IOT BASED DEVELOPMENT OF SMART CITY WITH DIGITAL WATER SUPPLY SYSTEM

Kavyashree MM[1]Apoorva D[2] Kavya AP[3] Nalina MS[4] Mrs.Kokila KS[5]
[1]Student, Dept. of ECE, BGSIT, Mandya.
[2]Student, Dept. of ECE, BGSIT, Mandya.
[3]Student, Dept. of ECE, BGSIT, Mandya.
[4]Student, Dept. of ECE, BGSIT, Mandya.
[5]Assistant Professor, Dept. of ECE,BGSIT, Mandya.

Abstract-Basically the system consists of a centralized microprocessor interfaced with many sensors for making the city smarter. The project aims to bring smartness in four different aspects of any city such as density based traffic monitoring, city pollution control, intensity based street light monitoring and digital water supply system. The complete system is controlled and monitored by a multipurpose web app connected to the server. The Internet of Things (IOT) shall be able to incorporate transparently and seamlessly a large number of different and heterogeneous end systems, while providing open access to selected subsets of data for the development of a plethora of digital services. Building a general architecture for the IOT is hence a very complex task, mainly because of the extremely large variety of devices, link layer technologies, and services that may be involved in such a system. In this paper we focus specifically to urban IOT systems that, while still being quite a broad category, are characterized by their specific application domain. Urban IOTs, in fact, are designed to support the Smart city 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 hence provides a comprehensive survey of the enabling technologies, protocols and architecture for an urban IOT.

Keywords— Raspberry pi; IOT Modem ; IR Sensor ; Co2 sensor; LCD; Relay; LED;

I. INTRODUCTIN:

The system consists of a centralized microprocessor Raspberry Pi interfaced with many sensors for making the city smarter. The project aims to bring smartness in four different aspects of any city such as density based traffic monitoring, city pollution control, intensity based street light monitoring and digital water supply system. The complete system is controlled and monitored by a multipurpose web app recent connected to the server.

The IOT is a communication paradigm that envisions a near future in which the objects of everyday life will be equipped with micro-controllers, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the Internet. The IOT concept, hence, aims at making the Internet even more immersive and pervasive. Furthermore, by enabling easy access and interaction with a wide variety of devices such as, for instance, home appliances, surveillance cameras, monitoring sensors, actuators, displays, vehicles, and so on, the IOT will foster the development of a number of applications that make use of the potentially enormous amount and variety of data generated by such objects to provide new services to citizens, companies, and public administrations. This paradigm indeed finds application in many different domains, such as home automation, industrial automation, medical aids, mobile health care, elderly assistance, intelligent energy management and smart grids, automotive, traffic management and many others.

II. LITERATURE SURVEY

[1]L.Atzori, A. Lera, and G. Morabito:This paper addresses the Internet of Things, Main enabling factor of this promising paradigm is the integration of several technologies and communication solutions. Identification and tracking technologies, wired and wireless sensor and actuator networks.

[2]P. Bellavista, G. Cardone, A. Corradi, and L. Foschini: The Internet of Things has been inscription in this review paper. Internet of Things is a keyword to cover various challenges related to internet and web to the real physical world. The most applicable factors of IOT is the identification and tracking various factors for smart objects.

[3] A. Laya, V. I. Bratu, and J. Markendahi: Machine-machine communications refer to the automate exchange of information between devices for control and monitoring applications. This type of communication is not new since

automated systems have been present for more than three decades.

III. METHODOLOGY

Pollution Control

IOT can provide means to monitor the quality of the air in crowded areas, parks or fitness trails. In addition, communication facilities can be provided to let health applications running on joggers' devices be connected to the infrastructure. In such a way, people can always find the healthiest path for outdoor activities and can be continuously connected to their preferred personal training application. The realization of such a service requires that air quality and pollution sensors be deployed across the city and that the sensor data be made publicly available to citizens.

