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Smart City using IOT

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Abstract: *The aim of building a smart city is to civilize the definition life by using technology to improve the capability of services and meet resident's needs. In the smart city, maximum use is made up of ICT(Information and Communication Technology) to improve the functioning, management and supervision of variety of systems and services with an emphasis on saving energy ,water, land and other natural resources and we can also reduce noise pollution ,air pollution and water pollution. In this project we implant combination of five new technologies like smart irrigation system, smart parking, wind power system, automatic railway crossing gate, smart home.*

Keywords: *Smart irrigation, Smart parking, Wind power system, Automatic railway crossing gate, Smart home.*

I. INTRODUCTION

The vision of the building smart city to improve the quality of city and add the new technology's in the city. Due to this technology improve the transport system, energy use, health and air quality or to drive economic growth. Smart city is the information and communication technology which is used create efficiencies, improve sustainability, create economic development, and enhance quality of life factor for people living and working in the city. In this smart city project we used various types of electronics methods and sensors to collect data. During dry period, irrigation may need to preserve landscape quality. Over or under irrigation a landscape can possibly increase diseases incidence, waste water and decrease over landscape condition. Water can be saved using smart irrigation. Smart parking contributes to cleaner environment, reduce the time that is necessary to find a parking spot .It will reduce amount of fuel that is used when looking for a parking space. This will reduce air pollution. Because of smart parking it reduces the traffic and help to improve the safety.

In the wind power system we use the proper air to generate the electricity. It is best way to generate the electricity. It has low maintenance required low space. It is developed on hilly areas. In automatic railway crossing we reduce the man power. It improves the safety. Automatic railway gate control system reduces the time which is required to close the gate is less as compared to manually operate. Automatic railway gate control system is used to prevent accidents at the railway crossing track. When you enter in your house light get switch on automatically. When we show the hand towards tap it will provide water. The purpose of smart home is to increase the security. Using assistant we can turn on all electronic application.

II. SCOPE AND RELEVANCE

In future, smart city technologies are likely to expand in scope and revolutionize areas such as healthcare, education and policing, while also supporting the growth and development of engaged residents capable of understanding and utilizing digital solutions and services smart citizens. A smart city uses the internet of things (IOT), data, and technology to streamline services to make a city more connected, efficient, manageable, and cost effective. Smart cities drive innovation, have connected residents, optimize governance, and make better use of precious resources. It's an advance city which is outfitted with high- tech communication capabilities. it is developed by using digital technology also to enhance the performance and its wellbeing and to reduce the costs and resources consumption and engage more effectively and actively with its citizens.

Our honourable prime minister of INDIA SHRI NARENRA MODI initiated "digital India" scheme where some cities will be converted into smart cities where smart grid will be implemented to materialize the smart city into reality. it is risky because to financial development and regulations.

III. LITERATURE REVIEW

Dr. K. S. Kennan, Dr. P. Devadalan and P. Deepa [1] have presented A 'SMART CITY' is a urban district that is profoundly cutting-edge regarding foundation, manageable land, correspondences and market reasonability. It is a city where data innovation is the important framework and the reason for giving fundamental administrations to occupants. There are numerous mechanical stages included, including however not restricted to mechanized sensor systems and server farms. The idea of shrewd urban communities started when the whole world was confronting one of the most noticeably awful monetary emergencies. In 2008, IBM started chip away at a 'more intelligent urban communities' idea as a feature of its Smarter Planet activity. Start of 2009, the idea had enthralled the creative ability of different countries over the globe.

YIN Chan Tao, XIONG Zhang, CEN Hui, WANG Jing Yuan, COOPER Dave and DAVID Bertrand [2] have proposed an understanding of the definition of a smart city is vital to be able to understand its scope and content. As was demonstrated in Section 1, a concrete definition of a smart city is still emerging, and various definitions have been given by stakeholders from several different standpoints. It is difficult to formalize the definition, because the smartness of a city can be as simple as a single function provided to a certain group of citizens, or as complicated as an entire administration processed presenting the restructuring efforts of a government procedure.

