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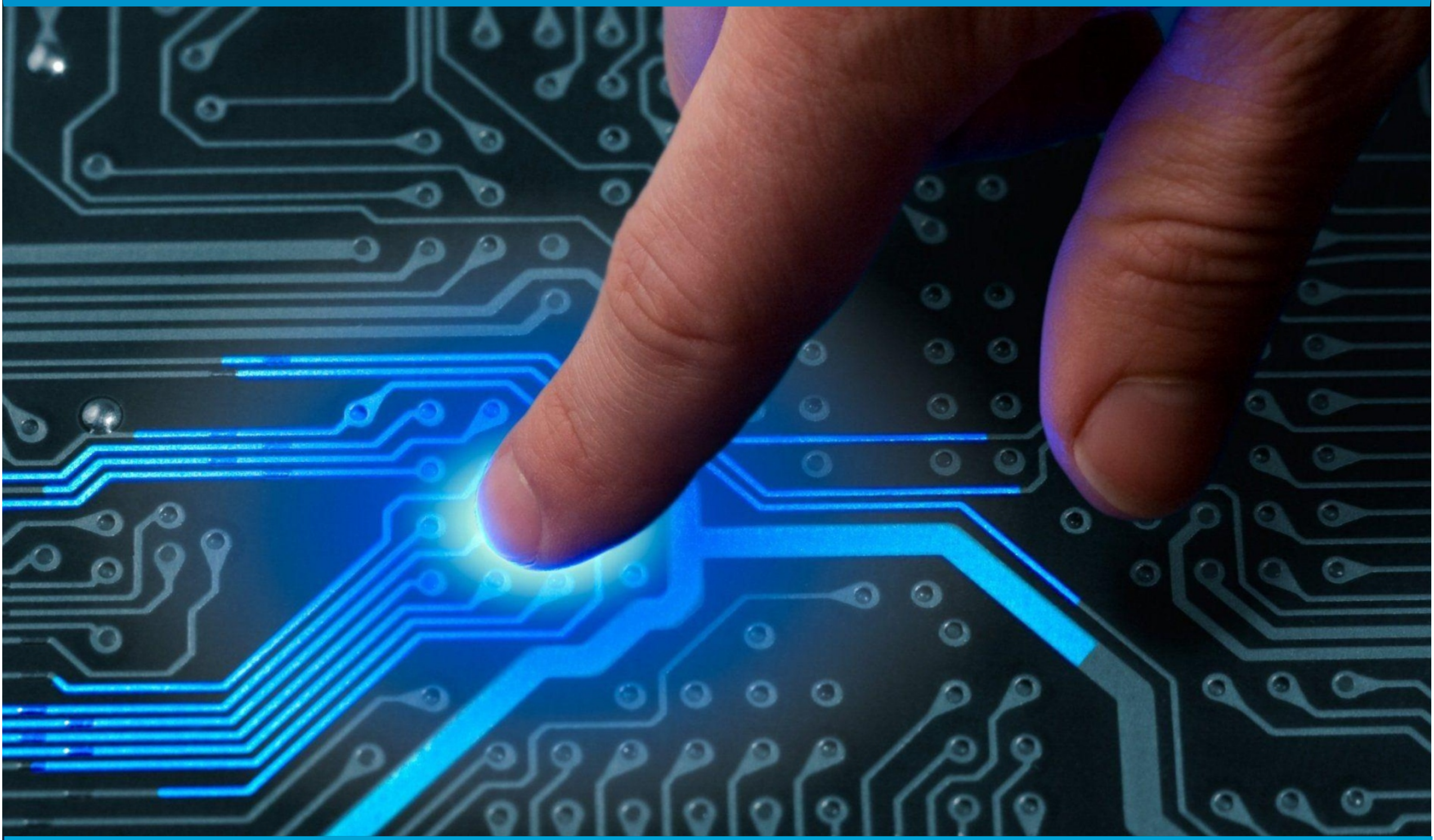

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A Real Time Environmental Monitoring for Smart City Surveillance Based On IOT

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ABSTRACT: Environmental pollution is currently the biggest challenge facing the world today. Nowadays Smart city concept and its application are developed to manage the pollution caused through huge urban flows and allows for real time responses. Currently, IoT technologies are widely implemented to monitor environmental pollution in cities and it is a measured way to deal with consolidate different sensors with all the ICT arrangements. Recognizing all these issues in mind, we proposed a system which is completely based on the several wireless attached sensor networks for collecting information about environment and transport periodically. The sensors will detect and transform the relevant data and take actions accordingly. Apart from that it can also transfer the same to the IOT server. This proposed work not only solve the environmental issues but also the major issues incities like ambulance emergency care, level monitoring, trafficmonitoring and waste management which helps in monitoring the traffic related to the ones that impact the day to day life of the citizens and able to provide proper guidance to the people in case of emergency.

