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Hybrid Water Pumping Control System for Irrigation using Arduino

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Abstract: ***There are many water pumping system such as diesel powered, solar photovoltaic, mechanical windmill exists. Few combine solar and wind energy sources to provide better performance and reliability to the existing system. In this paper wind turbine and solar photovoltaic (PV) water pumping array are analyzed separately and are combined as a hybrid system. Large amount of water pumped from the water resources are not effectively used. So a suitable control methodology was also proposed to operate the pump automatically depending on the water availability and the water requirement for crops .The main objective is to provide 1.Advantage of hybrid system over WT or solar PV array separately.2.suitable methodology to prevent water loss. Additionally MPPT system Can be used to improve the efficiency of PV array.***

I. INTRODUCTION

The production of electricity in India from utilities has increased from 9, 22,451 GWh during 2011-12 to 9, 63,722 GWh during 2012-13.All the generated power are not effectively utilized, transmission losses may occur in the power system and reduce the efficiency of the power transmitted. The estimated electricity consumption increased from 4, 11,887 GWh during 2005-06 to 8, 52,900 GWh during 2012-2013 and further increases during 2014 due to the utilization of heavy rated machines. Vast power is consumed by agriculture and industries, since Agriculture plays a significant role in the socio economic development of a country. The subsidies paid for the power consumption by the agriculturist is less? This may affect the economic status of our country. So, in order to reduce the consumption of power from the main grid, Hybrid system is implemented in the agricultural land. But, Agriculture faces a problem such as soil consolidation, dryness, flood may occur by supplying excessive water to the field. Irrigation acts as a key tool for solving these problems .It assists the effective growth of crops, Maintains landscapes, revegetation of soil in dry areas due to inadequate rainfall. Thus, this paper proposes the method to utilize the electric power produced from the hybrid solar

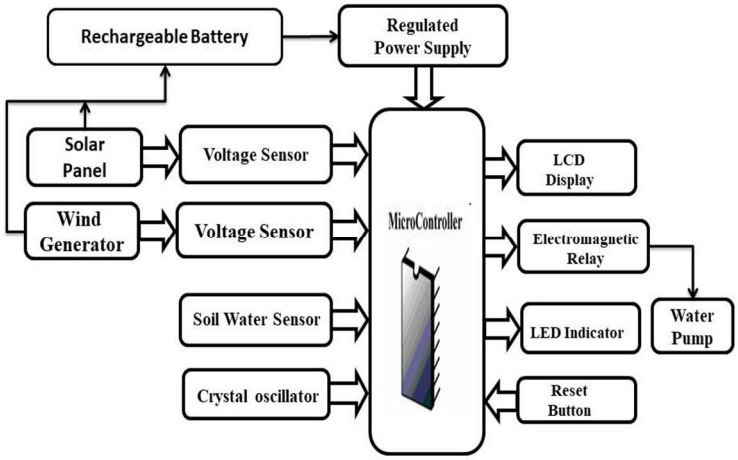


Fig: block diagram of hybrid water pumping control system for irrigation by using ardunio

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II. RELATED WORK

Hybrid water pumping control system for irrigation using Arduino is a system that uses both solar and grid power sources to pump water for irrigation. The system is controlled using an Arduino microcontroller, which allows for precise control over the water pumping process. Here is an overview of the components that make up hybrid water pumping control system for irrigation using Arduino

1) *Solar Panels:* The solar panels are used to generate electricity from the sun, which is used to power the water pump.
2) *Battery:* The battery is used to store the electricity generated by the solar panels for later use, such as during periods of low sunlight.
3) *Inverter:* The inverter is used to convert the DC electricity generated by the solar panels and battery into AC electricity that can be used to power the water pump.
4) *Arduino Microcontroller:* The Arduino microcontroller is used to control the water pumping process. It receives input from sensors, such as a soil moisture sensor or a flow meter, and uses this information to control the water pump and ensure that the irrigation system is operating efficiently
5) *Water Pump:* The water pump is used to pump water from a water source, such as a well or a reservoir, to the irrigation system.
6) *Sensors:* Sensors are used to measure various parameters, such as soil moisture and water flow rate, and provide feedback to the Arduino microcontroller to allow for precise control over the water pumping process.

