# IWUNZE KELECHI

DIVINE

18/ENG05/023ENG 224 ASSIGNMENT

The name of my application is the DIVINE automated Irrigation machine, this application has the ability to read the temperature of the soil, determine the moisture content, detect and alarm lack of water in the tank for irrigation.

My design is based on the software development cycle which is ;

PLANNING ANALYSIS DESIGN IMPLEMENTATION TESTING MAINTENANCE.

The cycle of creation of my application starting from the PLANNING; The DIVINE automated irrigation app was created from dire need to improve the ABUAD farm and solve the irrigation problem. My application is aimed at creating a program that will eradicate the irrigation problem in the farm, create a device that will precisely detect the temperature and also determine water levels. It is also secured so it can only be accessed.

ANALYSIS; I had thousands of bytes of data analysis which I integrated into my algorithm design which include;

**.** The average temperature of soil (to determine when the soil is getting dry because the warmer the soil is the dryer) which is between 65-75 F.

**.** Time period the soil needs regular moisture circulation for health nourishment.

**.** Night and day temperatures.

**.** Average healthy and unhealthy level of soil moisture content.

DESIGN; A representation of the design of the application is shown below in form of a well- defined algorithm and a properly structured algorithm.

IMPLEMENTATION; A C++ code was implemented to integrate the algorithm into instructions that could be understood by the system.

TESTING; my application was analyzed and tested on Grace-Dandyson Parks & garden, it was able to successfully determine the moisture content, read the temperature and also sound an alarm when the moisture level is below the healthy condition.

MAINTENANCE; My application consists of a hardware device that can withstand the harshest of conditions and also a annual update would be released for debugging.

### HARD WARE COMPONENTS

The hardware components of my device consists of six wireless sensors and valve actuating nodes installed across the soil, a central base station made up of a transceiver connected to a computer and a graphical user interface (GUI).

### SOFTWARE COMPONENTS

The software components of my app consist of a program that was created with a C++ code, it has various sensors integrated into the system. It has an automated control system, with a wireless network across the soil. It works based on a combination of granular matrix sensors and soil water balance (SL+WB). It also has a security check to only grant access to specific user.

Below is a table for the various sensors integrated into my designs and their various purposes.

|  |  |
| --- | --- |
| **The sensor** | **Biometrics measured** |
| Time-temperature threshold | Temperature of soil |
| Crop water stress index | Water stress quantification |
| Granular matrix sensor | Soil water potential |
| Soil water balance | Yield reduction |
| Temperature evapotranspiration | Soil evaporation |
| Neutron probe | Quantity of water |

FLOWCHART



START

INPUT SECURITY FALSE

KEY

TRUE

M<50

YES

NO

STOP

SEND REPORT TO USER

INITIALIZE WATERING TO THE PLANT

START IRRIGATION

Sound alarm

Check moisture content

ALGORITHM

1. Start.
2. Input security key.
3. Check soil moisture content (M).
4. Read through database and determine the condition.
5. Sound alarm for unhealthy conditions.
6. Start irrigation.
7. Initialize watering system.
8. Check for errors by debugging.
9. Stop.

## TOP DOWN APPROACH

IRRIGATION MACHINE

MOISTURE

CONTENT DETECTION

ACCESS

DATABASE

IRRIGATION

WATERING

SYSTEM

READ

CONDITIONS FOR SOIL

MUSIC

SOUND

CREATE ALARM