|  |  |  |
| --- | --- | --- |
| **D:\PROJECT\rabiproject\DOCUMENT\images.jpg** |  | **docu0005** |

**SMART AGRICULTURE MONITORING SYSTEM**

**BASED ON INTERNET OF THINGS**

**A PROJECT REPORT**

***Submitted by***

**ANURAAG. K (211414205012)**

**ARAVINTH. V (211414205014)**

**ARUN DAVID. M (211414205016)**

**ARUN. E (211414205015)**

***in partial fulfillment for the award of the degree***

***of***

**BACHELOR OF TECHNOLOGY**

***in***

**INFORMATION TECHNOLOGY**

**PANIMALAR ENGINEERING COLLEGE, POONAMALLEE**

**ANNA UNIVERSITY : CHENNAI 600 025**

**APRIL 2018**

**ANNA UNIVERSITY: CHENNAI 600 025**

**BONAFIDE CERTIFICATE**

Certified that this project report **“SMART AGRICULTURE MONITORING SYSTEM based on IoT”** is the bonafide work of “**ANURAAG. K (211414205012), ARAVINTH. V (211414205014), ARUN. E (211414205015), ARUN DAVID. M (211414205016)”** who carried out the project under my supervision.

**SIGNATURE SIGNATURE**

**Dr. M. HELDA MERCY M.E., Ph.D., Mr. P. V. RAO M.E,. (Ph.D.,)**

**HEAD OF THE DEPARTMENT SUPERVISOR**

Assistant Professor

Department of Information Technology Department of Information Technology

Panimalar Engineering College Panimalar Engineering College

Poonamallee, Chennai - 600 123 Poonamallee, Chennai - 600 123

Submitted for the project and viva-voce examination held on \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SIGNATURE SIGNATURE**

**INTERNAL EXAMINER EXTERNAL EXAMINER**

**DECLARATION**

I hereby declare that the project report entitled “**SMART AGRICULTURE MONITORING SYSTEM BASED ON IOT**” which is being submitted in partial fulfilment of the requirement of the course leading to the award of the ‘Bachelor Of Technology in Information Technology’ in **Panimalar Engineering College, Affiliated to Anna University- Chennai** is the result of the project carried out by me under the guidance and supervision of **Mr. P. V. Rao, M.E., (Ph.D.) Assistant Professor in the Department of Information Technology**. I further declared that I or any other person has not previously submitted this project report to any other institution/university for any other degree/ diploma or any other person.

Date**:**

Place**:** Chennai (ANURAAG. K)

(ARAVINTH.V)

(ARUN DAVID. M)

(ARUN. E)

It is certified that this project has been prepared and submitted under my guidance.

Date: (**Mr. P. V. RAO M.E., (Ph.D.))**

Place: Chennai (Supervisor)

**ACKNOWLEDGEMENT**

A project of this magnitude and nature requires kind co-operation and support from many, for successful completion . We wish to express our sincere thanks to all those who were involved in the completion of this project.

Our sincere thanks to **honorable Founder and Chairman Dr. JEPPIAAR, M.A., Ph.D.,** for his sincere endeavor in educating us in his premier institution.

We would like to express our deep gratitude to **Our Beloved Secretary and Correspondent, Dr. P. CHINNADURAI, M.A., Ph.D.,** for his kind words and enthusiastic motivation which inspired us a lot in completing this project.

We also express our sincere thanks to **Our Dynamic Directors Mrs. C. VIJAYA RAJESHWARI and Mr. C. SAKTHI KUMAR, M.E.,** for providing us with the necessary facilities for completion of this project.

We also express our appreciation and gratefulness to **Our Principal Dr. K. MANI, M.E., Ph.D.,**  who helped us in the completion of the project. We wish to convey our thanks and gratitude to our head of the department, **Dr. M. HELDA MERCY, M.E., Ph.D.,** Department of Information Technology, for her support and by providing us ample time to complete our project.

