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IOT BASED SMART CITY

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❖ ABSTRACT.

The rapidly growing urbanization facing many problems during daily life so, the smart IoT based city is a model showing the helpful tools created by the combination of electronics and IoT (INTERNET). It's help to citizen forsurviving easily and reducing the human efforts here we shoes the automatic home automation using IoT garbage monitoring system and electricity. This project design by inspiring the IoT System large use and updating generation

we are designing only small things but in future many more things are added as per improvement.

The smart IoT based city implementation based on this main thing's electricity supply chain, requirement fulfilment with less human efforts and digital work all cover in this demo project.

Keywords— *Internet of Things (IoT), Smart City, Smart Garbage, Smart Buildings/Homes, Electricity generation*

❖ INTRODUCTION

A city equipped by basic infrastructure to give a decent quality of life, a clean and livable environment to live smarter and sustainable environment through application of some smart solutions. A smart city is one that has digital

technology embedded across all city functions.

Smart city is the integrated form of communication with information technology, where massive numbers of devices are interconnected with the IOT. Based on challenges identified by increasing in the population, industrial growth, and urbanization, there is a need for safeguarding water resources. Hence a block-chain based system is implemented, which helps to effectively manage the utilization of the water and also helps in handling the wastewater properly by providing an effective sanitation mechanism.

Cities are dynamic and complex by their very nature. The future livability, vibrancy and sustainability of our cities is challenged by multiple factors including population growth, natural resource constraints and climate change. At the same time, established and emerging areas of research are converging. This together with broad technology adoption and sophisticated analysis and prediction tools create exceptional opportunities to achieve huge advances for our cities and our communities. Smart Green Cities was established to address these challenges and capture the best these opportunities offer.

World population has increased significantly in the last decades and so has the expectation of living standards. It is predicted that around 70% of the world population will live in urban areas by the year 2050. At present cities IOT BASED SMART CITY consume 75% of the world's resources and energy which leads to the generation of 80% of greenhouse gases. Thus, in the next few decades there can be severe negative impact on the environment. This makes the concept of smart cities a necessity. According to this problem we are building a smart IOT based City which provides better resolution to live life. The creation of smart cities s a natural strategy to mitigate the problems emerging by rapid urbanization and urban population growth. In this Smart city we are mainly showing tree structure waste management, supply chain, automations. Core of smart city implementation is the Internet of Things (IOT). In other words, the IOT is the technical backbone of smart cities. The smart cities need to have three key features: intelligence, interconnection, and instrumentation which the IOT can provide. It can be said that the use of the IOT can make the smart cities feasible.

The use of smart phones, smart meters smart sensors, forms the IOT framework in the smart cities. In this project IOT framework consists of various components including electronics, sensors, networks and software. IOT use as a network of interconnected things just like home automation with involvement or smart phone. The IOT ensuring the communication of all home equipment with each other and also the garbage monitor are communicate with municipality division it's work based on variety of systems and applications for providing increasingly smart, reliable and secure services.

In Smart City we include and combine the three projects are Smart Home Automation IOT based, Smart Garbage Monitoring System and Electricity Power Generation by Green Energy.

❖ LITERATURE REVIEW.

IOT Smart City: Introduction and Challenges Prateek Gurani, Mohit Sharma, Shreya Nigam, Nitasha Soni, Krishan Kumar International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-3, September 2019

The paper primarily focuses on the challenges encountered in smart cities, particularly safety and management issues. It discusses the safety challenges faced by cities, emphasizing the need to mitigate hazards in unsafe areas to ensure citizens' safety. This project recognizing home door locks as safety measures can contribute to this goal. Additionally, it highlights management as a prevalent and recurring problem in cities, attributing it to the rapid urbanization process.

HOME AUTOMATION SYSTEM: Aaditya Gupta Shah*1, Aashish Gaurav*2, Abhishek Anand*3, Ganesh Kumar Shah* e-ISSN International Research Journal of Modernization in Engineering Technology and Science Volume:03/Issue:04/April-2021

This paper discusses the significant role of home automation control, which plays a crucial part in managing various aspects of household environments. It explores numerous applications and provides a comprehensive circuit diagram. According to the findings, home automation is a sustainable endeavor, heavily supported by IOT (Internet of Things) technology and low-energy Bluetooth.

This paper discusses the significant role of home automation control, which plays a crucial part in managing various aspects of household environments. It explores numerous applications and provides a comprehensive circuit diagram. According to the findings, home automation is a sustainable endeavor, heavily supported by IOT (Internet of Things) technology and low-energy Bluetooth.

