

# Digital Transformation of Modern Village using ESP32 Microcontroller

Merugu Anvitha<sup>1</sup>, Boda Nikitha<sup>2</sup>, Parimi Naveen kumar<sup>3</sup>, Pathange Naresh kumar<sup>4</sup>, Vadla Amulya<sup>5</sup>

[Font: Times New Roman, Size:11]

<sup>1,2,3,4</sup> Student, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College

<sup>5</sup> Assistant Professor, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College

**Abstract**—Now a day by the initiative taken by the Government of India in the scheme of “Smart India”, all villages will soon transfer to Smart Villages. This will be achieved by the Information Technology Platforms. For converting the Villages to Smart Villages, the Internet of Things (IoT) plays a major Role in India. By using IoT everything in the village is connected to the Internet and it is controlled by the users anywhere by remotely. In our project we have taken the problems in Smart Garbage System and Smart Water Level Controller to distribute water from the common tank to all users. In Garbage System the wet and dry waste is identified separately and it regularly monitored whether the tank is full, then information given to municipality to clean that concern Garbage. In water level controller the utilization of water from common tank is controlled and managed by using the mobile application. Keep tracking of water level in the tank by float sensor and based on the water level it will be distributed to the users. The domestic public users also controlled by the user defined commands which is intercepted with the home of particular user.

**Index Terms**— ESP32 Microcontroller, Blynk App

## I. INTRODUCTION

Village equipped with all the modern technology without destroying the nature can be defined as smart village. The system consists of centralized microprocessor interfaced with many sensors for making the villages cleaner and smarter. The system aims to bring smartness in four different aspects of any village such as digital display of the government subsidies and offers to farmers, smart garbage management, intensity-based street light monitoring and digital water supply system. The internet of things (IOT) is recent communication paradigm that envisions a near future in which the

objects of everyday life will be equipped with micro-processor, 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.

Agriculture Field plays a major role in Agriculture were all the crops are grown. To sense the soil, a soil moisture sensor is used. Soil moisture sensors measure the volumetric water content in soil. It measures the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity.

Smart Village is an application of advanced technology in agriculture which solves a series of technical hurdles in information technology for wide area, efficient and reliable data transmission under integrated system. It acts as a catalyst for the transition from traditional proactive farming to modern farming, providing opportunity for creating new technology and service development in IoT for farming application. This paper presents an intelligent monitoring platform framework and system structure facilitating the agriculturally based ecosystem under IoT (Internet of Things).

The complete system consists of three subsystems, viz. the GSM module, sensor units and M2M based Cloud Computing.

## II. LITERATURE SURVEY

This paper elucidates the research and implementation of IoT based Smart Village. IoT (Internet of Things) is a structure which provides an exclusive identity and ability to relocate the data over a network without requiring two-way handshaking from human-to-human. It enables the path to connect anytime, anywhere, with anything and anyone ideally using any network topology with a specify service. Hence the divergence on the scenario of a Smart Globe has emerged to mean many things to many people. Meaning of “Smart” utilizes sensitive information and communications technology (ICT) remains consistent with the Internet Technologies to address rural challenges. To bifurcate the ideal scenario on the basic occupation of agriculture, the ecosystem control technology and system becomes mature having high level of intelligence. This puts precise significance on efficiency, high-quality, secure and sustainable production of facility agriculture. That makes a glance of a smart irrigation as a smart farming, ultimately converging into a “Smart Village”. This is all about the outsourcing application, technology and wonders of IoT (Internet of Things). The purpose of this project is the creation of a Smart Village. Model of a smart village following the concept of a smart city is presented in this manuscript as the effect of integrated technological changes which can be realized in a place which has none. Thus, a remote and isolated village location is chosen where the modern civilization has not touched. The design makes the village self-sufficient with respect to electric power, water supply, street lighting, security, education and communication. Application of non-conventional methods of energy generation is the key for betterment as discussed. Renewable and non-polluted power is generated from solar heat. The heat energy is captured and stored in water for use at night and in absence of sun. Internet of Things (IOT) is controlling embedded devices through Internet. Energy efficient street lamps with controlled light

intensity as per the requirement have been designed. Water is provided to houses in cold and hot forms. Computers, mobile application for individual. And educational places will enrich the place. Many sensors were used to detect the input and produce the following output. Village equipped with all the modern technology without destroying the nature can be defined as smart village. The number of villages where proper and immediate care is not taken against abnormalities like garbage overflow, water supply problems, checking quality of water, the digital display of government offers and subsidies and also against electrical issues like street light monitoring. Using the proposed system, the problems can be solved. The proposed system also aims at internet of Things (IOT) is a recent communication paradigm that envisions a near future, in which the objects of everyday life will be equipped with microcontrollers, 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.

In the above-mentioned papers, we notice different studies that emphasize on the need to be able to manage the amount of waste being generated and what percent of people actually take up the responsibility and take steps to ensure this. Also, we can see how IOT modules are used to detect or track the waste for different waste bins or locations to be specific. We can also observe how with the use of IoT we can communicate between different devices and provide better solutions. From and we can observe that a major percentage of waste is generated by building in different forms. This tends to put forward a simple observation that a very minor percentage of people actually take up the responsibility and regulate the amount of waste being generated from these main sources. Therefore, this issue needs a proper solution. In and we can see how the IR sensors placed at appropriate position and ideal conditions can help detect the level of the waste generated and so be used to detecting the amount generated and equally take action on the same. Also, in we can observe that minimal number of sensors placed at appropriate places can prove cost effective and very efficient but still a way for proper real time notification is

not present. The paper explains us how the Wi-Fi chip can be used to communicate between different devices and therefore bring about many solutions in embedded systems. Therefore, our literature survey identifies. Need for solution to manage the amount of waste generated by buildings and other large sectors. International Journal of Pure and Applied Mathematics Special Issue128.

