SURVEY OF THE TRENDING TECHNOLOGIES PROTOCOLOS AND ARCHITECTURE FOR AN URBAN IOT

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Abstract - *Internet of things can connect devices embedded in various system to the internet. When devices/objects can represent themselves. Digitally they can be controlled from anywhere. This paper proposes IOT based smart village, consists of a centralized microprocessor interfaced with many sensors for making the village cleaner and smarter. The proposed scheme consists of five different aspects of any village such as digital display of the government subsidies and offers to formers, smart garbage management, intensity-based street light monitoring, digital water supply system and E-learning to the students. This paper specifically focusses an urban IOT systems that uses Raspberry Pi. Urban IOTs in fact are designed to support the smart village vision, which aims at exploiting the most advanced communication technologies to support added value services for the administration of the city and for the citizens. This paper proposes four main applications of IOT which helps all the urban people efficiently.*

Key Words: **Internet of things (IOT), Microcontroller, LCD, LED, sensors, Relay, DC pump, etc.,**

1. INTRODUCTION

IOT allows businesses and people to be more connected to the world around them and to do more meaning-full, higher-level work. IOT is about extending power of the internet beyond computers and smart phones to a whole range of other things, IOT is a system ability to transfer data over a network without requiring human –to – human or human-to computer interaction. The proposed system consists of a centralized microprocessor interfaced with many sensors for making the village cleaner and smarter. This scheme brings smartness in five different aspects of any village such as digital display of the government subsidies and offers to farmers, smart garbage management, E-learning for the students in schools, intensity-based street light monitoring and digital water supply system. A smart village can make intelligent response to different kinds of needs, including daily livelihood, environmental protection, public safety, city services and industrial and commercial activities [8]. In IOT the objects of everyday life will equipped with microcontrollers, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with users, becoming integral part of the internet. The IOT concept, hence, aims at making the internet even more immersive and pervasive.

2. PROBLEM STATEMENT

Metropolitan cities and villages of all kinds require streetlights that help their busy lifestyle. But as the human lifestyle gets busy they tend to forget to turn off these streetlights when its dawn. Technology is being improved at the speed of light; the use of timer-based streetlights does not always solve the problem of electricity being wasted. Automation plays a wonderful role in solving this problem. Using the web app, the control of the streetlights can be monitored. The intensity control feature helps in saving energy during late nights while traffic density on the streets is low.

As residential area grows, all the needs of people have to be satisfied for an issueless life especially in case of water. It focuses on distributing water to all channels (connections) in a particular area. Various actions performed with this activity are, checking whether all channels get water supply, every area is provided with a centralized water distribution unit which distributes water to all home units in that particular area.

The "KasaMuktha" ward program was started by BBMO for wide opportunity in learning and communication to extend the knowledge about waste isolation from the starting place then pass on message to the people about the innovative technology about the garbage gathering and clearance from their area. Internet of Things (IoT) is an ecological unit of associated corporal substance which are reachable during the internet. The 'thing' in IoT could be a physical device with sensor capabilities which are capable to send information through IP address and ability to communicate information to base station automatically. This technology helps the object interrelate with inner and outer side, in revolve involve the choice chosen. Internet of Things be able to interact in various system over internet. The objects can embody digitally which can be operated or monitored around the world. This will help the people which can confine extra information from different places which is guarantee for increasing effectiveness and recuperating protection and defense. Since the full village is connected with web electronic equipment and show alphanumeric display all the govt. offers and schemes for the farmers are displayed on the

display system employing a wireless app utilized by the govt. Advanced E-learning for the school children is introduced using the same technology where the rural students also can get the quality education under Edu-sat IOT based Learning.

3. OBJECTIVE

village by taking smart decisions using smart technologies and services. This project report deals with development of village as a smart village. We define smart village as bundle of services of which are delivered to its residence and businesses in an effective and efficient manner. "Smart Village" is that modern energy access acts as a catalyst for development in education, health, security, productive enterprise, environment that in turns support further improvement in energy access. In this report we focus on improved resource use efficiency, local self-governance, access to assure basic amenities and responsible individual and community behaviour to build happy society. We making smart.

4. SCOPE OF THE PROJECT

- A lot of power can be saved since intensity-based street lights are used.

