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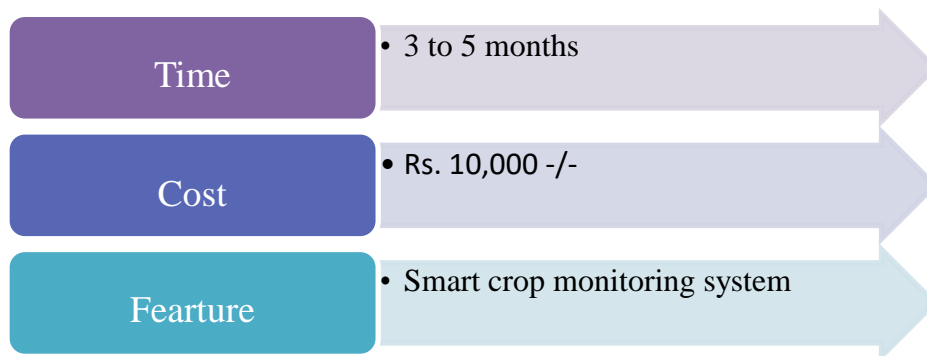
## SMART CROP MONITORING SYSTEM

### 1. Requirements:

#### i. Empathize Research:

Agriculture is the mainstay of the economy. It contributes to the gross domestic product. Agriculture meets the food requirements of the people and produces several raw materials for industries. But because of animal interference and fire in agricultural lands, there will be huge loss of crops. The crop will be totally getting destroyed. There will be a large amount of loss of farmers. To avoid these financial losses, it is very important to protect agricultural fields or farms from animals and fire. To overcome this problem, in our proposed work we shall design a system to prevent the entry of animals into the farm. Our main purpose of project is to develop intruder alert to the farm, to avoid losses due to animals and fire. These intruder alert protect the crop from damaging that indirectly increase yield of the crop. The developed system will not be harmful and injurious to animals as well as human beings. The theme of the project is to design an intelligent security system for farm protection by using an embedded system.

#### Analysis:



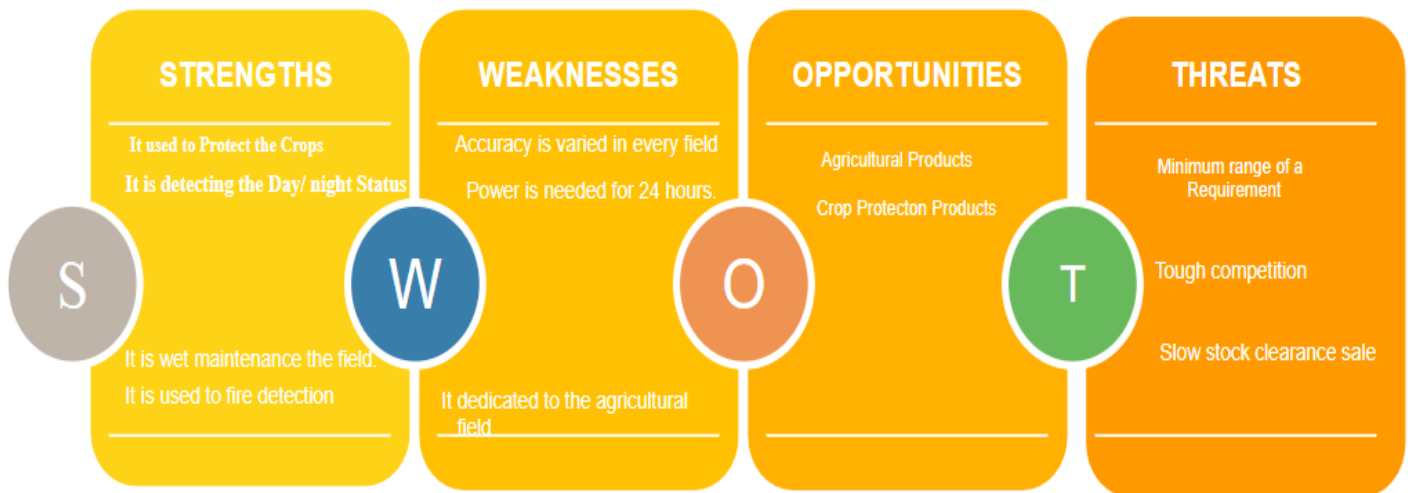
**ii. High-Level Requirement:**

ID	Description	Status (Implemented/Future)
HR02	Soil Wet/Dry Detection	Implemented
HR02	Motor On/off	Implemented
HR03	Fire Detection	Implemented
HR03	Rainfall Detection	Implemented
HR01	Day/night Status	Implemented

