

# Implementing Smart City Concept with Various Application Using IOT Based Technique

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**Abstract:** *Recently, population is increasing day by day, which gives in lack of public awareness of healthy environment. This has been creating a health issues all over the world. The world is increasingly getting smarter and looking for secure, perception and smart conclusion of resource optimization to increase quality of consumer life. This necessity has led to the development of smart and safe cities connecting the virtual world to the physical, bring real-time services that modify to real-time situations based on IOT technology. This system uses various sensors for monitor of infrastructural facility in a city. System sensor connected ATmega16 microcontroller using wireless communication technique. Controller collect the information from sensors transfer to the Raspberry Pi through Zigbee module, send SMS to control room, it display on monitor.*

**Keywords:** *Sensors, ATmega16 Microcontroller, Zigbee module, Raspberry Pi.*

## 1. INTRODUCTION

The picture of smart city contains list of services that describes level of aspiration. To provide for the aspiration and needs of the public urban planners ideally aim to developing entire urban ecosystem, which is represented by four pillars of development – institutional, physical, social and economic infrastructure. The core infrastructure elements in a smart city would include drainage line, waste/Garbage Collection, power electricity, water supply, IT connectivity and digitization, good governance, safety and security of public, health and education, and public transport.

So, developing the smart city infrastructure we are managing the drainage line, garbage collection, power electricity, water distribution supply. For that, we construct and developed wireless technique to implement above mentioned application in smart city management using IOT based technology. The IOT results objects to be monitor the status and controlled existing network Infrastructure, creating opportunities

for world and resulting in improved efficiency, accuracy and economic benefit (12).

## 2. LITERATURE REVIEW

Kasliwal Manasi H.et .al. proposed garbage level using ultrasonic sensor and it will monitor through GSM module. Micro-controller is used to interface the sensor system with GSM system (1) Joke O. ADEYEMO et al. Presents the development of an architecture based on smart city technology, for waste materials. Implement concept using Arduino UNO microcontroller board, proximity sensor, breadboard, refuse bin and a personal computer (2). Jalpa shah et.al. proposed smart city enables the effective utilization of resources and better quality of services to the citizens. To provide services such as air quality management, weather monitoring the basic parameters are temperature, humidity and CO<sub>2</sub>. This paper presents a customized design of an Internet of Things (IOT) enabled environment monitoring system to monitor temperature, humidity and CO<sub>2</sub> (3). Aishwarya Pandey.et.al. studied that the Internet of Things (IOT) has the ability to deliver that increase energy efficiency, security, health, education and many parameters of daily life(4). Sanghyuk Jung.et.al. proposed a novel GC mechanism, called link-based GC (LINK-GC), which provides fast victim selection and preemptive operation with small additional space overhead to existing page-mapped FTLs (5).Dario Bonin .et.al .introduces smart city platform (SCP) developed in the content of the ALMANAC FP7 EU project and discusses matter during the first experimental application of the platform to smart waste management. The ALMANAC SCP aims to integrate Internet of Things (IOT), capillary networks and metro access networks to offer smart services to the citizens, and thus enable Smart City processes(6). Murgesh SK.et.al. Studied about system of monitoring the water level and atmospheric temperature and pressure inside a manhole and to check whether a manhole lid is open. It also checks underground blockages(7). Abhimanyu Singh.et.al.

Discussed an IOT based methodology has been proposed as a new solution. The methodology proposes use of Infrared sensors to collect data from the garbage and that of Raspberry Pi2 Development Board to communicate this information to the control room(8). R.Kumar.et.al. demonstrated some of the applications of Internet of Things are smart parking, smart home, smart city, smart environment and health monitoring process (9).K Fukuyama.et.al studied models the decision mechanism by monitoring to garbage and classification, and count how they decide to cooperate to the system. Moreover, based on the model and the survey results effective management of the system for better classification are examined (10).