We express our indebtedness and gratitude to our staff in charge, **Mr. P. V. RAO**, **M.E., (Ph.D.)** Assistant Professor, Department of Information Technology for his guidance throughout the course of our project. Last, we thank our parents and friends for providing their extensive moral support and encouragement during the course of the project.

**TABLE OF CONTENTS**

|  |  |  |
| --- | --- | --- |
| **CHAPTER NO.** | **TITLE** | **PAGE NO** |
|  | **ABSTRACT** | viii |
|  | **LIST OF TABLES** | ix |
|  | **LIST OF FIGURES** | x |
|  | **LIST OF ABBREVIATIONS** | xii |
| **1** | **INTRODUCTION** | **1** |
|  | 1.1. OVERVIEW OF THE PROJECT | 1 |
|  | 1.2 NEED FOR THE PROJECT | 2 |
|  | 1.3 OBJECTIVE OF THE PROJECT | 2 |
|  | 1.4 SCOPE OF THE PROJECT | 2 |
| **2** | **LITERATURE SURVEY** | **3** |
|  | 2.1 A System for precision irrigation using sensor network. | 3 |
|  | 2.2 A remote sensing and control irrigation system using distributed wireless sensor network. | 3 |
|  | 2.3 A Wi-Fi based smart sensor network for agricultural environment. | 4 |
|  | 2.4 A ZigBee based smart sensing platform for monitoring environmental parameters.  2.5 Feasibility Study | 5  5 |
| **3** | **SYSTEM DESIGN** | **8** |
|  | 3.1 PROPOSED SYSTEM ARCHITECTURE DESIGN | 8 |
|  | 3.2 DATA FLOW DIAGRAM FOR PROPOSED SYSTEM  3.3 UML DIAGRAM FOR PROPOSED SYSTEM | 17  19 |
|  | 3.4 MODULE DESCRIPTION | 24 |
|  | 3.4.1 Wi-Fi Module | 24 |
|  | 3.4.2 Digital Sensing components | 26 |
|  | 3.4.3 Analog Sensing component | 29 |
|  | 3.4.4 Microcontroller  3.4.5 Data Reception and alert processing  3.4.6 Cloud Storage | 29  31  31 |
| **4** | **REQUIREMENT SPECIFICATION** | **32** |
|  | 4.1 HARDWARE REQUIREMENTS | 32 |
|  | 4.2 SOFTWARE REQUIREMENTS | 32 |
|  | 4.2.1 Features Of Arduino IDE | 32 |
|  | 4.2.2 Features Of Proteas simulation | 32 |
|  | 4.2.3 Features of MySql  4.2.4 Features of Dreamweaver  4.2.5 Features of Wamp | 32  33  33 |
| **5** | **IMPLEMENTATION** | **34** |
|  | 5.1 SAMPLE CODE | 34 |
|  | 5.2 SAMPLE SCREEN SHOTS | 39 |
| **6** | **TESTING AND MAINTENANCE** | **47** |
|  | 6.1 WHITE BOX TESTING | 47 |
|  | 6.2 BLACK BOX TESTING | 47 |
|  | 6.3 UNIT TESTING | 48 |
|  | 6.4 REGRESSION TESTING | 48 |
|  | 6.5 INTEGRATION TESTING | 48 |
|  | 6.6 SMOKE TESTING | 49 |
|  | 6.7 ALPHA TESTING | 49 |
|  | 6.8 BETA TESTING  6.9 TEST CASES AND RESULTS | 49  50 |
| **7** | **CONCLUSION AND FUTURE ENHANCEMENTS** | **52** |
|  | 7.1 CONCLUSION | 52 |
|  | 7.2 FUTURE ENHANCEMENT | 52 |
|  | **REFERENCES**  **APPENDIX** | **54**  **56** |

**ABSTRACT**

This is the project from the motivation of the farmers working in the farm lands are solely dependent on the rains and bore wells for irrigation of their land. In recent times, the farmers have been using irrigation technique through the manual control in which the farmers irrigate the land at regular intervals by turning the water-pump ON/OFF when required. The project mainly runs on the platform of Internet of Things (IoT). It means that all the collected data will send to Arduino Uno board and it sends to Web portal (Online view) through Wi-Fi. This monitoring can be done through any devices like Mobile, Tab, Laptops and PCs.