**iii. Low-Level Requirement:**

ID	Description	Status (Implemented/Future)	Datasheet
LR01	1 channel 30A Relay	Implemented	<a href="#">Link</a>
LR02	AVR ATmega328	Implemented	<a href="#">Link</a>
LR03	Soil sensor	Implemented	<a href="#">Link</a>
LR03	LDR sensor	Implemented	<a href="#">Link</a>
LR03	Temperature sensor	Implemented	<a href="#">Link</a>

iv. **SWOT Analysis:**



- **STRENGTH**

1. It used to Protect the Crops
2. It is detecting the Day/ night Status
3. It is maintaining the field with wet status.
4. It is used to fire detection and Rainwater detection
- 5.

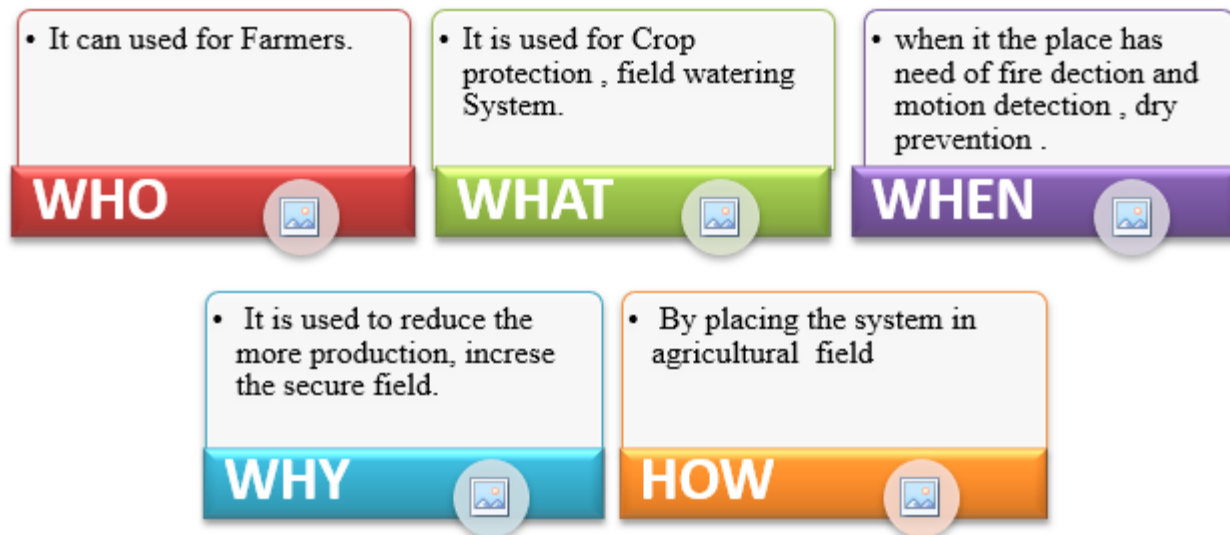
- **WEAKNESSES:**

1. Power backup is necessary
2. It can't control by mobile phone

- **OPPORTUNITIES:**

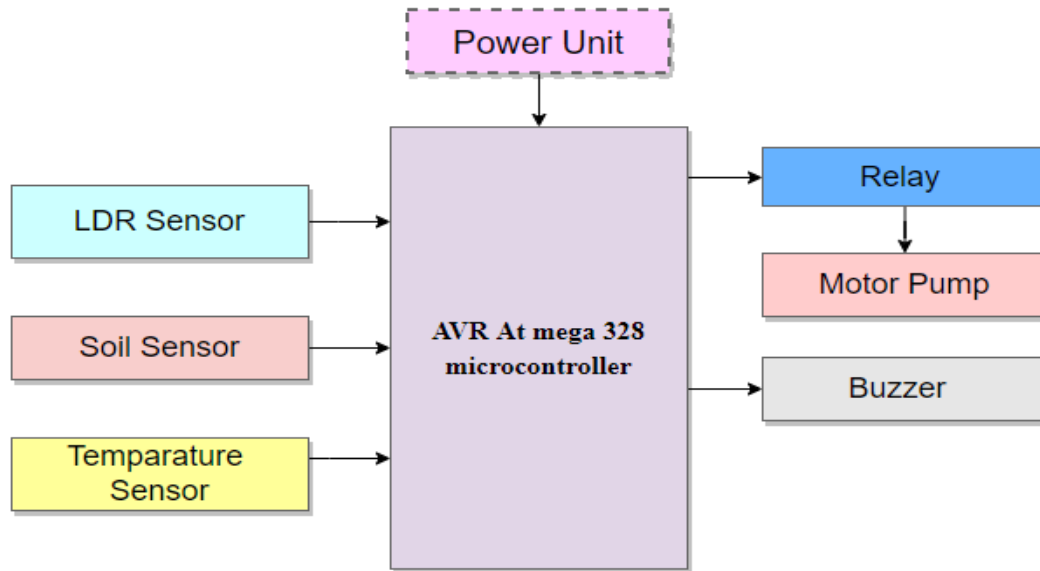
1. Agricultural Products
2. Crop Protection Products
3. Farming Products

v. 4W 1H:



## 2. Design:

### i. Block Diagrams:



- **Sensor:**

- **Soil sensor:** It shall be sensing the level of the water in fields to avoid the dry field prevention.
- **Temperature sensor:** It used to detect the fire occurs in fields or Rain detected in field.
- **LDR sensor:** It is used to sense the Day / Night Status.

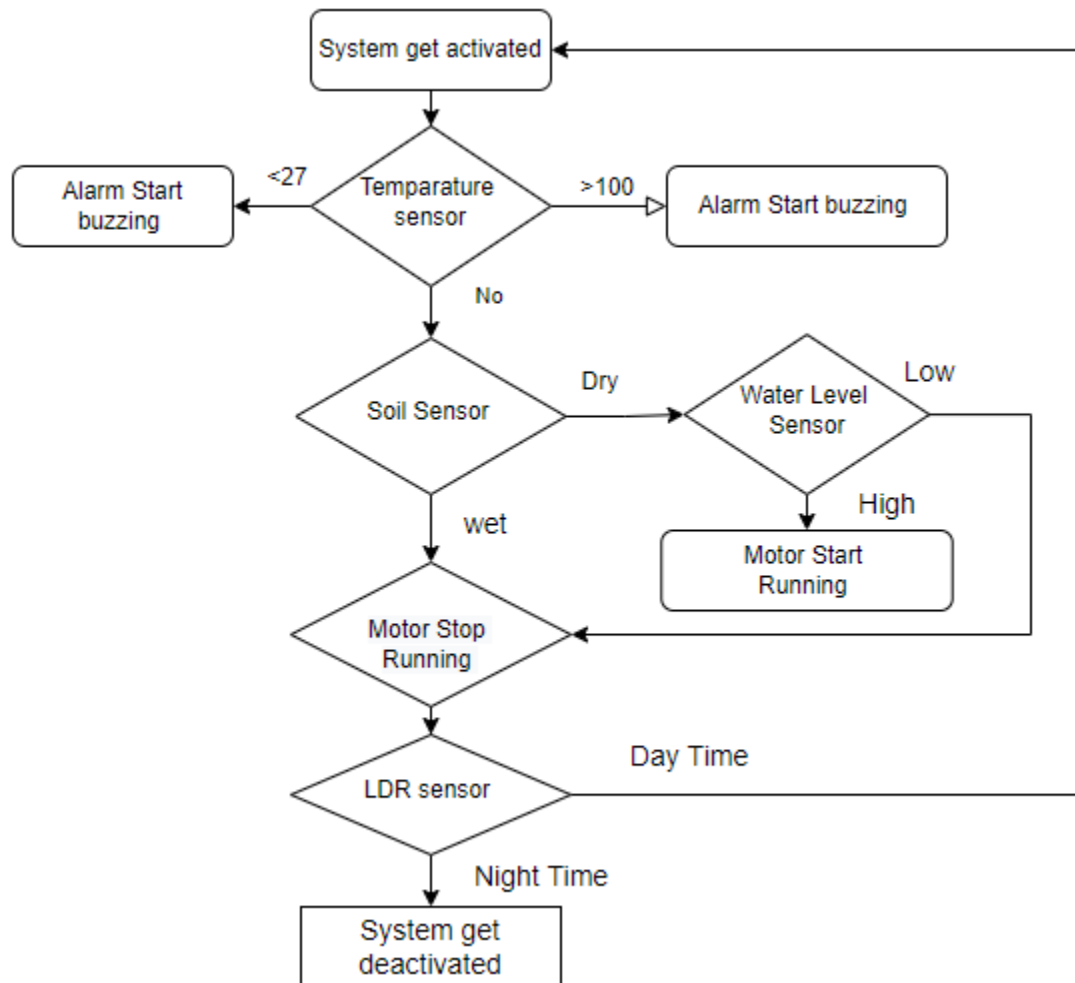
- **Actuator:**

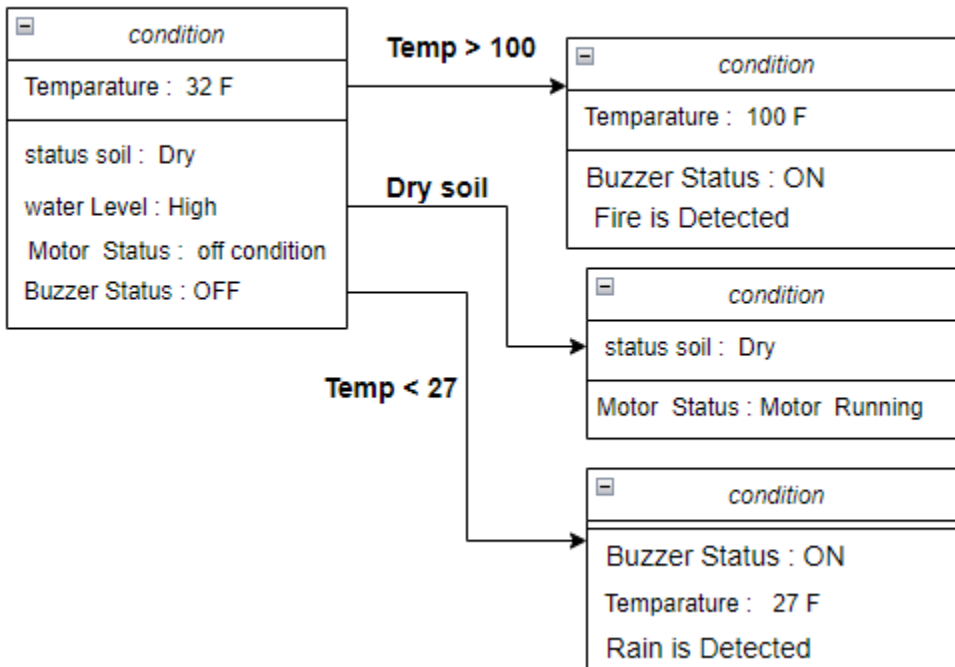
- **Relay module:** It shall be used to control the single-phase motor and used as a protection circuit.
- **Single -Phase motor Pump:** it shall be used to pump the water from the tank and feed to the agricultural field.
- **Buzzer:** It is used to give Alert when the fire is detected or over Rain wall is detected

- **Microcontroller:**

- **AVR At mega 328:** Microcontroller development board with a chip of ATmega328P. 6 GPIOs, 6 PWM and 6 ADC, a 16 MHz crystal frequency, USB program debug with the reset button.

## ii. Structural Diagram:



**iii. Behavioral Diagram:****3. Evaluation****i. High Level Testing Plan:**

Test Id	Test case	Expected output	Actual output
1	GSM module for “ <b>Turn On</b> ”	“Motor Started”	“Motor Started”
2	GSM module for “ <b>Turn Off</b> ”	“Motor Stopped”	“Motor Stopped”
3	GSM module for “ <b>Status</b> ”	“Motor in running “	“Motor in running “