- All Govt. related schemes and Market price of the grown crops can be directly displayed on the Digital display system using a Smart Web App maintained by Government.

- City can be kept clean since smart garbage management system is developed.

- By sitting at one place water can be supplied to an entire city.

- IOT based smart E-learning for students have been introduced in the village level.

5. PROPOSED SYSTEM

Basically, the system consists of a centralized microprocessor interfaced with many sensors for making the city smarter. The project aims to bring smartness in five different aspects of any city Digital Display of the Government Subsidies and offers to farmers, smart garbage management, E-learning for the students in schools, intensity-based street light monitoring and digital water supply system. A set of IR sensors are interfaced with the processor which are in turn mounted on the dust bins so as to monitor the garbage level. Whenever the level reaches to the maximum then information will be passed to the concerned authorities for quick actions.

LDR light sensors are interfaced with the processor so as to detect the intensity of light falling and accordingly the street lights will be controlled. Relays are interfaced with the processor for turning on and turning off the water valves according to convenience by mobile phone. Since the whole village is connected with internet and digital display all the government offers and schemes for the formers will be displayed on the display system using a wireless app used by the government. Advanced E-learning for the school children is introduced using the same technology where the rural students also can get the quality education under Edu-sat IOT based Learning.

6. METHODOLOGY

The project aims to bring smartness in five different aspects of any village such as Digital Display of the Government Subsidies and offers to farmers, E-learning to the students, smart garbage management, intensity-based street light monitoring and digital water supply system.
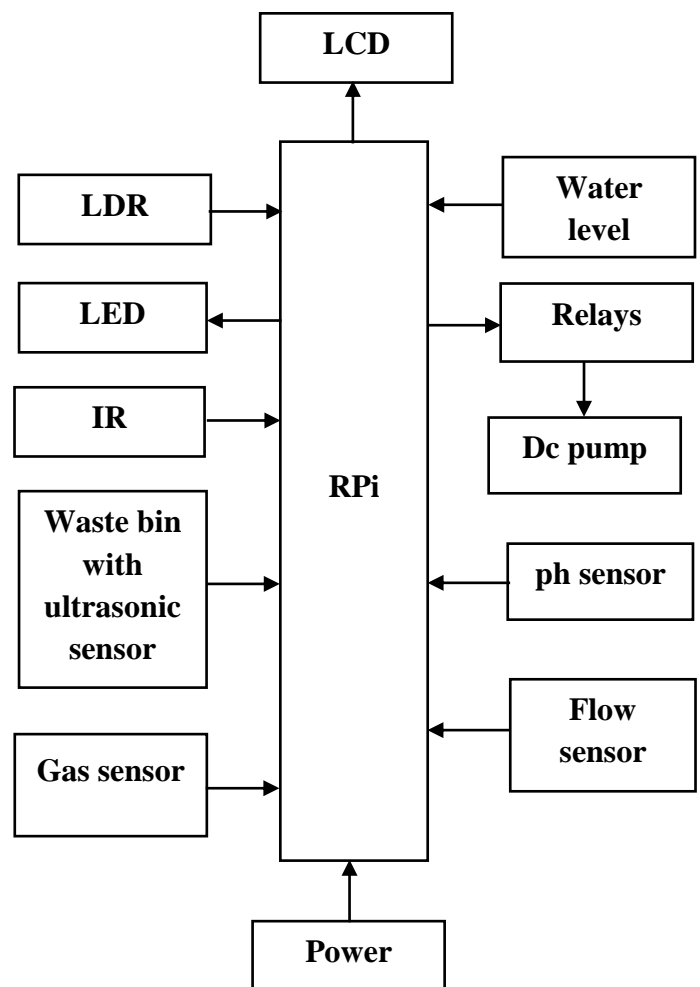

Fig:1 Block diagram of smart village with web app using raspberry pi3.