Smart Traffic management

On the same line of air quality and noise monitoring, a possible Smart City service that can be enabled by urban IOT consists in monitoring the traffic congestion in the city. Even though camera-based traffic monitoring systems are already available and deployed in many cities, low-power widespread communication can provide a denser source of information. Traffic monitoring may be realized by using the sensing capabilities and GPS installed on modern vehicles, but also adopting a combination of air quality and acoustic sensors along a given road. This information is of great importance for city authorities and citizens: for the former to discipline traffic and to send officers where needed, for the latter to plan in advance the route to reach the office or to better schedule a shopping trip to the city Centre.

Intensity controlled Street Light control

In order to support the 202020 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. In order to properly work, such a service needs to include the street lights into the Smart City infrastructure. It is also possible to exploit the increased number of connected spots to provide Wi-Fi connection to citizens. In addition, a fault detection system will be easily realized on top of the street light controllers.

Digital water supply:In order to reduce the complexities associated with water supply management IOT has brought a smart solution in which water supply can be done using a mobile phone. Water can be supplied to any part of the city any time by sitting at one place

IV. HARDWARE COMPONENTS

RASPBERRY PI

Raspberry pi is a card –sized ARM powered linux computer development board. there square measure in total of five forms of numerous board with totally different specification, for the planned meteorology system Raspberry pi to model is employed because the main development board which is shown in Figure 1.

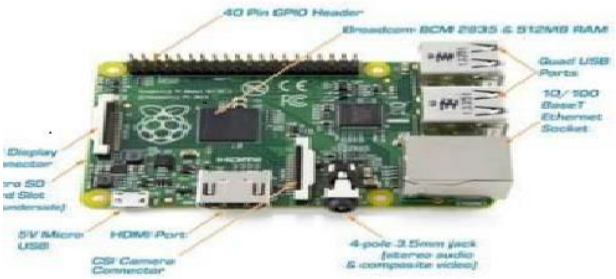

Fig1: Raspberry PI

The raspberry pi consists of four USB ports and one 10/100 Base T Ethernet Socket. Forty pins GPIO Header are present in the raspberry pi board which is used for connecting to analog to digital converter chip (MCP3008)to which the sensors are connected. A 5V micro USB power port is present to which the power supply is given for the device. A HDMI port is present through which interfacing of the monitor and the raspberry pi can be done and the USB ports for the keyboard and mouse interfacing. At the bottom a Micro SD Card Slot is provided where the Micro SD Card is too inserted with the raspbian Jessie botting software which based on Linux platform. The GPIO pins have different uses individually such as power supply, ground, clock, UAR.

IR SENSOR

IR Sensor module has great adaptive capability of the ambient light, having a pair of infrared transmitter and the receiver tube, the infrared emitting tube to emit a certain frequency, encounters an obstacle detection direction (reflecting surface), infrared reflected back to the receiver tube receiving, after a comparator circuit processing, the green LED lights up, while the signal output will output digital signal (a low-level signal), through the potentiometer knob to adjust the detection distance, the effective distance range 2 ~ 10cm working voltage of range 3.3V -5V.

Fig 2: IR Sensor

The detection range of the sensor can be adjusted by the potentiometer, with little interference, easy to assemble, easy to use features, can be widely used robot obstacle avoidance, obstacle avoidance car assembly line count and black-and-white line tracking and many other occasions.

Co2 SENSOR

Sensitive material of MQ-2 gas sensor is SnO2, which with the lower conductivity in clean air. When the target combustible gas exist, the sensor gas sensor interacts with a gas to measure in concentration they are used in various industries ranging from medicine to aerospace. conductivity is more higher along with the gas concentration rising. Convert change of conductivity to correspond output signal of gas concentration MQ-2 gas sensor has high sensitivity to LPG, propane and hydrogen, also could be used to methane and other combustible steam, it is with a low cost and suitable for different application.

Fig 3: Co2 Sensor

RELAY

A relayis an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays.

Fig 4: Relay

Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations. monitoring the pollution in the city and if the pollution level seems to be increased then necessary actions can be taken Relays are interfaced with the processor for turning on and turning off the water valves according to convenience by a mobile app.