Abdulrahman Alkandari and Meshal alnasheet [3] have proposed a smart city is one that uses a smart system characterized by the interaction between infrastructure, capital, behaviours and cultures, achieved through their integration. From our survey of the smart city concept by reading recent papers in this field, we found no uniform concept of the smart city; some papers discussed it as a general case study, while others dealt with specific parts. This paper is a survey of a number of articles, which we divided into two categories. General case study, which covers the topic of smart city in a general framework, and 2-Specific case study, which covers the topic of the smart city from a specific detailed application, such as Traffic Management System, Smart Grid and Wireless Technology. The results of our research show that the information of communication technology (ICT) covers all areas on smart cities such as government facilities, buildings, traffic, electricity, health, water, and transport. Until now there is no unique definition for smart cities, most of researcher define the smart city form their needs or prospective.

Prof. Rahul Wantmure and Dr. Murlidhar Dhanawade [4] have proposed Indian cities and cities around the world are gradually evolving. It is not a sudden decision with planned infrastructure in advance. The concept of Smart City has suggested in a planned city, with such impact that each activity carried out in the city is supervised and controlled by technology. Internet of things is an emerging technology in the IT world that can be explored to its zenith to achieve the goal of building a smart city. Building alone is not enough, but to maintain and sustain their identity. The integrity and authenticity is another task to be processed and implemented. Koushalya Bijjaragi and Poonam Tijare [5] have proposed as the volume of traffic is increasing day by day, it becomes difficult to store and process such large data sets using traditional software. A set of storage devices for storing such vast amounts of data and also a parallel computing model for the analysis of those huge data entries is needed. Hardtop is one such framework that provides reliable cluster storage facility, which stores large amounts of data in a distributed manner using a special file system, called system distributed Hardtop files and provides functions for efficient parallel processing through framework Map Reduce. In Map Reduce filtered data traffic can be easily recovered, to provide end users with traffic analysis and provide useful predictions.

R. D. Patil and Omprakash S. Jadhav [6] have proposed Big Data is a popular topic in the research. Everyone is talking about large volumes of data, and it is believed that science, business, industry, government, society, etc. will undergo a change through the impact of big data. Big is used to refer to very large data set that is bigger, more complex, hidden pattern, nature structured and unstructured data with difficulties in collecting, storage, process analysis or result. This paper also presents a review of various advanced statistical techniques for handling the key application of big data have large data set. These advanced techniques handle structure as well as unstructured big data in different area.

IV. OBJECTIVES OF PROPOSED WORK

The main objectives of proposed system are as follows:

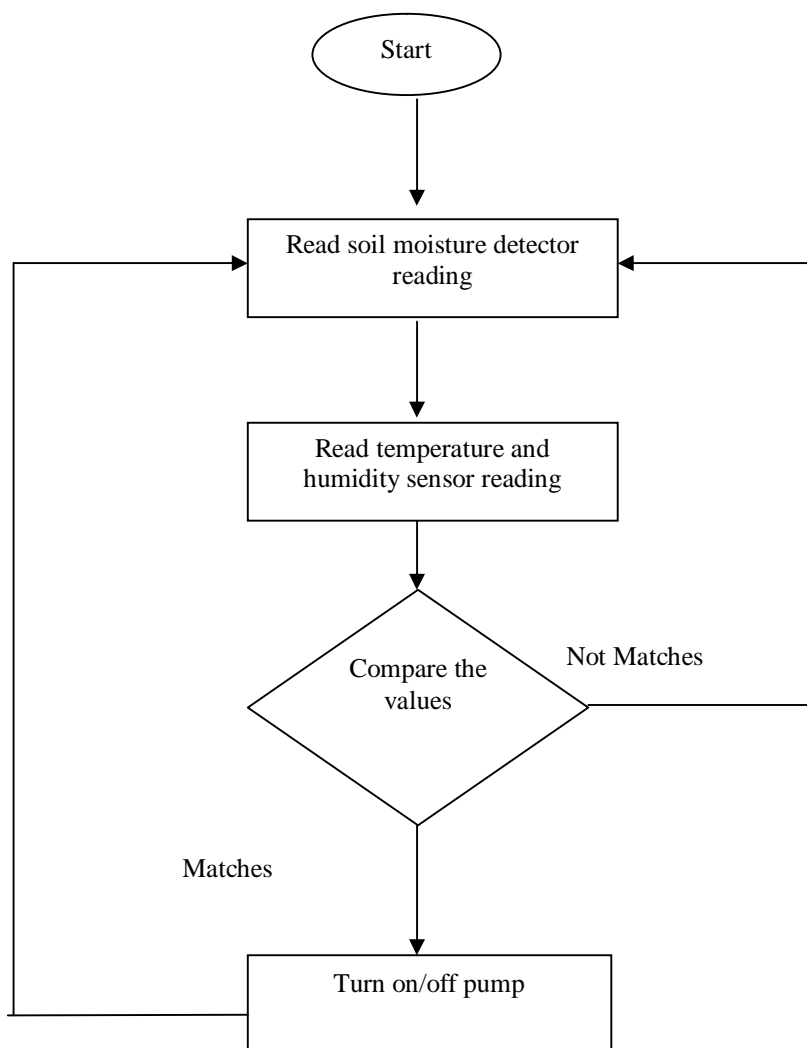
- A. Improving the governance in the city making governance citizen- friendly and cost effective- increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without visiting offices.
- B. Improving the citizen services and infrastructure.
- C. Housing and basic sanitation facilities.
- D. Reduce congestion on roads air pollution and resource depletion, boost local economy, promote interactions and ensure security.

