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MATRIC NO: 18/ENG01/004

COURSE: ENG 224

The name of my application is the Joy 2.0 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 Joy 2.0 irrigation app was created was 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.

. Night time and day time temperatures.

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

. 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 computer system.

TESTING; my application was tested on Mrs Bassey's 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 yearly 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 laptop and a graphical user interface (GUI).

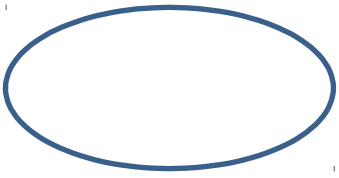
SOFTWARE COMPONENTS

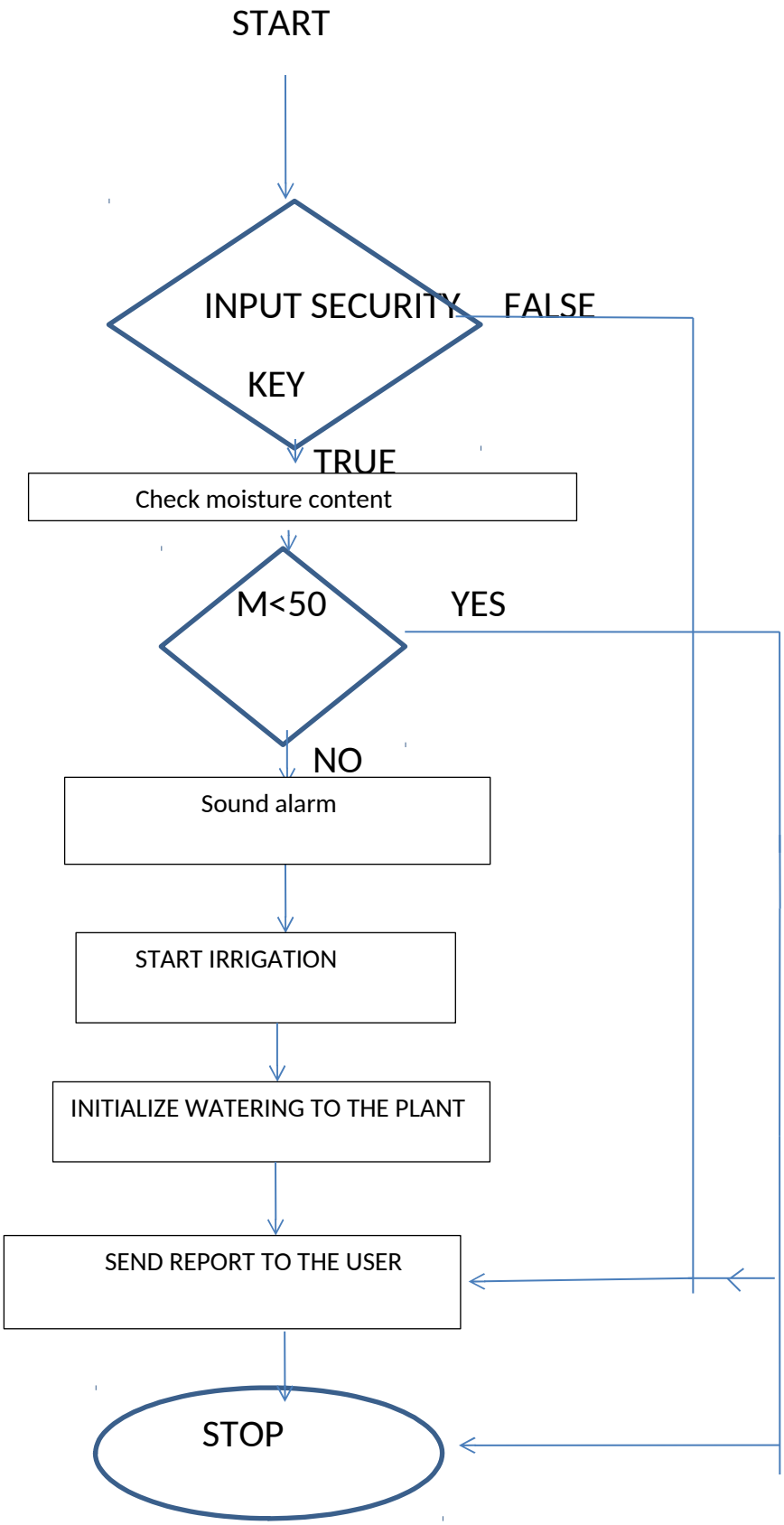
The software components of my app consist of a program that was created with a C++ code, it has various sensors integrated into the system. It has an automated control system, with a wireless network across the soil. It works based on a combination of granular matrix sensors and soil water balance (SL+WB).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

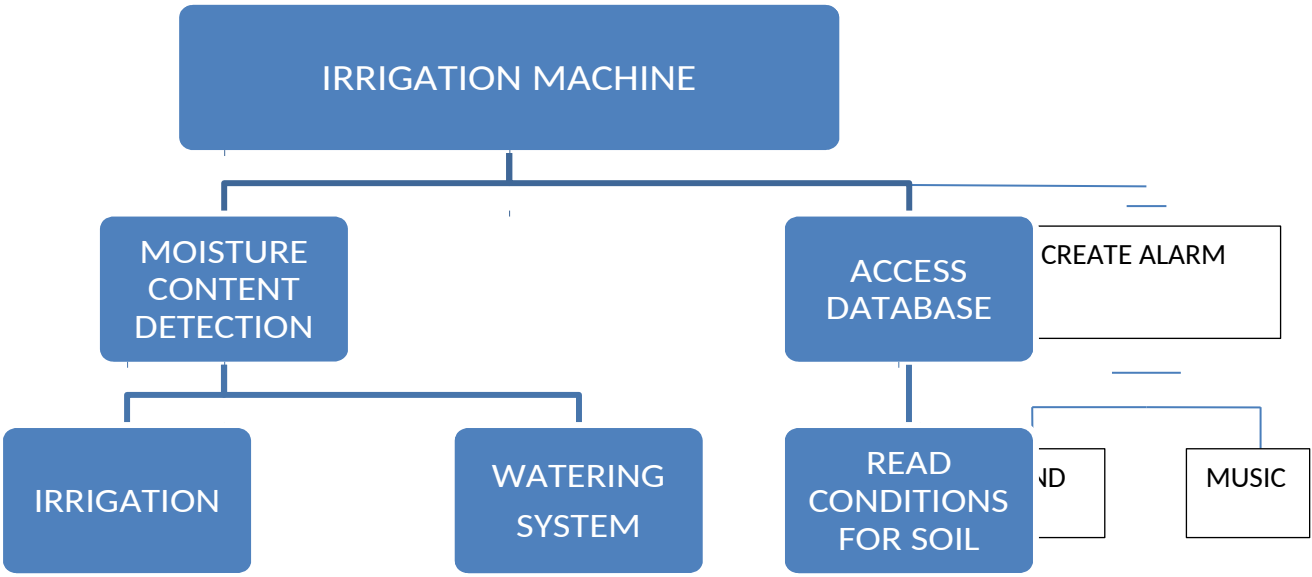



START
INPUT SECURITY KEY
FALSE
TRUE
Check moisture content
M<50
YES
NO
Sound alarm
START IRRIGATION
INITIALIZE WATERING TO THE PLANT
SEND REPORT TO THE USER
STOP

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
CREATE ALARM
IRRIGATION
WATERING SYSTEM
READ CONDITIONS FOR SOIL
ND
MUSIC