KEYWORDS: Internet of Things, Smart City, ICT, Pollution control, Transport monitoring

I. INTRODUCTION

The term "smart city" was coined towards the end of the 20th century. It is rooted in the implementation of user-friendly information and communication technologies developed by major industries for urban spaces. Its meaning has since been expanded to relate to the future of cities and their development. Smart cities are forward-looking, progressive and resource-efficient while providing at the same time a high quality of life. They promote social and technological innovations and link existing infrastructures. They incorporate new energy, traffic and transport concepts that go easy on the environment. Their focus is on new forms of governance and public participation. Intelligent decisions need to be taken at the strategic level if cities want to become smart. It takes more than individual projects but careful decisions on long-term implementations. Considering cities as entire systems can help them achieve their ultimate goal of becoming smart. Smart cities forcefully tackle the current global challenges, such as climate change and scarcity of resources. Their claim is also to secure their economic competitiveness and quality of life for urban populations continuously on the rise. Human have become more dependent on networked Information and Communication Technologies (ICT) than ever. By 2050, more than 70 percent of global population will live in urban areas. The population growth in cities and our increased dependence on ICT necessitate intelligent and efficient management of critical infrastructure (e.g., energy, transportation, etc.) and address challenges of development and sustainability. To achieve these goals in a holistic manner, the smart city concept embraces these ICT challenges. Indeed, a smart city is a vision of future urban area where smart ICT technologies will connect every major sector of the city through rich features such as the smart economy, smart mobility, smart environment, smart people, smart living, and smart governance. On the other hand, another emerging technology paradigm Internet of Things (IoT) is envisioned as a crucial part of the smart city concept. IoT is a network of interconnected devices with advanced capabilities to interact with each other, human beings, their surrounding physical world to perform different tasks. IoT enables easy access § Contributed equally to this work. and integration between a variety of devices such as home appliances, vehicles, smart phones, etc. in an intelligent urban living setting. By integrating IoT in the smart city, flexible resource management for different application domains can be achieved in urban areas.

II. EXISTING SYSTEM

The system has been designed in such a way that it can detect the sensor datas and can monitor the datas.A window system is being designed to see the datas and monitor them accordingly.

Disadvantages

1) Only data can be monitored. There is no adequate process to take appropriate action based on the system
2) Presented on the window application.

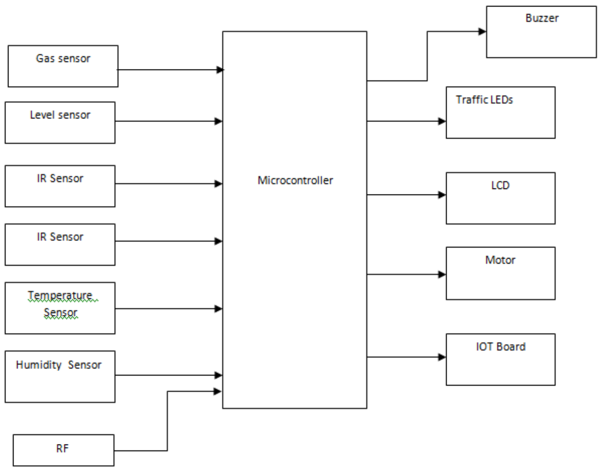
III. PROPOSED SYSTEM

In the proposed work, IR sensors are used to monitor the traffic, if anyone is found breaking the rules then the fine can be composed immediately. The level sensor is used to monitor the water level on the main roads. If there is any stagnation of water then the traffic will be halted for 10 mins and all the water can be drained using outlets in the side ways of the road. These water can be forwarded to the city lakes. After draining the traffic will be resumed again. Apart from that the level sensor can also be used to detect the water level in the city lakes. If the level comes near the dangerous level, then an announcement will be done in the nearby areas or to the areas where the flood can affect. Temperature and humidity sensors are used to detect the temperature and moisture variations. If the datas crosses alarming level, then the relevant officers will be intimated as well as the alarm can also be raised to take precautions.

Advantages

1) All the major aspects are being covered.
2) Cost effective.