V. METHODOLOGY

The smart city concept integrates information and communication technology (ICT), and various physical devices connected to the IOT network to optimize the efficiency of city operations and services and connect to citizens. Smart city technology allows city officials to interact directly with both community and city infrastructure and to monitor what is happening in the city and how the city is evolving. ICT is used to enhance quality, performance and interactivity of urban services, to reduce costs and resource consumption and to increase contact between citizens and government.

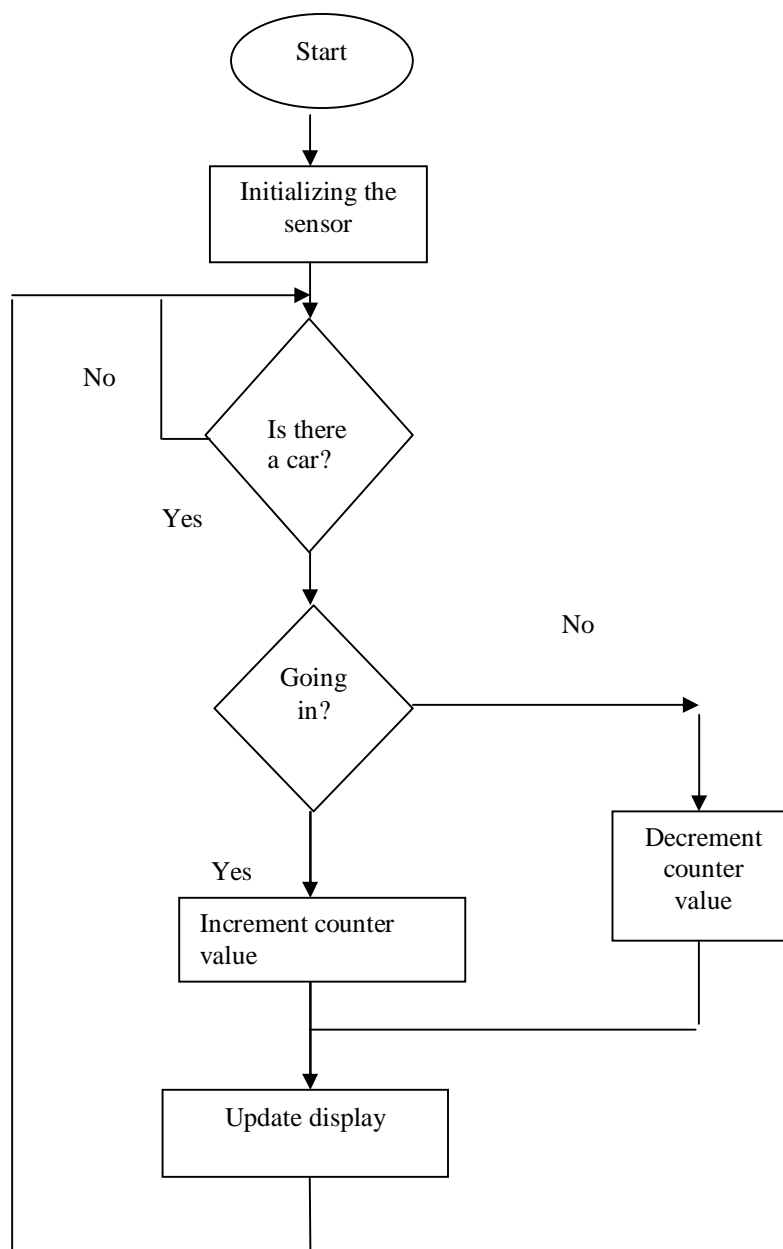
Smart city applications are developed to manage urban flows and allow for real-time responses. A smart city may therefore be more prepared to respond to challenges than one with a simple "transactional" relationship with its citizens. Yet, the term itself remains unclear to its specifics and therefore, opens to many interpretations.

