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Smart Appliance Control over IOT Electricity Generation from Flowing Water in Society

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Abstract

Internet of Things is one of the appear techniques that help in extend over the gap between the physical and cyber world. In the Internet of Things, the different smart objects connected, communicate with each other, data is gathered from the smart objects and based on the need of the users, and the data collection are queried and setback to the user. IOT helps in monitoring electrical and physical parameters. The main goal of this project is to implement green technologies for society to reduce the fuel gobble up costs. Green technology is an alternative energy but inexpensive, efficient and effective. This can open fuel supplies, cost of capital and release. In addition, the aim of this project is to generate electricity by developing a Pico-hydro-generation proto type system that produces low capacity to be used in rural communities. This project has primarily focused on the design and manufacture of a Pico-hydro device that can be used for low capacity equipment such as motor and bulb. In addition, this project will evaluate the generator production based on turbine rotation. In the high-PVC tubing, water flow has the ability to move the turbine where it is attached to a generator to transform mechanical energy into electrical energy. Within this project the pulley system can be seen to improve the turbine's output. The turbine connecting to the pulley system needed lower speed compared to the turbine directly connecting to the generator.

Keywords: *Smart Appliance Control, Electricity Generation, high-PVC tubing, Pico-hydro, IOT Electricity Generation*

INTRODUCTION

The Pico Hydro comes from word Pico which means very small and hydro means water. It refers to electrical energy that comes from the force of moving water used to power equipment. Specifically, Pico Hydro is hydro power with a maximum electrical output from few hundred watts up to five kilowatts (5kw). The main objective behind this project is to harvest the energy from water flowing in domestic water pipelines and converts it into electricity for further implementation. Hydroelectric power is a power generated by , using its gravitational force when it is flowing in the turbine and the water spins it , which moves the shaft that moves the generator make electricity Internet of Things gathers useful data by integrating sensing and communication capabilities between different devices.

Advancements in this field have opened a wide range of possibilities in the design of future smart homes. These devices are very much useful in monitoring and analyzing various physical and environmental parameters remotely. IoT enabled electricity consumption devices to monitor the amount of electricity consumed by home appliances will help individuals to understand and analyses the amount of electricity consumed by each appliance at home. As devices can be connected wirelessly and data can be remotely accessed, these devices are gaining popularity rapidly., As electricity consumption is increasing day by day, the cost of it also is increasing thus; consumers are interested in reducing their consumption in electricity.

There are devices available in market that helps in monitoring and saving energy consumption in home appliances. These devices help in monitoring the amount of electricity consumed by different devices. A vast majority of household appliances consume a large amount of power and energy. Consumers mostly tend to leave their lights, fans, freezer, air conditioner, and other appliances turned on when they are not in use, resulting in energy wastage, a tendency of human behavior.

The significance of this project is that it creates an opportunity for consumers to control their power consumption practices and help them manage their power and energy usage. It also creates an

opportunity for the consumers to practice energy saving and to keep track of their household appliance's performances and current behavior to prevent over current. Therefore, the main challenge will be designing an efficient technique that can monitor power consumption in residential buildings. Hydro power system of "Pico" size benefits in terms of cost and simplicity from different approaches in the design, planning and installation than those which are applied to large hydro power. On a global scale, a very substantial market exists for Pico hydro system. There are several reasons for the existence of this market.

- Pico hydro equipment is small and compact.
- Easy to transport and install.
- Only small water flows are required for Pico hydro so there are numerous suitable sites.

LITERATURE SURVEY

- The hydro power is nearly 2000 years ago when the Greeks used water wheels to grind wheat into flour.

- In the 1700's, hydropower was broadly used for milling of lumber and grain and for pumping irrigation water.

- Appleton, Wisconsin became the first operational hydroelectric generating station in the United States, in 1882, producing 12.5 kilowatts (kW) of power.

- The total electrical capacity generated was equivalent to 250 lights.

- Within the next 20 years roughly 300 hydroelectric plants were operational around the world.

The invention of the hydraulic reaction turbine created the sudden expansion of hydropower. As IOT is growing every day with new technologies involved, new challenges arise. The IOT has encouraged people to connect to devices using the internet and the increase in the use of IOT devices motivated people to use smart technologies. The water Monitoring in the distribution system is a serious factor that affects public health and smart water 5 system provides a user-friendly interface to monitor the water monitoring in houses and take remedial measurements if necessary.

This electricity generation from flowing water systems can offer many advantages both in terms of quantity of energy produced and supply continuity without

the problems. These systems can provide municipalities with an opportunity to reduce costs and reliance on grid-based power by using their existing water infrastructure to generate cost-effective renewable energy. These systems can help to improving the management of water networks, allowing to monitor and adjust the water flows and to optimize overpressure, thus lengthening service life of all equipment. One of the main challenges in smart water system is managing the cost, energy and efficiency required for water distribution system.

