

HIGHWAY WINDMILL MONITORING SYSTEM

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ABSTRACT

The motive of our project is to construct a system which includes wind turbine to store wind energy which is obtained by the vehicles which are moving on the highway. Wind energy is one of the natural, easily available and fastest growing sources. A highway plays a major role in this project because the energy which is obtained due to the vehicle moment is large in number and this energy is unused. The circuit so formed is placed on the median and the wind turbine rotates in either ways due to the motion of vehicles which are entering and leaving the road. With this data the street lights can be automatically operated and can be monitored through IOT with the help of base station. Due to environmental changes the wind source will fluctuate, a storage system is designed so as to maintain a constant source of power. On the whole, wind energy can be used as a source for different functions.

Keywords: ARM 7, Highway median, Temperature sensor, DTH sensor, Vertical windmill.

I. INTRODUCTION

From the beginning researcher has constantly tried to decrease the number of blades on the turbine. Modern windmills have 4-6 blades and past windmills have had 3-8 blades. Modern windmills can also be automatically turned into the wind. As we know wind energy is by far the fastest-growing renewable energy resource and the wind turbines are used to provide constant lighting of street lights. In many cities, highways are used as faster route for everyday transportation and this helps in constant lighting which makes this as an efficient way to produce electrical energy.

If the efficiency of the wind turbine is increased, then we can generate more amount of power by decreasing the need for big power plants which also causes pollution. Wind energy is an open source, for which one can access to it without any charge. By improving the efficiency of wind turbine, we can generate more power and decrease the cost.

Vertical-axis wind turbine involves 4 spiral blades which utilizes the mass momentum of the wind so as to make the blades to spin around the central shaft. Wind energy is applied onto the blades which rotates in either of the directions.

II. RELATED WORK

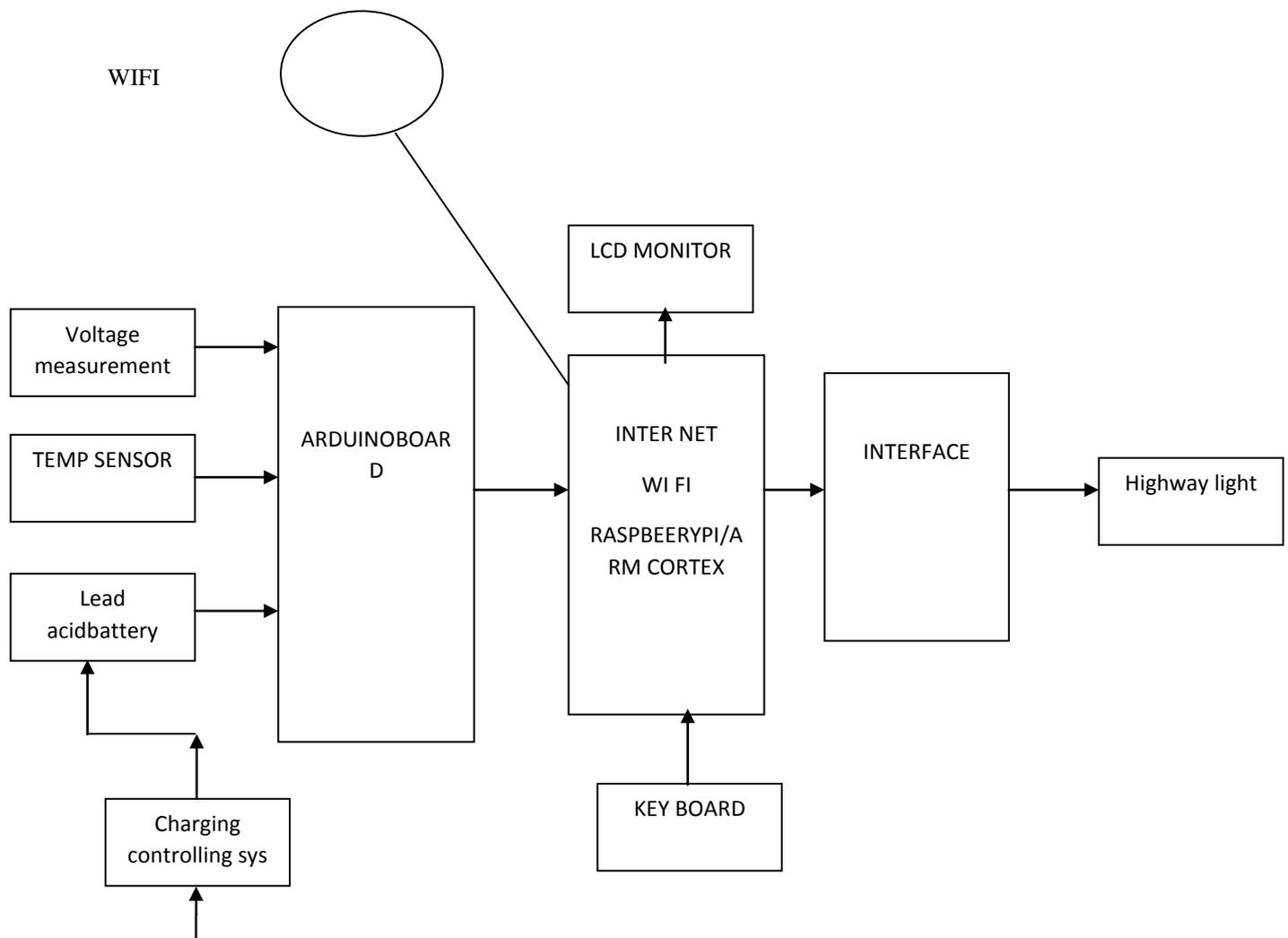
In today's generation the fulfillment of more energy demands and shortage of sources has become a serious issue, indeed wind energy acts as a cost-competitive and a reliable energy source. Wind energy is used as an alternative to other sources like fossil fuels etc, which is huge in number, renewable and widely distributed over the cities. Usage of wind energy doesn't cause any effect to the environment for example greenhouse gas