Block Diagram



Block Diagram Explanation

In the above block diagram, various sensors are being used. This block diagram is proposed to monitor and solve the major issues in a city like pollution, ambulance emergency care, flood, Traffic Problems and Environmental Problems. Gas sensor is used to monitor the air pollution. Level sensor is used to monitor the water level on the roads in case of heavy rain or flood. If water is stagnating beyond the level, them the side doors on the road and water will be drained inside. IR sensor is used to monitor the traffic condition. If vehicles are detected more than a display will be shown on lcd and traffic will be cleared. Temperature sensor is used to monitor the temperature condition. Humidity sensor is used to use the moisture content in the air. RF module is used to monitor the ambulance. If an ambulance is coming in a direction, then that way traffic will be cleared immediately. All the above data can be monitored in the online.

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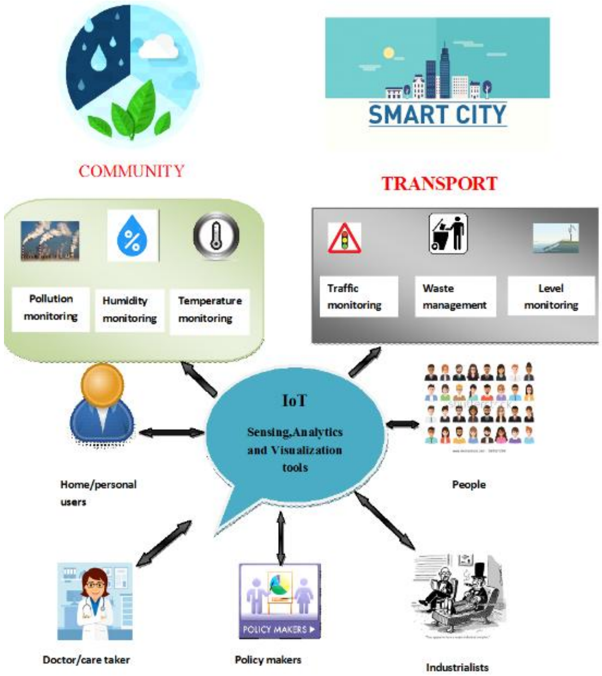

Hardware Components

i. PIC Microcontroller
ii. Voltage Regulator
iii. Gas Sensor
iv. Level Sensor
v. IR Sensor
vi. Temperature Sensor
vii. Humidity Sensor
viii. RF Module
ix. Buzzer
x. Traffic LEDs
xi. LCD
xii. Motor
xiii. IOT Board

IV. LITERATURE SURVEY

The recent changes in climate have increased the importance of environmental monitoring, making it a topical and highly active research area. This field is based on remote sensing and on wireless sensor networks for gathering data about the environment. Recent advancements, such as the vision of the Internet of Things (IoT), the cloud computing model, and cyber-physical systems, provide support for the transmission and management of huge amounts of data regarding the trends observed in environmental parameters. In this context, the current work presents three different IoT-based wireless sensors for environmental and ambient monitoring: one employing User Datagram Protocol (UDP)-based Wi-Fi communication, one communicating through Wi-Fi and Hypertext Transfer Protocol (HTTP), and a third one using Bluetooth Smart. All of the presented systems provide the possibility of recording data at remote locations and of visualizing them from every device with an Internet connection, enabling the monitoring of geographically large areas. The feasibility of the three developed systems for implementing monitoring applications, taking into account their energy autonomy, ease of use, solution complexity, and Internet connectivity facility, was analyzed, and revealed that they make good candidates for IoT-based solutions [1].
Multibuilding campuses commonly span both academic and industrial institutions, resulting in densely populated areas in which people conduct a multitude of day-to-day practices. The resources and infrastructures provided by such campuses are implicated in these practices and are directly linked to the bottom line of not only the campus itself but also the city in which it resides. IoT developers will face similar technical and organizational barriers involving integrating complex financial or institutional constraints and priorities. We reflect on why creating this platform has

been more challenging than we first thought and present a set of lessons learned and opportunities for the community. We hope that drawing attention to these issues will start an important dialogue among practitioners and researchers in academic and nonacademic settings alike [2].

The Collaborative Internet of Things (C-IoT) is an emerging paradigm that involves many communities with the idea of cooperating in data gathering and service sharing. Many fields of application, such as Smart Cities and environmental monitoring, use the concept of crowdsensing in order to produce the amount of data that such IoT scenarios need in order to be pervasive. In our paper we introduce an architecture, namely SenSquare, able to handle both the heterogeneous data sources coming from open IoT platform and crowdsensing campaigns, and display a unified access to users. We inspect all the facets of such a complex system, spanning over issues of different nature: we deal with heterogeneous data classification, Mobile Crowdsensing (MCS) management for environmental data, information representation and unification, IoT service composition and deployment. We detail our proposed solution in dealing with such tasks and present possible methods for meeting open challenges. Finally, we demonstrate the capabilities of SenSquare through both a mobile and a desktop client [3].