A. Flow Chart for smart irrigation system



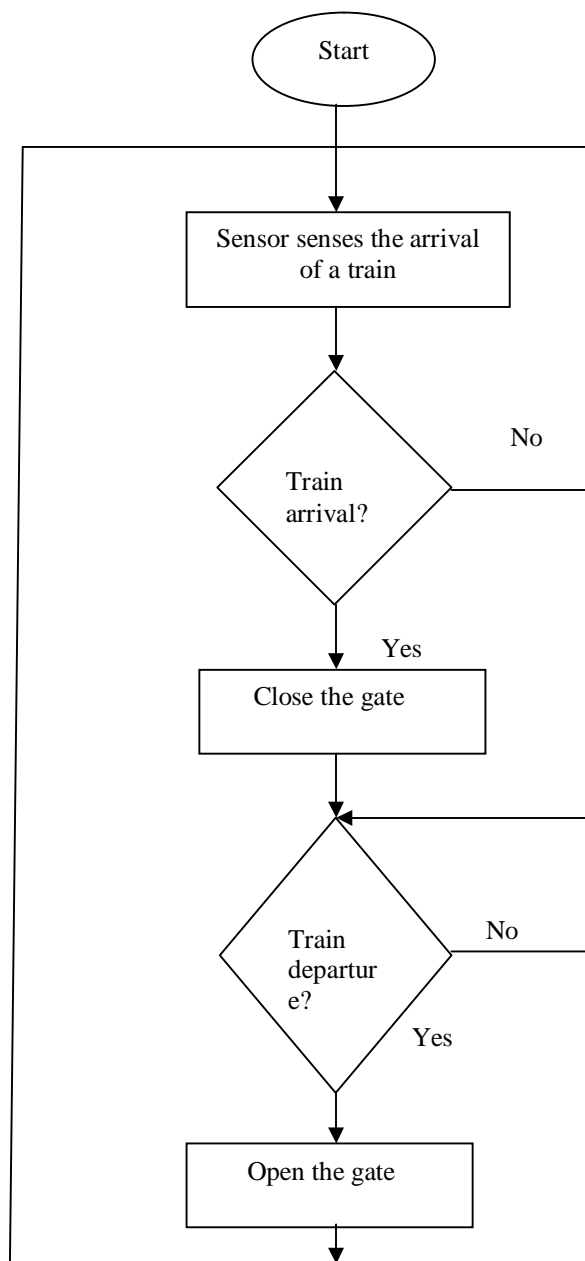
Flowcharts are used for used in designing and documentation of process and programmes. Above flow chart shows the working of smart irrigation system we use to create circuit Adriano UNO board, GSM module, Connecting Wires, Transistors, Power supply, Relay, Pump, Soil moisture sensor, Resistors, Terminal connector, Voltage regulation, 16x2 LCD display, etc. First step motor start with the help of input controls also motor starts running. Next step read soil moisture detector reading then read temperature and humidity sensor reading and compare the values and turn off or on the pump.