The paper emphasizes that home automation offers cost-effective and measurable systems, allowing for easy device integration through simple hardware and microcontrollers. True to its name, home automation facilitated automated task execution, as elaborated with examples throughout the paper.

Internet of Thinfs (IOT) and Smart City-Transformation of Cities through IOT: Ms. Rashmi Dongre, Dr. Meera Deshmukh International Joutnal of Applied Engineering Research ISSN 0973-4562 Volume14, Number 7, 2019

According to this paper smart city projects are getting stronger because of IOT and big data. These services are making big changes by improving infrastructure and transportation, reducing traffic jams, managing waste better, and making life better for people. This paper gives an overview of IOT in smart cities, the types of ICT networks used, possible opportunities, and important requirements. It also looks at the latest efforts by standard organizations.

IOT BASED SMART CITY Smitaraj R. Shastri1, Pallavi B. Chitale2, Dipali S. Bhuwad 3, Prof. P. P. Gaikwad4 International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 09 Issue: 05 | May 2022

This paper also considering the use of the Internet of Things (IOT) to making smart city projects possible all over the world. According to paper IOT combines various sensors with ICT solutions and they also gives the valuable example like: Over the past few years, more than 50 billion objects have been connected to implement smart cities. For the smart city operation IOT communications are essential.

The purpose of IOT is to support smart city concepts, which use advanced communication technologies for city management and citizen services. Advanced technologies have made smart cities versatile in controlling, monitoring, and operating various fields like traffic management, waste management, and electricity usage. Cities are now smarter than ever before, achieving efficiency without requiring excessive time and manpower. This project aims to identify smart city essentials and address challenges faced by ordinary cities. Its main goal is to simplify daily tasks, enhance efficiency, and reduce manpower.

Smart City Based on IOT, C.M. Gaikwad[1], A.A. Jadhav[2], N.N. Suryawanshi[3], P.P. Farakate4 International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 04 Issue: 03 | Mar -2017

Now a condition population is growing every day, leading to problems like air and water pollution, traffic jams, and reliance on non-renewable energy sources such as petrol and LPG gas. The main goal of the system is to protect the environment. To address these issues and protect the environment, smart city IOT systems are designed. These systems manage traffic, water, and air pollution. The proposed system uses Raspberry Pi, image processing, VB, and sensors. In the traffic management system, it monitors live road conditions, detects potholes and accidents, and measures CO2 levels in the air to inform citizens and government authorities. Renewable energy sources like solar, wind, and biogas are used to generate pollution-free energy. This energy is used for street lights, traffic signals, and parks. Biogas is produced from waste materials and used in apartments for cooking and other purposes.

❖ BLOCK DAIGRAM

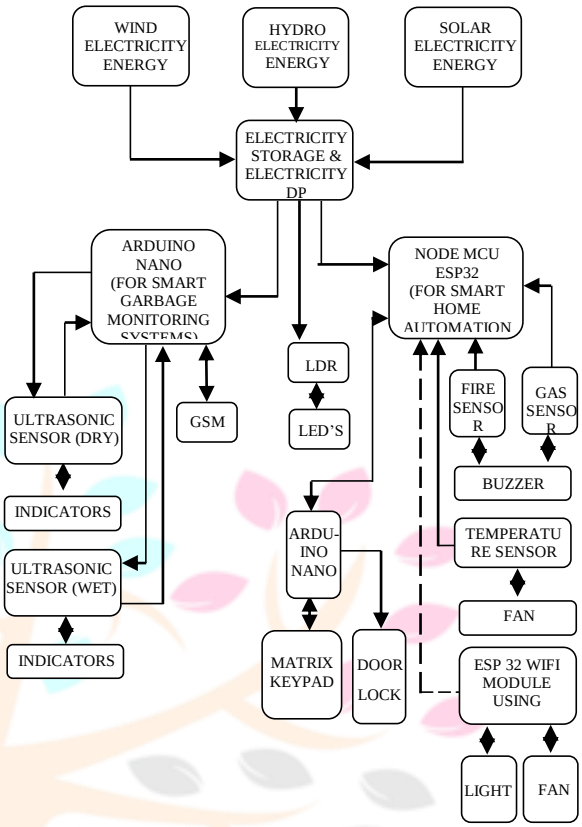

Fig.1.1: Block Diagram of Smart City

❖ HOME AUTOMATION

Home automation refers to the automatic way to control of household appliances, there are various systems used for home automation that is based on different microcontrollers and take different parameters to monitor and control the home appliances. This system providing facility to control of home appliances by IoT sensor and other communication devices efficiently. We can control home appliancesby mobile device.