emission. And it is done using little land [1]. Many experiments have come across in past few years in different fields of engineering, like in electrical, electronics, instrumentation, telecommunication and in mechanical fields. Many have proposed the work on this, in their own field but with different ideas. For the development of modern engineering wind turbines are manufactured in a both ways i.e. vertical and horizontal which helps in wind range applications. In many countries the array of large turbines has become an important source of renewable energy to reduce the demand for fossil fuels [2]. Even the small wind turbines are also used for micro power generation, similarly as of wind farms with large power output[3].

In this project, ARM controller is used. A series of windmills are placed onto the median to generate the power. The energy which is generated by the rotation of wind turbine is stored in the battery and that power is indeed used as a source of highway lights and nearby villages or the unused power is sent back to the utility supplier via the electrical grid. In this project various sensors are used, which helps to know the changes that occur in the system and the system environment. This work can also be extended by connecting a solar panel to the system or during rainy season the water can be stored and in turn can be used for the generation of power.

III. PROPOSED WORK

3.1. Block diagram



Highway vertical wind mill

3.2.Methodology and Implementation

Due to the Vehicle motion the turbines rotate. The Mechanical Energy produced in turn causes the dynamo Mechanism to produce electrical energy. The Electrical Voltage produced will be regulated using the regulator and is connected to 12V battery, so that Battery will charge from this Wind Turbine. The stored power is used as a source for the highway street lights, or it can be used to serve the nearby villages or if the power generated is excess, it is stored for further use in the future. For automatic street lights LDR sensor is used which will check the intensity of sunlight whenever sunlight is less LDR gives maximum output and street Lights will be turned ON. When it gives minimum output lights will be turned OFF. KEIL IDE is used to program the controller and the coding is done using Embedded C.

IV.RESULT AND CONCLUSION

With the data the street lights can be automatically operated and can be monitored through IOT with the help of base station. Using this data, wind turbines are designed and placed on the medians. Although one turbine may not provide an adequate power generation, but an array of turbines which are connected in series, onto the median will generate large amount of energy that can be used in many ways. For example to power streetlights, other public amenities or even generate profits by selling the power back to the grid. The main motto of the design is to maintain a sustainable and environmentally friendly system. Theoretically, any moving vehicle can power the turbine such as an amusement park ride. The highway wind turbine can be used to provide power in any city around the globe where there is movement of vehicles at higher speeds.

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