AUTOMATION IN RESTROOM USING SPEECH RECOGNITION

Subtitle if needed (14pt, Italic,line spacing: Before:8pt, after:16pt)

[1]Abisha Grace G M, [2]Nancy W, [3]Priyadharshini M, [4]Yuvalakshmi K,

[1]Assistant Professor, [2]Assistant Professor, [3]Student, [4]Student,
[1]Electronics and Communication Engineering,
[1]Jeppiaar Institute of Technology, Chennai, India

Abstract : The objective of this paper is to conserve the water. Nearly 95% of water goes as waste in home. Country has able to manage only 4 percent of fresh water available. The water shortage problem is not due to insufficiency of water but due to excessive wastage of fresh water. About 50% of fresh water is wasted in the country as a result of leakage of fresh water and due to improper water management system. There are different causes of wastage of water, human being are the major cause for wastage. This leads to serious cause for existence of life. To overcome the problem there are many measures .This paper is about to start the management from our restroom itself by limiting the water quantity and to control by speech recognizer along with the sensor. This will be the cost efficient method to conserve the water wastage and it is a reliable method.

IndexTerms **- Cost efficient, Reliability, speech recognizer, sensor, controlled water quantity.**

I. INTRODUCTION

People do not think about how much water is wasted due to daily activity. Conservation of water can be improved by using it wisely and being aware of to how the water is used and how often. On an average one person waste somewhere between 0 to 45 Litres of water every day. Water is also the most thoughtlessly used natural resources in the world.

- 06/01/2010-The Hindu 40% of water supply is wasted in Delhi
- 25/10/2012-DNA India –Mumbai's water goes down the drain
- 16/05/2013-Times of India-40% of water daily wasted in Hyderabad
- 12/04/2016-DNA India – CM Fad avis says 900 million Litres of water is wasted daily.
- 15/04/2016-Mid day – With no proper measures, 70% of treated water is wasted every day.
- 06/05/2016-Times of India -124ml of water is wasted daily.
- 15/05/2016-Times of India –Mumbai loses 25% of leakage, theft.

In order to sustainably manage the natural resource of fresh water many policies and strategies were proposed by the government. Seventeen percent of the world's human population is in India. There is an immediate need to meet the current and future human demand of water thereby protecting the hydrosphere. Factors like growing population, increase in the household size, growth and affluence affects water quantity. Households include dishwashers, wastewater sinks, bath tubs, washing machines and showers.

Households that use dry toilets produce less wastewater than those that use flush toilets. According to the National Commission for Irrigated Water Resource Development of India, the water shortage problem arises not due to lack of it, but due to wastage and poor management.

This paper contributes in providing and identifying potential actions for further reduction of water wastage in every restroom in cost effective manner. With regards to consumer perception, behaviour at consumer level and in consumer retailer interaction.

II. PROOSED SYSTEM

The proposed system is that automated restroom in which restroom is automaized by speech recognizer. It is not only applicable for washbasin but also for other driving machine in restroom such as shower, flush, tap and wash basin. The device gets turned ON when the restroom light gets turned ON. Speech recognizer also gets powered when the light is turned ON. If there is no water in the tank it shows the intimation. The ultrasonic sensor senses the movement of the object and hence the water flow can be controlled. The aim of this paper is to minimize the cost of the system (i.e) the system is reliable and beneficial to the normal people.

III. EXISTING SYSTEM

The existing system proposed with ultrasonic sensor. Sensor[1] senses the hand and it automatically turns ON/OFF. Servo motor used to close the tap after the hand moved out of range. It exists only in luxurious places like shopping malls, millionaire houses. This applies particularly to those with a high level of usage, such as schools, public buildings and hospitals which are now getting benefitted from sophisticated systems that control the automated functions[6] of all faucets, basins and showers from one central point.

IV. COMPONENTS OF PROPOSED SYSTEM

- Arduino UNO
- Solenoid valve
- Ultrasonic sensor
- Speech recognizer
- Voltage regulator
- Transformer
- Connecting wire

4.1Arduino UNO

Arduino is an open source platform used for building electronics projects. Arduino consist of physical programmable circuit board and microcontroller. UNO is the most popular board in the arduino family. Arduino UNO has 6 analog inputs, power jack, a USB connection, a reset button and power with AC-DC adapter or battery to get started, 14 digital input/output pins, 6 can be used as the (Pulse Width Modulation) PWM outputs, 16MHZ ceramic resonator ICSP header. The microcontroller used is ATmega328.