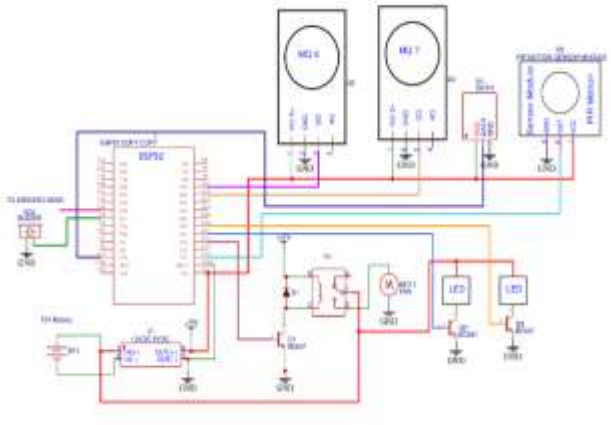

Fig.1.1: Circuit Diagram of Smart Home Automation IOT based

The system is used for controlling various tube lights, fans, home appliances, electrical motors etc are easily controlled by Iot , All these types of systemsbecoming more popular due to its less cost of implementation and provides flexible functionality that can be easily configurableby everyone according to their need that's why all the IoT system are in great demand and have a lot of value because helping peoples like the people having disabilities, as they can't walk more much then this system is very useful to them and also for the patient or for the old aged person that remains mostly on the bed or also beneficialfor the persons that live alone in their hous This project prevents a possible solution whereby the user controls devices by using their existing mobile phone, where control is communication to the microcontroller from a mobile through its Bluetooth interface.

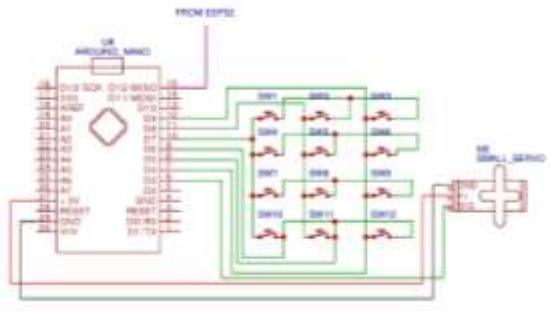

Fig.1.2: Circuit Diagram of Home Door Lock

Here we are automatically handling the home using smart technology.

- Mobile control door lock
- Automatic light on off (by motion detection using PIR sensor)
- Fan control by Android
- Light control by Android
- streetlight pole it is on rood in front of home and also way of home (its need for security/ safety)
- Fire sensor for fire alert system to make safer.
- Room temperature monitoring

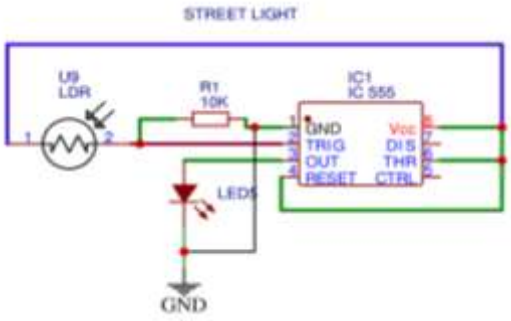

Fig.1.3: Circuit Diagram of Street Light for Home Automation

❖ SMART GARBAGE MONITORING SYSTEM

As the world's population grows at an unprecedented rate that's why more garbage waste is being generated on a daily basis and waste management and proper collection from garbage bins is becoming more and more challenging and important for today's generation. In extreme scenarios, littered garbage causes unhygienic and unhealthy conditions that risk the surrounding areas and communities. Such dangers are witnessedin the form of flooded and leaking dirty waste

containers. The leakage causes

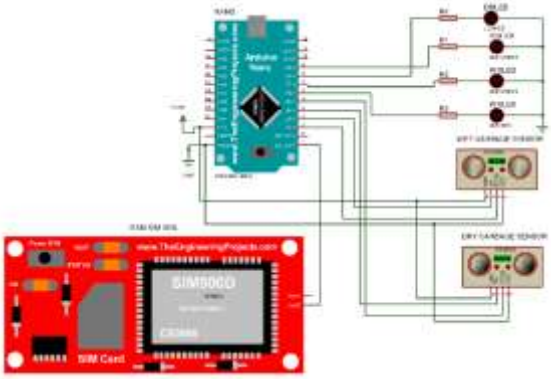

Fig.1.4: Circuit Diagram of Smart Garbage Monitoring System

overflow of garbage waste all around the place making the area dirty and unhygienic.