### 3. PROPOSED SYSTEM

Modules used for the processed system can be summarized as below:

**LDR Sensor:** LDR sensors are used to monitor the status of the garbage tank. LDR is a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation.

**Float Drainage level sensor:** As the float rises or lowers with liquid level, then the magnetic field generated from within the float actuates hermetically sealed, reed switch mounted within the stem. The Drainage line monitoring uses sensors to detect drainage blockage and drainage overflow west water in the drainage.

**Phase fault detection circuit:** In the power electricity, if the power cut occurs at home, office, etc meter gives alert to nearest distributor and Consumer and owner get clarity of electricity information. It gives better result for power loss.

**Float water level sensor:** The system of water distribution can report pipe flow measurement data regularly, as well as send automatic alerts if water use is outside of an expected normal range. This allows a smart city to identify the location .This system gives better solution for water loss. It uses float switch for water distribution.

**ATmega16 microcontroller:** The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. The AVR core combines rich instruction set with 32 general purpose working registers.

**Wireless Zigbee module:** ZigBee wireless mesh technology has been developed to address sensor and control applications with its promise of robust and reliable, self-configuring and self-healing networks that provide a simple, cost-effective and battery-efficient approach to adding wireless to any application, mobile, fixed or portable.

**Raspberry Pi3 modem:** Raspberry pi3 is the third generation .It has 1.2GHz 64 bit quad core ARMv8 CPU, 802.11n wireless LAN (11).

#### A) Algorithm

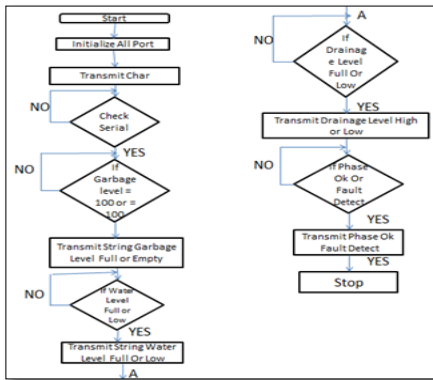
##### Algorithm for Transmitter side:

1. Start.
2. Initialize all ports.
3. Transmit.
4. Check Serial if no then repeat if yes then go to next step.
5. If Garbage level equal to 100 or not equal to 100, if no then repeat, if Yes then Transmit string garbage level full or empty.
6. If Water level full or low, if no then repeat, if yes then transmit string water level full or low.
7. If Drainage level full or low ,if no then repeat ,if Yes then Transmit string Drainage level high or low.
8. If Phase level ok or fault detect, if no then repeat, if Yes then Transmit Phase level ok or fault detect.
9. Stop

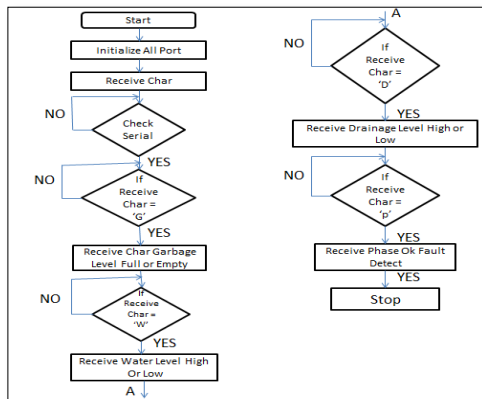
##### Algorithm for Receiver side:

1. Start.
2. Initialize all ports.
3. Receive.
4. If receive char = 'G' if no then repeat, if yes receive char garbage level full or empty.
5. If receive char = 'W' if no then repeat ,if yes receive char water level high or low.
6. If receive char = 'D' if no then repeat, if yes receive char drainage level high or low.
7. If receive char = 'P' if no then repeat, if yes receive char Phase level ok or fault detect.
8. Stop.