6.1 Waste management

Waste management is a big challenge as the population is increasing day by day. Municipality waste management team monitoring all the dustbins every day even the dustbin is not filled. This project acts as a waste management guard at every dustbin. Whenever the dustbin is about to fill it sends information to the team to collect the waste and also differentiates wet and dry waste. Energy consumption and management are a major task for people to lighten up the next generations future. To realize a smart waste management service, the IOT shall connect the end devices, i.e., intelligent waste containers, to a control center where an optimization software process the data and determines the optimal management of the collector truck fleet. To realize such a smart waste management service, the IoT shall connect the end devices, i.e., intelligent waste containers, to a control center where an optimization software processes the data and determines the optimal management of the collector truck fleet.

6.2 Intensity controlled Street Light control

Now a day's manual systems are used to control the street lights and these lights are switched ON in the evening before the sunsets and they are switched OFF in the next day morning after the is sufficient light on the outside. But the actual timing for these lights to be switched ON is when there is absolute darkness, with this, the power will be wasted up to some extent. From the proposed scheme manual operation of a lighting system is completely eliminated. This is achieved by sensing and approaching a vehicle using an IR transmitter and IR receiver couple. Upon sensing the movement, the sensor transmits the data to the microcontroller which furthermore the light to switch ON. Similarly, as soon as the vehicle or an obstacle goes away the light gets switched OFF.

6.3 Digital water supply

WATER has become a big issue because of less rain fall. Increase in population many cities are facing this problem. Due to lack of monitoring water can't be supplied properly, some areas in city get water while other some area can't so, there is a need of continuous monitoring, water scheduling and proper distribution. For this IOT has brought a smart solution in which water supply can be done using a mobile phone. Water can be supplied to anywhere of the city any time by sitting at one place.

6.4 Digital Display of the Government Subsidies

Government has three visions regarding the forming sector that is, one to maintain the timeliness, second to increase productivity and finally to reduce human labour. The main objectives of government subsidies are to adapt newer and faster machines to facilitate machine purchasing, helping to decrease the cost of evaluation, to ensure the timeliness of cultivation timing, to improve the livelihood of the formers. Government offers certain benefits for the formers which includes, 'Rashtriya Krishi Vikasa Yojana (RKVY)', 'National Food Security Mission (NFSM)', 'Sub-Mission on Agriculture Mechanization (SMAM)', etc... Like many subsidies are given to formers but all these information's are not reached to formers in a proper time. In order to avoid this digital display systems are used in rural areas using IOT, for this whole village is connected with internet modem and all the government schemes for the formers will be displayed on the display system using a wireless app used by the government.

6.5 E-learning

IOT is providing the smart education, like gamification which provides better knowledge retention. In this scheme, model for smart education using gamification is presented which includes smart learner, smart devices, smart learning environment to make learning process more efficient through IOT applications.

7. WORKING

7.1 Waste management

Waste management is a primary issue in many modern cities, for instance, the use of intelligent waste containers that detect the level of load and allow for an optimization of the collector trucks route, can reduce the cost of waste collection and improve the quality of recycling. Initialing the system. Check "Ultrasonic sensor" sensor status garbage container is filled or empty. If it is not filled wait for sensor output. If it is filled then sensor will send the status to RPi with the GPS location where the dust bin is located. RPi will send the message to cloud web app and LCD display.

We can upgrade this system with placing some chemical sensors which are designed to detect the chemical reactivity nature of the wastes and by this can differentiate between biodegradable and non-biodegradable wastes. The authorized person observes the web app, in which area dustbin is located, by comparing coordinates and updates the location and inform the respective vehicle to collect the waste. This will help in managing the garbage collection efficiently. Thus, real time monitoring of garbage bins can be provided.

7.2 Street light monitoring system

In order to support the directive, the optimization of the street lighting efficiency is an important feature. In particular, this service can optimize the street lamp intensity according to the time of the day, the weather conditions and the presence of people. The block

diagram consists of microcomputer, LDR, IR sensor, LED's.

Here we consider two streets A and B

In street A: By using LDR we can operate the lights i.e., when light is available the LED will be OFF and when light is not available LED will be turned ON which means that LDR is directly proportional to light.

In street B: Here the presence of people or objects are less compared to street A. When light falls on LDR it sends the signal to the Raspberry pi to turn OFF the light and the switches off the light even if the IR sensor has high output. The IR sensor will be basically use to turn ON and OFF the lights according to the presence of the objects during the night time. All the commands from the LDR and IR sensor will be send to Raspberry Pi and normal function occur depending on the signals received from the sensor.