This results in wastage of vital resources used due to a lack of coordination and keeping an eye on data in clusters and poor infrastructure. IoT based Garbage Monitoring system uses a very innovative system which helps in keeping the city clean.

The Smart Dustbin is an improvement of normal dustbin it works with Arduino NANO, GSM. Sensors and input/output actuators. In this project we used two ultrasonic sensor for sense the Wet garbage and dry garbage, both ultrasonic sensor are connected to the controller and sense the level depth of garbage dustbin continuously, and continuously provide the indication of dustbin level through a indicators, when the dustbin (DRY & WET) is filled the ultrasonic sensor will sense the waste filled in the dustbin and send the sensed data to the arduino nano controller. Controller send the message to the GSM Module (SIM800L). GSM module will send message to the concern authorities person like municipalities, securities etc., as required when dustbin is filled.

❖ **ELECTRIC POWERGENERATION.**

Starts by explaining what hydro, Wind, solar power generation is and its significance as a renewable energy source.

1. The hydro turbine harnesses kinetic energy in the form of flowing water and convert into electrical energy by rotation of turbine and generator motor.

The energy of hydroelectric power has significantly large as compared to other green energy source like solar, wind etc.

2. Wind turbines generates electrical energyon very easy way through the blade and it rotate like a fan wind turbine use wind to generate electricity wind rotates the blade and blades spin the generator which generates the electrical energy.

India has increased its wind power generation capacity through the large amount of installation of wind power generation turbine in ad different areas of where wind flows in speed and in large amount and its electric cost also is less as compared to others.

3. The solar energy is directly proportion tothe sun gives heat energy and solar panelconvert heat energy into electrical energy. The solar panner made by silicon and othersemiconductor material it can absorb theheat energy and convert into electrical energy.

Solar energy is infinity and renewable energy source, and it saves money.

This three solar, wind, & hydro, energy source is generating electricity in low cost keep safe our environment generates green energy.

Which protect us from pollution and keep safe from global warming.

❖ COMPONENTS

5.1 ESP32.
5.2 MQ7 Gas Sensor
5.3 MQ6 Gas Sensor
5.4 DHT11- Temp & Humidity Sensor
5.5 Relay SPDT 5v for Fan
5.6 BC 547 Transistor
5.7 IN4007 DIODE
5.8 PIR Motion Sensor
5.9 I2C 16*2 LCD Display
5.10 12V DC Fan
5.11 LED Light
5.12 Ultrasonic Sensor
5.13 SIM8000L GSM
5.14 Arduino NANO
5.15 4X4 Matrix Keypad
5.16 Servo Motor 9G
5.17 LDR (Light Dependent Resistor)
5.18 555 (Timer IC)
5.19 Resistors
5.20 Battery lithium ion 12V 2000 maH
5.21 Solar Panel
5.22 Jumper Wires

❖ CONCLUSION

In conclusion, the integration of IOT technology into smart city initiatives has shown promising results across three key areas: home automation, garbage monitoring, and reusable energy sources. Through the implementation of smart home devices and systems, residents can enjoy enhanced convenience, comfort, and energy efficiency within their homes. The introduction of smart waste management solutions facilitates more efficient garbage collection and disposal processes, leading to cleaner and healthier urban environments. Additionally, the utilization of renewable energy sources contributes to reducing carbon footprints and promoting sustainability within the city. Overall, the adoption of IOT-based technologies in these domains holds significant potential for improving quality of life, resource management, and environmental sustainability in modern cities.

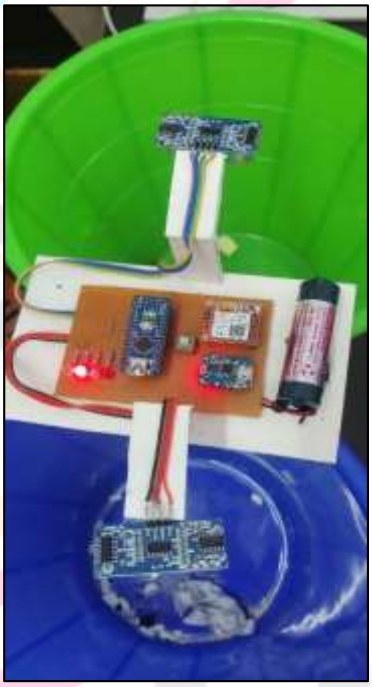

Fig.1.5: Actual Project

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