**LIST OF TABLES**

|  |  |  |
| --- | --- | --- |
| **Table No.** | **Name of the Table** | **Page No.** |
| 3.1  3.2 | Key parameters of ATmega328 microcontroller  Recommended operating conditions | 10  25 |
| 6.1 | Testing conditions | 50 |
|  |  |  |

**LIST OF FIGURES**

|  |  |  |
| --- | --- | --- |
| **Figure No.** | **Name Of the Figure** | **Page No.** |
| 3.1 | Proposed System Architecture | 8 |
| 3.2 | ATmega328 microcontroller | 9 |
| 3.3 | PIR sensor | 11 |
| 3.4 | PIR sensor PIN diagram | 12 |
| 3.5 | pH level sensor | 12 |
| 3.6 | pH level sensor PIN diagram | 13 |
| 3.7 | Water level sensor | 15 |
| 3.8 | Humidity sensor | 15 |
| 3.9 | Level 0 - Soil Moisture sensing and updating | 17 |
| 3.10 | Level 1 - Soil moisture and Humidity level updating | 17 |
| 3.11 | Level 2 - PIR Sensor Updating | 18 |
| 3.12 | Level 3 - pH level updating | 18 |
| 3.13 | UML Use Case Diagram | 19 |
| 3.14 | UML Class Diagram | 19 |
| 3.15 | UML Activity Diagram 1 | 20 |
| 3.16 | UML Activity Diagram 2 | 20 |
| 3.17 | UML Activity Diagram 3 | 21 |
| 3.18 | UML Activity Diagram 4 | 21 |
| 3.19 | UML Sequence Diagram | 22 |
| 3.20 | UML Deployment Diagram | 23 |
| 5.1 | Humidity at normal level | 39 |
| 5.2 | Humidity level when changed | 39 |
| 5.3 | Reading before Temperature Change | 40 |
| 5.4 | Increase in Level of Temperature | 40 |
| 5.5 | No detection in Obstacle | 41 |
| 5.6 | Detection of an obstacle | 41 |
| 5.7 | pH at normal level | 42 |
| 5.8 | pH at “1” when urea is low | 42 |
| 5.9 | Water not present in the soil | 43 |
| 5.10 | Water present in soil | 43 |
| 5.11 | Working of Motor and alert system | 44 |
| 5.12 | pH Sensor and its A/D convertor | 44 |
| 5.13 | Working of Water Level sensor | 45 |
| 5.14 | Working of Wi-Fi module | 45 |
| 5.15 | Correlation of ATmema328 microcontroller | 46 |

**LIST OFABBREVATIONS**

IoT Internet of Things

M2M Machine-to-Machine

GPS Global Positioning System

UART Universal Asynchronous Receiver Transmitter

RF Radio Frequency

SMS Short Message Service

PIR Passive Infrared Sensor

ESP Espressif

DHT Digital Humidity and Temperature

AVR Alf and Vegard’s RISC processor

ISP Internet Service Provider

EEPROM Electrically Erasable Programmable Read Only Memory

SRAM Static Random Access Memory

I/O Input/output

USART Universal Synchronous Asynchronous Receiver Transmitter

SPI Serial Peripheral Interface

A/D Analog/Digital

TQFP Thin Quad Flat Package

QFN Quad-Flat No-leads

MLF Micro-Lead Frame

MIPS Microprocessor without Interlocked Pipeline Stages

USB Universal Serial Bus

NTC Negative Temperature Coefficient