Compile code to Arduino. Arduino is based on easy-to-use hardware and software. Arduino boards are able to read inputs like light from a sensor, a finger on a button. PWM is a technique for getting analog results with the help of digital means. Digital control is used to create a square wave (a signal that is switched between on and off). The ATmega328 is a single-chip microcontroller created by Atmel in the megaAVR family. ATmega microcontroller can execute up to 16 million instructions per second.

4.2 Solenoid Valve

A solenoid valve is an electromechanical actuated valve to control the flow of liquids and gases. The valve is controlled by flow of current through a solenoid. The current flow through the wire is controlled by magnetic field around the wire. The magnetic field around the coil is many times stronger, flowing around the coil and through its centre in the doughnut shape. The magnetic field is said to exert a force on the plunger. As a result of this the plunger is pulled toward the centre of the coil and hence the orifice opens. This is the basic principle that is used to open and close solenoid valves.

When normally open solenoid valve is not powered, the plunger is down, which means that a flow is allowed through the valve. Once the coil on the plunger is energized the magnetic field causes the plunger to rise. In the case of a two-port valve the flow is switched on or off whereas in the case of a three-port valve, the outflow is switched between the two outlet ports.

4.3 Speech Recognizer

Speech recognition[2] is the ability of a machine or program to identify phrases and words in the language spoken and convert them into a low level language (0's and 1's). High level software has the ability to accept natural speech as input which in turn is given to an Analog to Digital Converter (ADC). It translates the analog waves of voice into digital data by sampling the sound. The higher is the precision rates and sampling, the higher the quality.

To convert speech to onscreen text or a computer command, a computer has to do several complex steps. When we speak, we create vibrations in the air. Both use recordings of the human voice, but they do different things with it. The speech recognition process eliminates the personal differences to detect the words. Voice recognition[3] typically disregards the language and meaning to detect the physical person behind the speech. So, the speech recognizer is preferred in the proposed system.

4.4 Ultrasonic Sensor

An Ultrasonic sensor is a device that uses sound waves[5] to measure the distance to an object. It measures the distance by sending out a sound wave at a specific frequency and waiting for that sound wave to bounce back. The Ultrasonic sensor sends out a high-frequency sound pulse towards the object for which the distance have to be measured and then starts calculating the time for the echo of the sound to reflect back. The sensor has 2 openings on its front. One opening transmits ultrasonic waves, (like a tiny speaker), the other one receives them, (like a tiny microphone). Ultrasonic sensor is an affordable proximity or distance sensor that has been used mainly for object avoidance in various projects that use robots.

4.4 Transformer

A transformer is an electrical device that transfers electrical energy between two or more circuits through the electromagnetic induction. A transformer consists of two electrically isolated coils and operates on Faraday's principal of "Mutual Induction", in which an Electro Magnetic Field (EMF) is induced in the transformers secondary coil by the magnetic flux generated by the voltages and currents flowing in the primary coil winding. The primary may be connected phase to ground or phase to phase. The secondary is usually grounded on one terminal. The three primary types of voltage transformers (VT) are capacitor, electromagnetic and optical.

The electromagnetic voltage transformer is a wire-wound transformer. Transformers are used to increase or decrease the alternating voltages in electric power applications. Hence transformers are called as "voltage transformers". Transformers can be used either to increase the voltage ("step up") or decrease the voltage ("step down").

4.5 Voltage Regulator

DC voltage is independent of the load current, temperature and AC line voltage variations. A voltage regulator may use a simple feed-forward design or may include negative feedback. It uses an electromechanical mechanism in which electronic components are using different types of voltage regulators working principle.

A voltage regulator is used to regulate voltage level. It is preferred when a steady, reliable voltage is needed. It generates a fixed output voltage that remains constant for any changes in the input voltage or load conditions.