**B) Flowchart**

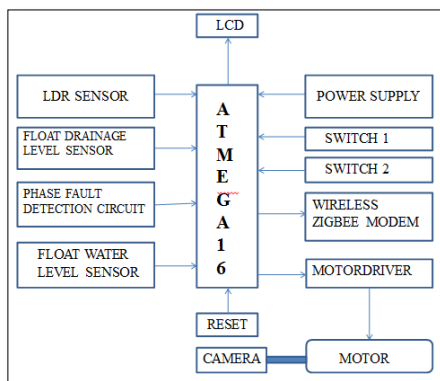


**Fig 1(a): Transmitter section**

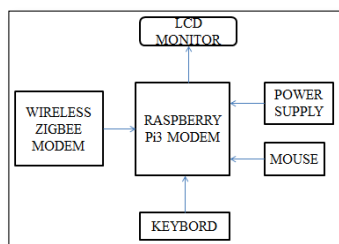


**Fig 1(b): Receiver section**

**4. WORKING**



**Fig 2(a) : Transmitter Section**



**Fig 2(b): Receiver Section Block diagram**

Input to controller is LDR sensor for detecting the garbage level. If the garbage level is more than threshold value then garbage full message given to the controller. ATMEGA 16 through ZIGBEE, SMS will be send to control room which will indicate that the Please inform the cleaner of specific floor as the dustbin of that floor is full. In master unit when the SMS is received at control room, it will indicate on GUI the percentage of approximate garbage collection of that floor and it will automatically inform the cleaner of that floor. The input to its control is a signal, either analog or digital, representing the position commanded for the output shaft. Concern Person which put the garbage out of dustbin at that time camera captured image of person which is implement on motor. The modules have a few features built in, such as the ability to change the brightness of images, auto-contrast and auto-brightness adjustment and motion detection. We can take snap pictures and they are pre-compressed JPEG images which makes them nice and display on television set of control room. The 3 phase supply from the power grid is monitored by obtaining the feedback from the mains network R, Y and B, this feedback is taken through Opto-coupler IC PC817. Opto-coupler isolates the microcontroller from the mains supply and also provides feedback without any damage to the controller.

The implementation of the drainage line monitoring using float switch. If any blockage occurs in the line the water level in the line will rise due to prevention of flow and after certain time water level will reach the chamber, when this saturation occurs the float switch placed at the chamber level will be triggered and blockage will be detected. Gives indication to ATMEGA16 through Zigbee about blockage is detected. When the SMS is received at control room buzzer is ringing and gets indication of drainage blockage.

Implementation of water distribution systems we are conducting quantitative analysis and discharge rate analysis for equal "Time based" distribution of available quantify and conserve the excessive available quantify of water. Available quantify is analyzed through the status of the float switches placed at different levels in the tank. WDN is an important infrastructure in modern cities, since it relates the daily water usage of residents. However, it faces at least two major threats, i.e., contaminations and leakages. Relay driver used to drive the relay. Relays are used quantitative analysis and discharge rate analysis for equal "Time based" distribution and must be controlled

by one circuit and re-transmitted to the valve. The valve is controlled by an electric current through a solenoid and the flow is switched on or off.

ZigBee wireless mesh technology makes wireless sensor and control network applications practical. ZigBee wireless mesh technology has been developed to address sensor and control applications and send information to the Raspberry Pi and display on the LCD.

## 5. CONCLUSION

Our Smart city system monitored the management of drainage line, water level, waste collection level, power electricity in the city. In the water level systems we are conducting quantitative analysis and discharge rate analysis for equal "Time based" distribution of water and conserve the excessive water. The LDR sensor is used to monitor the garbage level in dustbin. If level of garbage becomes more than threshold limit, it spreads bad smell in surrounded area and if the drainage maintenance is not proper the pure water gets contaminate with drainage water and infectious diseases may get spread in the city. So our system results better city overview and intelligent management of the services in the city. Voltage sensor is used for monitoring R phase of the power line and so our system gives better solution of conserve electricity. By monitoring proper management of garbage materials, water level, power electricity maintain good and hygienic environment to live by using IOT technology and become development of smart and safe cities.

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