Overall, hybrid water pumping control system for irrigation using Arduino provides a cost-effective and efficient way to manage water resources for irrigation. It allows for precise control over the water pumping process and can be easily customized to meet the specific needs of a particular irrigation system.

As shown in above block diagram the Voltage from solar and wind turbine are measured by microcontroller and displayed in LCD display in real-time. The rechargeable battery gets charged by solar and wind generated power. The generated power is used to pump the water based on the input from soil water sensor.The entire system is monitored and controlled by Arduino Uno microcontroller powered by a regulated power supply of 5v DC.

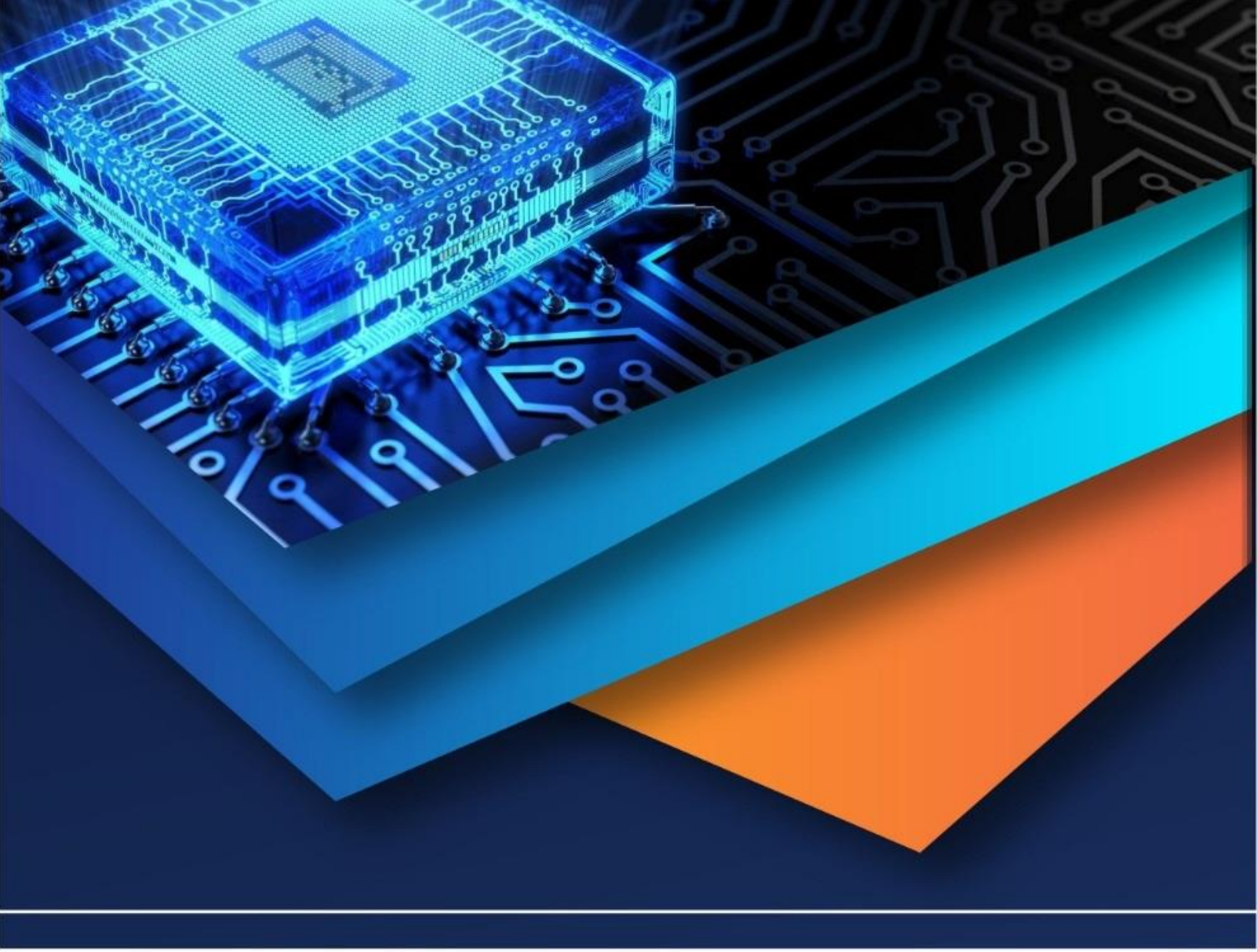
III. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested

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