B. Flow Chart of Smart Parking



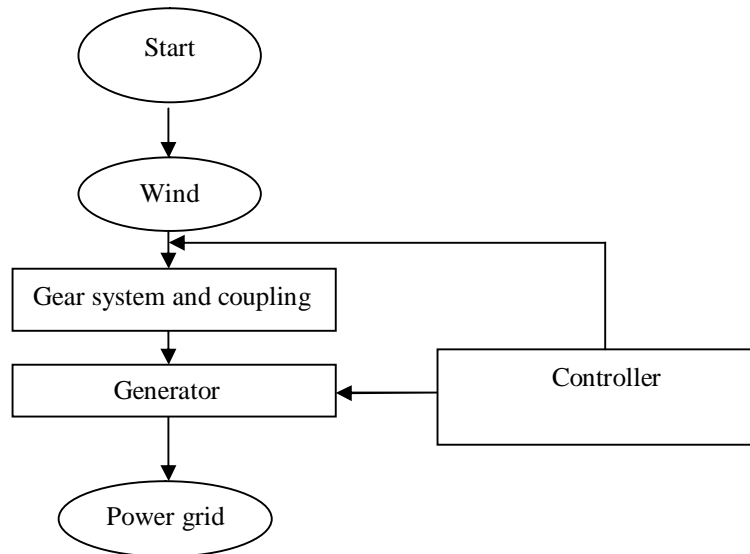
Above shows flow chart of the smart parking it involves two IR sensors, two servos motor and one ultrasonic sensor, etc. first step is the start the system in entry while entering the bike or car is noticed by the sensor. Firstly the outer sensor and then inner sensor. The count increases the result is shown in the display. In exit in this case firstly the inner sensor notices and then the outer sensor the count decreases and result is shown on display. Two servos motor will act as entry and exit gate and they rotate to open or close the gate. Finally an ultrasonic sensor is used to detect if the parking slot is available or occupied and send the data to ESP8266 Accordingly.

C. Flow Chart On Automatic Railway Crossing



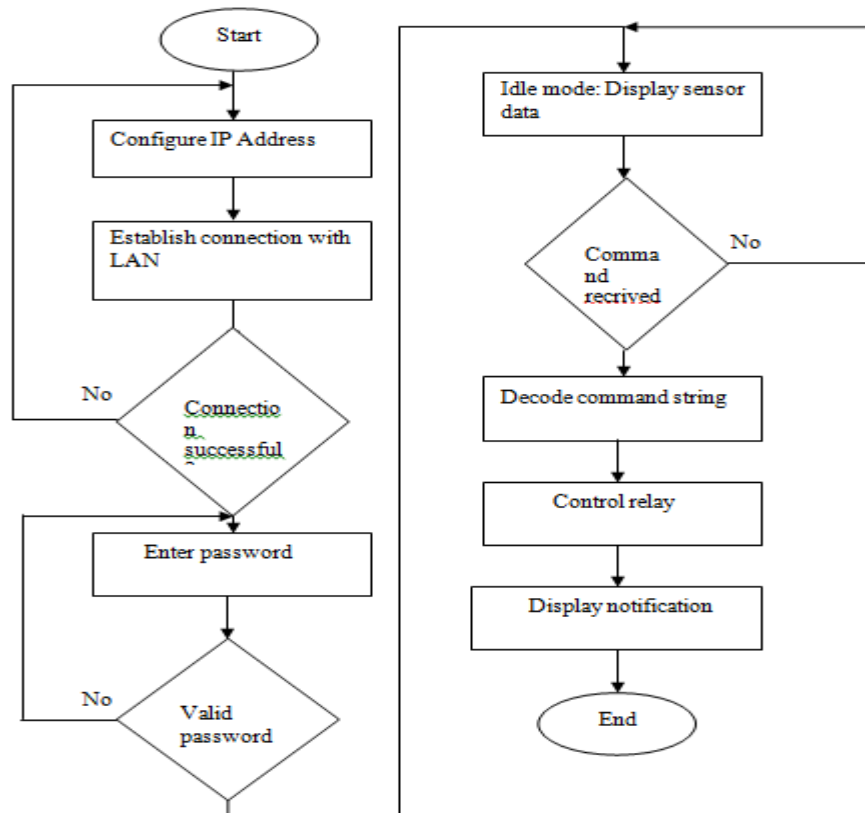
Above shows flow chart of automatic railway crossing gate it involves two IR sensors, Buzzer, Arduino NANO V3, one switch, motor, etc. First start the overall system the sensor senses the arrival of a train then train arrival and gate is to be close next the sensor sense the departure train then train departure and open the gate. An Automatic railway gate control is implemented with very simple hardware and easy control. Human intervention at level crossings can be removing with the help of this project and many railway level crossing accidents can be prevented. Automatic gate control system with high speed alerting system is an innovative circuit which automatically controls the operation of railway gates detecting the arrival and departure of trains at the gate.