7.3 Digital water supply

This system can be implemented on water tanks for safe and waste less consumption. Water when supplied from the reservoir to tanks then the pH level of water will be checked, if it comes in required range than the conductivity of water will be checked. If pH or conductivity of water will not be in safe range than the water will not be supplied to household tanks and valves will be closed. The Same procedure will be followed till water does not come in safe range. After the satisfactory quality check of water if the tanks are full than valves of the tank will be opened and water will be distributed. This whole data is sent from Wi-Fi to the Web page so that system can be accessed remotely from a computer. The flow of distribution and quality of water both will be monitored from the web page which can be displayed anywhere using the internet.

The water flow sensors used, when the valve is turned ON and the water flows from the tank to the consumer through the pipe. The water flow sensor is used to find the water flow rate and the leakage detection of the pipe. The water flow rate is identified with the water flow sensor. The leakage detection is found in the pipe, through the two difference of the water flow sensor placed in the pipe at a longer distance, such that the flow rate senses the water flow through the pipe. The difference of the water flow rate1 and the water flow rate 2 is the leakage detection of the same pipe at longer distance. The difference of the two-water flow rate must be zero, such that there is no water leakage in the pipe.

The real time water supply management system is based on microcontroller and timers which are used to open and close the water supply valve at particular time in particular area. Each valve has particular ID in the sub-control server system. Based on the ID the valve opening

and closing time will be set and reset. Suppose area AX have the t Lanes L1 and L2. The sub-control unit is SAX for that particular area. Each water supply unit is installed on for every Lane.

1. Suppose Lane L1 water supply time schedule is from 9AM to 10AM and L2 is 10:30AM to 11:30AM and L3 is 1:00 PM to 2: PM.
2. When timer of L1 unit give time to Microcontroller 9 AM. The microcontroller gives the instruction to DC motor rotate clockwise for open the water supply valve for L1.
3. When the valve will open same time data will update in the sub-control server that Lane L1 water supply is started at 9AM and data saved in database
4. When again timer will show the time 10AM, the microcontroller gives instruction to Motor rotate anticlockwise for close the supply valve and same time the data will update in saver room the L1 water supply is stopped.
5. If Lane L1 is required more time water from schedule, the operator reset the time from control unit for reschedule the supply in L1. The L2 also follow the same procedure to supply the water.

7.4 Government Subsidies to farmers

Agricultural subsidies are necessary, as the Indian economy is largely dependent on the farming sector. Since the full village is connected with web electronic equipment and show alphanumeric display all the govt. offers and schemes for the farmers are displayed on the display system employing a wireless app utilized by the govt.

The output from various sensors like IR sensor, temperature sensor, ph sensor are sent to the raspberry pi module and to the web application and LCD screen. Also, the electricity generated from piezo-electric sensor is sent to the battery. This paper helps the farmers and other beneficiaries for their agriculture and development. In order to avoid this digital display systems are used in rural areas using IOT, for this whole village is connected with internet modem and all the government schemes for the formers will be displayed on the display system using a wireless app used by the government.

7.5 E-learning

Advanced E-learning for the school children is introduced using the same technology where the rural students also can get the quality education under Edu-sat IOT based Learning. In this scheme, model for smart education using gamification is presented which includes smart learner, smart devices, smart learning environment to make learning process more efficient through IOT applications.

8. CONCLUSION

Using the proposed system, the model can be made completely automated and hence the objective of is to keep rural/urban area clean and avoid from environmental pollution by garbage monitoring system, and through automatic street light control the manpower and energy can be saved and from automatic water supply the power can be saved and water quality is also checked to keep away from the diseases. Thus, it can be concluded with respect to the result obtained that the proposed prototype can be a better and play a vital role in projects like "swatch Bharath" and in making Indian smart and clean. The proposed system can be further modified on different levels of designing and implementation. Many more facilities can be added. Through this model the India can be made smarter like aspects of any village such as Digital Display of the Government Subsidies and offers to farmers. Advanced E-learning for the school children is introduced using the same technology where the rural students also can get the quality education under Edu-sat IOT based Learning.

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