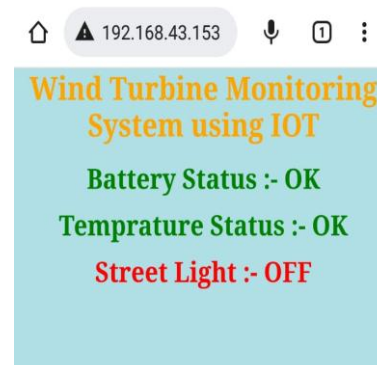


Fig 6: IOT Result 2



Fig 7: IOT Result 3

8. CONCLUSION

IOT is mostly used at the base station to regulate the energy that wind turbines produce as a result of the fast traffic on the roadway. The streetlights on the roadway and in the adjacent towns are powered by the electricity produced by wind turbines. This process is safe for the environment. The demand for power is rising along with the population as it grows daily. Energy production from non-renewable resources is insufficient to meet the needs of the average person and is harmful to the environment. Renewable resources like the wind and sun are widely accessible and may be used successfully to generate power. This could partially meet the demand for power.

9. REFERENCES

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