D. Flowchart of Wind Power Plant



Above shows flow chart of wind power plant system in this system we use Drive train, Generator, Controller, power grid, etc. wind energy is the use of wind to provide mechanical power through wind turbines to turn electric generators for electrical power. Wind power is a popular sustainable, renewable source of power that has a much smaller impact on the environment compared to burning fossil fuels. Wind farms connected to many individual wind turbines, which are connected to the electric power transmission network. The wind is an intermittent energy source, which cannot be dispatched on demand. Locally, it gives variable power, which is consistent form year to year but varies greatly over shorter time scales. The shaft of the turbine is coupled with an electrical generator. The output of the generator is collected through electric power cables.

E. Flowchart of Smart Home



Above fig shows the flowchart of smart home which are based on various microcontrollers, arduino, raspberry pi, etc. First, user need to configure the IP address of SHCS and key in the IP address at the web browser. For the SHCS prototype, it is connected to the university's network router which is a dynamic and private IP address. Next, user need to key in the password to access the main page. The website is kept in idle mode and refreshed in every 1 second (configurable) so that it can be updated with the current sensor reading. Lastly, a command string is decoded if the user enters a command key. The command is interpreted in microcontroller and HIGH or LOW output is produced to the relay circuit. The relay circuit enables a low voltage Arduino to control the high voltage home appliances HC-05 and a 3-channel relay board. The number of channels depends on the number of appliances you wish to control. Arduino Uno is powered with a 12V DC adaptor/power source. The relay module and Bluetooth module can be, in turn, powered using a board power supply of Arduino Uno.

VI. BLOCK DIAGRAM OF SMART CITY USING IOT

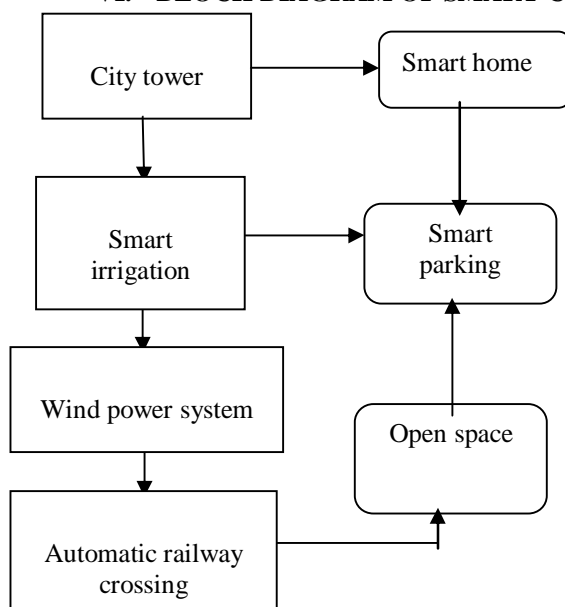


Fig.1 Block Diagram of smart city using IOT

VII. DESIGN STEPS

- 1) Step 1: Designing of block diagram of the system & selection of components.
- 2) Step 2: Interfacing of electronics method and sensors.
- 3) Step 3: Interfacing of Arduino board Wi-Fi module.
- 4) Step 4: Utilization of coding and IOT based sensor.
- 5) Step 5: Designing the overall smart city or model.
- 6) Step 6: System Implementation
 - a) Completion of the hardware part.
 - b) Coding.
 - c) Testing of an overall system.

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