The selection of water quality, quantity and topological parameters is another challenge in the smart water system. So there is in need of research about these challenges to provide a new cost and energy-efficient solution to the smart water system. The future work will focus on developing an IoT architecture in water distribution systems with integration of new technologies such as cloud, energy harvesting etc

Components

1. Turbine:

A turbine converts the energy in falling water into shaft power. There are various types of turbine which can be categorized in one of several ways. The choice of turbine will depend mainly on the proposed hydropower installation.

2. Generator:

In electricity generation, an electric generator is a device that converts mechanical energy to electrical energy. A generator forces electric charge (usually carried by electrons) to flow through an external electrical circuit.

3. Inverter:

A power inverter is a DC to AC inverter device that is capable of turning DC power, like the power found in batteries or the kind collected from generator, into AC power that is used to run everyday things in the home such as appliances, electronics, and even household lighting.

4. Battery:

A Battery is a device that is able to store electrical energy in the form of chemical energy and convert that energy into electricity.

C IOT Devices Used :

5. Relay Channel:

Relay control one electrical circuit by opening and closing contacts in another circuit. Relay is used to control a circuit by independent low power signal.

6. Boost Converter :

A boost converter normally utilizes a stored energy to boost the voltage level from its input to a higher output value.

7. Monitoring Unit :

Here, the battery data is being monitored and will keep on checking weather its health is in proper operating range or not.

8. Wi-Fi Module :

Due to Wi-Fi module we can transmit the collected data to cloud server (dweet.io) for remote monitoring. This will enable us in quick troubleshooting and low down time of system.

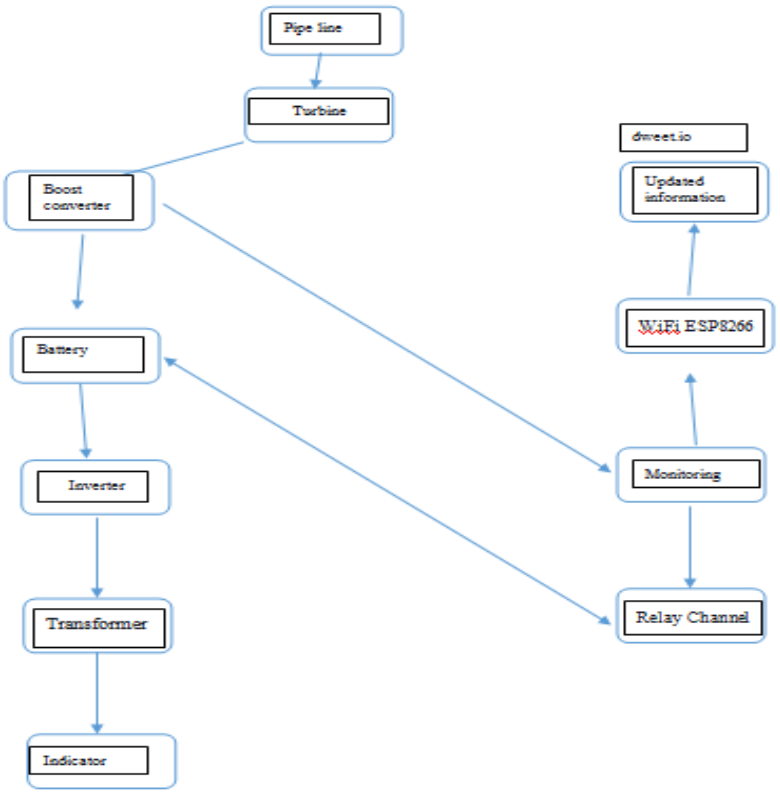
9. Transformer:

Here, the generator creates the electricity, which goes to the transformer that converts it to the right voltage. A transformer is designed to convert AC from one voltage to another.

10. Wi-Fi module :

ESP8266 The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network

PROPOSED METHODOLOGY



CONCLUSION

Among the different renewable energy sources that are nowadays suitable for integration in urban areas, in addition to photovoltaic and vertical axis wind systems, particularly interesting are small scale hydro systems, with power output from 5 to 100 kW (micro Hydro), installed in urban or industrial water supply grids and waste drainage networks.

Future Scope

As IOT is growing every day with new technologies involved, new challenges arise. The IOT has encouraged people to connect to devices using the internet and the increase in the use of IOT devices motivated people to use smart technologies. The water Monitoring in the distribution system is a serious factor that affects public health and smart water 5 system provides a user-friendly interface to monitor the water monitoring in houses and take remedial measurements if necessary. This electricity generation from flowing water systems can offer many advantages both in terms of quantity of energy produced and supply continuity without the problems.

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