V. BLOCK DIAGRAM

Basically the system consists of a centralized microprocessor Raspberry Pi connected to internet interfaced with many sensors for making the city smarter. The project aims to bring smartness in four different aspects of any city such as density based traffic monitoring, city pollution control, intensity based street light monitoring and digital water supply system. The complete system is controlled and monitored by a multipurpose web app connected to the server.

IR sensors are interfaced with the processor which are in turn placed on the lanes to monitor the traffic on the road and accordingly traffic lights will be monitored. Another set of IR sensors are interfaced with the processor which are in turn monitor the intensity based street light monitoring. Co2 sensors are interfaced with the processors and are fixed in the city centers for monitoring the pollution in the city and if the pollution level seems to be increased then necessary actions can be taken Relays are interfaced with the processor for turning on and turning off the water valves according to convenience by a mobile app.

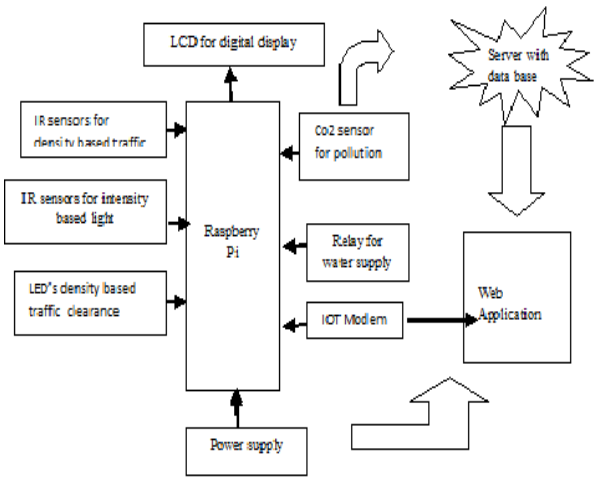

Fig 5: Overall block diagram

VI. RESULT

The smart technology can provide the solution for cities by helping them save money, reduce the carbon emissions and manage the traffic flows. It reduces the wastage of electricity. For this purpose IR Sensors are used. The Street light corresponding to that IR Sensor will switch on automatically when a vehicle passes and remaining street lights are switched off. It reduce the traffic load of the road and avoid the over waiting time on heavy road and time wasted by a green signal on an empty road. The data's that are collected by the sensors could be used by the administrators to take necessary action such as emergency warning messages and evacuation of people to snug places. As the smart water meters are digitized and automated, high accuracy is maintained by decreasing human efforts. Water thefts can be avoided. This paper demonstrates the successful implementation of an internet-based approach to monitor water supply and usage on a real time basis.

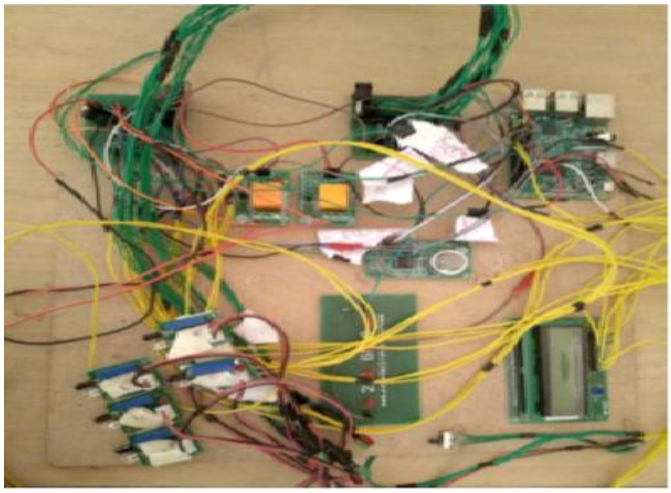

Fig 6: Model of the system

CONCLUSION

IOT is applicable for monitoring and detecting regular smart city application. There is no wastage of water and hence promoting water conservation. Smart cities concept has gained a lot of attention lately and it will most likely continue to do so in the future. Cities publishing smart plans. It provides sustainable environment safety and security of citizens and the Future Internet: Towards Cooperation Frameworks for Open Innovation", the Future Internet, Lecture Notes in Computer Science Volume 6656, pp. 431-446, 2011.24th European Regional ITS Conference, Florence, Italy, 20-23 Oct. 2013.

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