Buildings became complex systems where there are various technologies integrated together and thus should work as a single system. Modern building has several monitoring and control systems which should cooperate together to achieve energy saving while keeping indoor comfort and healthy environment. The overall building management systems (BMS) provides an integrated way to gather data from the building and issue control commands to the installed technology. The parameters that are monitored in modern buildings are not only temperature and humidity but todays buildings monitor also concentration values of CO2 or volatile organic compounds (VOC). The experience from last decades shows necessity to monitor also the structure of the building. Renewable materials (wood) are today often used for building construction. This material is quite sensitive to environmental factors like humidity and the environment has to be monitored in order to avoid structural health problems in future. Especially timber when exposed to humidity or moisture can degrade quite quickly and can lose load capacity. Modern communication technologies allow installation of many sensors directly into the structure which allows continuous monitoring of the building construction as well as the indoor climate in the building. Internet of Things (IoT) allows new communication technologies providing low cost, low power sensor application within smartcity sector [4].

Internet of Things (IoT) technologies have been broadly applied in smart grid for monitoring physical or environmental conditions. Especially, state estimation is an important IoT-based application in smart grid, which is used in system monitoring to get the best estimate of the power grid state through an analysis of the meter measurements and power system topologies. However, false data injection attack (FDIA) is a severe threat to state estimation, which is known for the difficulty of detection.We propose an efficient detection scheme against FDIA. First,two parameters that reflect the physical property of smart grid are investigated. One parameter is the control signal from the controller to the static Var compensator (CSSVC). A large CSSVC indicates there exists the intense voltage fluctuation. The other parameter is the quantitative node voltage stability index (NVSI). A larger NVSI indicates a higher vulner ability level.Second, according to the values of the CSSVC and NVSI, an optimized clustering algorithm is proposed to distribute the potential vulnerable nodes into several classes. Finally, based on these classes, a detection method is proposed for the real-time detection of the FDIA. The simulation results show that the proposed scheme can detect the FDIA effectively[5].

V. HARDWARE REQUIREMENTS

PIC Microcontroller:

The term PIC stands for Peripheral Interface Controller.It is the brain child of Microchip Technology,USA. Originally this was developed as a supporting device for PDP computers to control its peripheral devices, and therefore named as PIC, Peripheral Interface Controller. They have coined this name to identify their single chip micro controllers. These 8-bit micro controllers have become very important now -a -days in industrial automation and embedded applications etc.

One of the earlier versions of PIC Microcontrollers is PIC16C6x/7x. The 7x family has an enhancement of Analog to Digital converter capability. These 28 cs are available with a range of capabilities packaged in both dual in-line (DIP) packages and surface-mount packages. These are available in 28 pin DIP, 40 pin DIP ,44 pin surface mount packageetc. some of PIC controllers contain the letter A in their number. The presence of A indicates the brown-out reset feature, which causes a reset of the PIC when the Power Supply voltage drops below 4.0v.

Gas Sensor:

MQ-2 gas sensor is designed with sensitive material of sno2, which with lower conductivity in clean air. When the target combustible gas exists, the sensor’s conductivity is higher. Signal conditioning circuit is used to convert the change of conductivity to correspond output signal with the input 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 withlowcostandsuitablefordifferentapplication.TheMQ-2gasmoduleis mounted on a pcb board which has an operating voltage of $5V_{DC}$. The sensor output values can be get by means of both analog and digital.

IR Sensor

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor.

The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR lightreceived.

Level Sensor

Level sensors detect the level of substances that flow, including liquids, Slurries, granular materials, and powders. The substance to be measured can be inside a container or can be in its natural form. The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place. While point-level sensors only indicate whether the substance is above or below the sensing point generally the latter detect levels that are excessively high or low. Selection of an appropriate type of sensor suiting to the application requirement is veryimportant.

Humidity Sensor

Humidity measurement can be done using electronic hygrometers. Electronic type hygrometers or humidity sensors can be broadly divided into two categories namely capacitive sensing effects and resistive sensing effects. Resistive type humidity sensors pick up changes in the resistance value of the sensor element in response to the change in the humidity. Thick film conductor of precious metals like gold, ruthenium oxide is printed and culminated in the shape of the comb to form anelectrode.