### III. EXPERIMENTAL METHODOLOGY

The circuit is an approach to obtain both 12V and 5V DC power supply. The circuit uses two ICs 7812(IC1) and 7805 (IC2) for obtaining the required voltages. The AC mains voltage will be stepped down by the transformer T1, rectified by filtered by capacitor C1 to obtain a steady DC level. The IC1 regulates this voltage to bridge B1 and obtain a steady 12V DC. The output of the IC1 will be regulated by the IC2 to obtain a steady 5V DC at its output. In this way both 12V and 5V DC are obtained. Such a circuit is very useful in cases when we need two DC voltages for the operation of a circuit. The LM78XX series of three terminal positive regulators are available in the TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current.

### IV MODELING ANALYSIS

The main aim of our project is to sense or detect the garbage in our surroundings. Here we are using IR sensor and Moisture sensor. In our daily life we are having dry wastage and wet wastage. In order to detect the wet waste, we are using moisture sensor and IR sensor is used to detect the dry waste. The total system is based on ESP32 Microcontroller. All the functions required for garbage detection can be done in ESP32 Microcontroller. Once, the garbage is detected it gives a message to authorized person through Blynk app. Through this Blynk app we can know that garbage is detect.

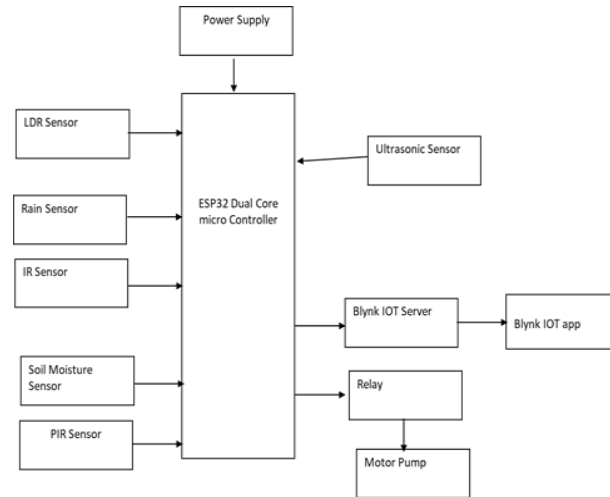
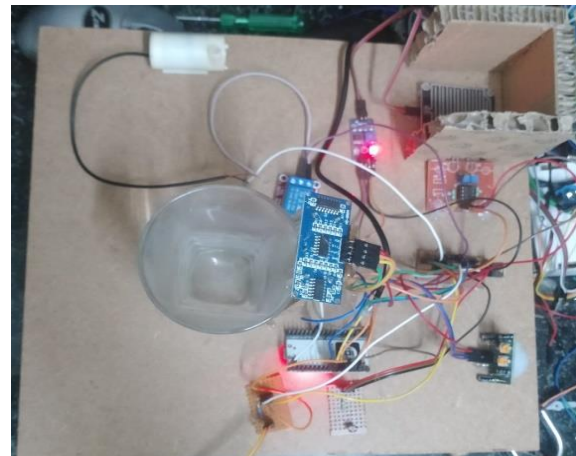


Fig: Hardware Block Diagram

### V. RESULT & DISCUSSION

This project has proposed the idea of smart village that can support a lot of automation systems. Technology has great impact in everyone's everyday life. This survey describes various methodologies used in automation system to control and access the systems remotely through Internet services anywhere anytime. Several unlock issues related to privacy and security needs to be focused for future Internet of Things.

Securing data, data management and privacy of every user plays a key role in the challenges of Internet of Things. Smart village are huge system that can includes multiple technologies and applications that can be used to provide security and control of home easily.



## VI. CONCLUSION

Internet of things serves as powerful, reliable and cost effective technology to implement the idea of smart village that aims to empower villages with advance rural connectivity through web service. Measurement of environment factors of soil moisture, temperature, humidity, and implementation of cloud computing along with real time monitoring using IOT system.

## REFERENCE

- [1] Vikrant Bohr, Pankaj Moraka, Maheshwar Gurav, Dishant Pandya, "Smart Garbage Management System", March 2015.
- [2] S.S. Navghane, M.S. Killedar, Dr.V.M. Rohokale," IoT Based Garbage and Waste Collection Bin", May 2016.
- [3] Ghose, M.K., Dikshit, A.K., Sharma, S.K. "A GIS based transportation model for solid waste disposal A case study on Asansol municipality. Journal of Waste Management", April 2015.
- [4] Dr.N. Sathish Kumar, B. Vijayalakshmi, R. Jenifer Prarthana, A. Smart Garbage alert system using Arduino 2016.
- [5] A.Ohri and P. K. Singh, Development of decision support system for municipal solid waste management in India: A review, international journal of environmental science, June 2016.
- [6] Kanchan Mahajan, Waste Bin Monitoring System Using Integrated Technologies, International Journal of Innovative Research in Science, July 2014.