When voltage at the electrical system is low the voltage regulator will cause the alternator to produce more output. In the compressed air system, the pressure switch will turn on the compressor when system pressure gets low. Accessories[8] like lights and ignition uses power from the electrical system.

V. FUNCTIONALITY

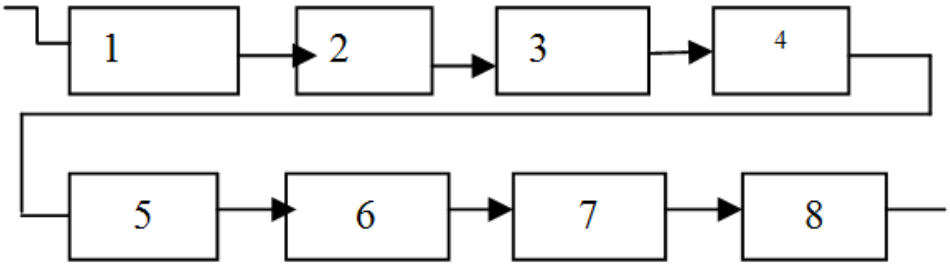

Fig.1 Work Flow

Figure 1 Shows the functionality of the system with the following units.

1.Switch

2. Voltage Regulator

3. Arduino UNO

4. Step up Transformer

5. Speech Recognizer

6. Ultrasonic sensor

7. Step down Transformer

8. Solenoid valve

VI. CONCLUSION AND FUTURE WORK

The objective of this paper is to avoid the wastage of water at low cost. Electric current is required to use solenoid valves. Solar panels can be used to supply power to solenoid valve which involves in conservation of electricity. Approximately the power consumed is 1100 kWh per month. In this case, it would be about 37kWh per day. Approximately we are using about 37 kWh per day. However, while that's usually the case with a central inverter[9] (which handles the output of all the panels), a newer type, the so-called 'micro-inverters', are installed or included with each solar panel, and are said to have a much longer lifespan (up to25 years) and could last for decades as well.

VII. ACKNOWLEDGMENT

In performing our work, we took guidance of the project advisor and from the faculties of our college. The work is supported by Department of Electronics and Communication in Jeppiaar Institute of Technology.

REFERENCES

[1] M. Chan, E. Campo, D. Esteve, Monitoring Elderly People Using a Multisensor System, Proc. of 2nd International Conference On Smart Homes and Health Telematic, Singapore, 2004, pp. 162-169

[2] M. Cowling, Non-Speech Environmental Sound Recognition System for Autonomous Surveillance, Ph.D. Thesis, Griffith University, Gold Coast Campus, March, 2004

[3] D. Istrate, E. Castelli, M. Vacher, C. Nguyen, Sound Processing for Health Smart Home, Proc. of 2nd International Conference On Smart Homes and Health Telematic, Singapore, 2004, pp. 41-48

[4] Steve Young, The HTK Book, User Manual, Cambridge University Engineering Department, 1995.

[5] J. Dahmen, B. L. Thomas, D. J. Cook, and X. Wang, "Activity learning a foundation for security monitoring in smart homes," Sensors, vol. 17, 2017.

[6] R. Abhishek, S. Zhao, D. Tipper, and D. Medhi, "Sesame: Software defined smart home alert management system for smart communities," In 2017 IEEE International Symposium on LANMAN IEEE, 2017.

[7] M. Tennant, F. Stahl, G. Di Fatta, and J. B. Gomes, "Towards a parallel computationally efficient approach to scaling up data streamclassification," in Research and Development in Intelligent Systems XXXI. Springer, 2014, pp. 51–6 of Computer Science, 2016.

[8] A. Mohammadkhan, S. Ghapani, G. Liu, W. Zhang, K. Ramakrishnan, and T. Wood, "Virtual function placement and traffic steering in flexible and dynamic software defined networks," in 2015 IEEE International workshop on LANMAN. IEEE, 2015, pp. 1–6.

[9] W. Zhang, J. Hwang, S. Rajagopalan, K. Ramakrishnan, and T. Wood, "Flurries: Countless fine-grained nfs for flexible per-flow customization," in Proceedings of the 12th International on Conference on emerging networking experiments and Technologies. ACM, 2016, pp. 3–17.