Then a polymeric film is applied on the electrode; the film acts as a humidity sensing film due to the existence of movable ions. Change in impedance occurs due to the change in the number of movable ions.

DC Motor

A DC motor converts direct current electrical power into mechanical power. DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move. This is known as motoring action.

When magnetic field and electric field interact, they produce a mechanical force. Thus, a DC motor can be used at a voltage lower than the rated voltage. But, below 1000 rpm, the speed becomes unstable, and the motor will not run smoothly. However, using the motor outside this range will result in high temperature rises and deterioration of motor parts.

Buzzer:

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

It generates consistent single tone sound just by applying D.C voltage. Using a suitably designed resonant system, this type can be used where large sound volumes are needed. At Future Electronics we stock many of the most common types categorized by Type, Sound Level, Frequency, Rated Voltage, Dimension and Packaging Type.

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IOT Board:

Internet of Things (IoT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The IoT allows objects to be sensed and/or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. IoT board featured with SIM900 GPRS modem to activate internet connection also equipped with a controller to process allinput.

Relay:

A relay is an electromechanical switch which is activated by an electric current. A single relay board arrangement contains driver circuit, power supply circuit and isolation circuit. A relay is assembled with that circuit. The driver circuit contains transistors for switching operations. The transistor is use for switching the relay.

An isolation circuit prevents reverse voltage from the relay which protects the controller and transistor from damage. The input pulse for switching the transistor is given from the microcontroller unit. It is used for switching of a singledevice.

Temperature Sensor:

LM35 is a precision IC temperature sensor with its output proportional to the temperature (in 0 C). The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than with a thermistor. It also possess low self-heating and does not cause more than 0.1 0C temperature rise in still air. The device is used with single power supplies, or with plus and minus supplies. As the LM35 device draws only 60 µA from the supply, it has very low self-heating of less than 0.1°C in still air. The LM35 device is rated to operate over a −55°C to 150°C temperature range.

Software Requirements:

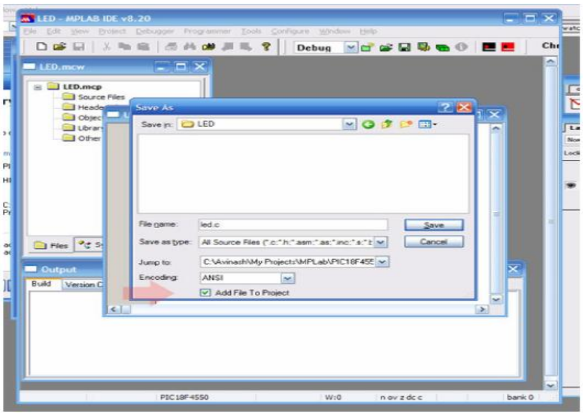
MPLAB:

MPLAB is a proprietary freeware integrated development environment for the development of embedded variety of many integrated tools &
applications on PIC and dsPIC microcontrollers and is developed by Microchip Technology.
MPLAB X is the latest edition of MPLAB, and it developed on the NetBeans platform. MPLAB and MPLAB X support project management, code editing, debugging and programming of Microchip 8-bit, 16-bit, and 32-bit PIC microcontrollers.
MPLAB is designed to work with MPLAB-certified devices such as the MPLAB ICD 3 and MPLAB REAL ICE, for programming and debugging PIC microcontrollers using a personal computer. PICKit programmers are also supported by MPLAB.
MPLAB X supports automatic code generation with the MPLAB Code Configurator and the MPLAB Harmony Configurator plugins.

NETBEANS:

NetBeans is an integrated development environment (IDE) for Java. It allows applications to be developed froma set of modular software components called modules.
NetBeans runs on Microsoft windows, MAC OS, Linuz and Solaris. In addition to Java it has extensions to other languages also like PH, C,C++ and HTML5**.**

VI. RESULTS



VII. CONCLUSION

In this paper we analyzed the solutions currently available for the implementation of urban IoTs. The discussed technologies are close to being standardized, and industry players are already active in the production of devices that take advantage of these technologies to enable the applications of interest, such as those described in Sec. II. In fact, while the range of design options for IoT systems is rather wide, the set of open and standardized protocols is significantly smaller. The enabling technologies, furthermore, have reached a level of maturity that allows for the practical realization of IoT solutions and services, starting from field trials that will hopefully help clear the uncertainty that still prevents a massive adoption of the IoT paradigm.

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