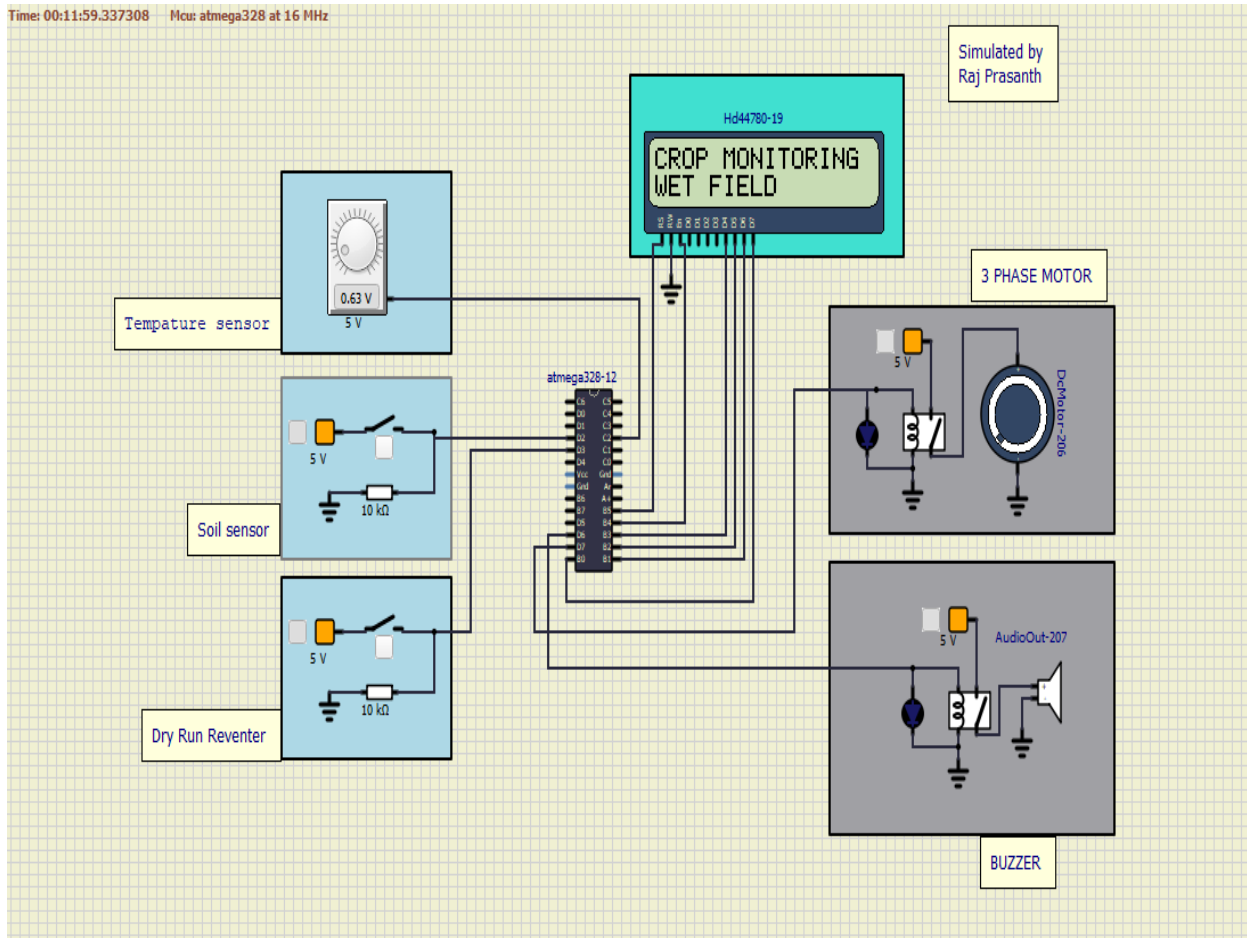
**ii. Low Level Testing Plan:**

Test Id	Test case	Expected output	Actual output
1	GSM module	“Motor ON “	“Motor ON”
2	Water level sensor	1	1
3	Relay Module	0	0 (Turn ON)

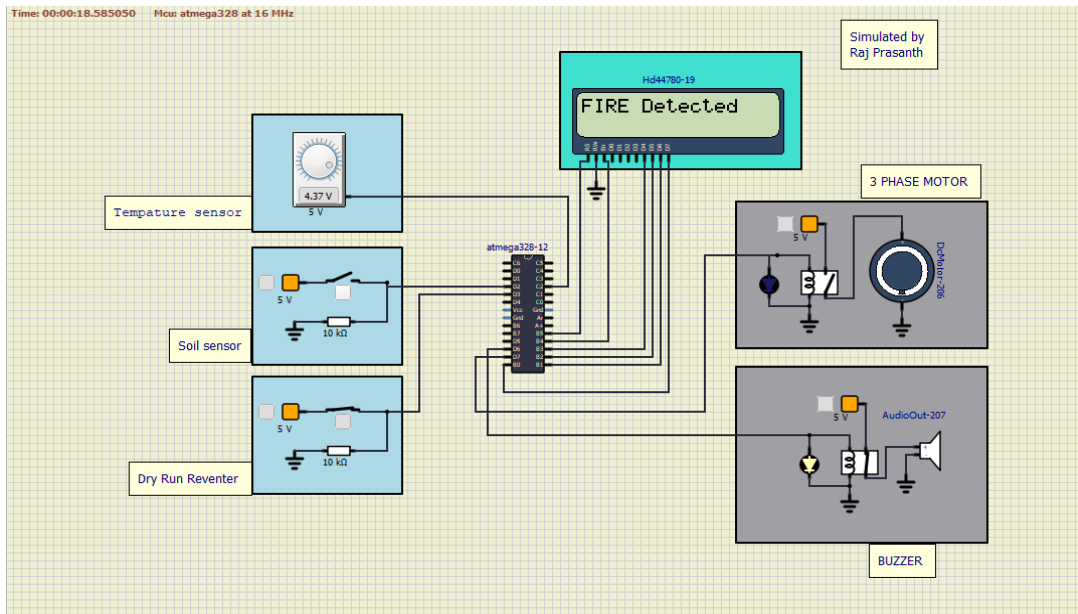


## 4. Implementation:

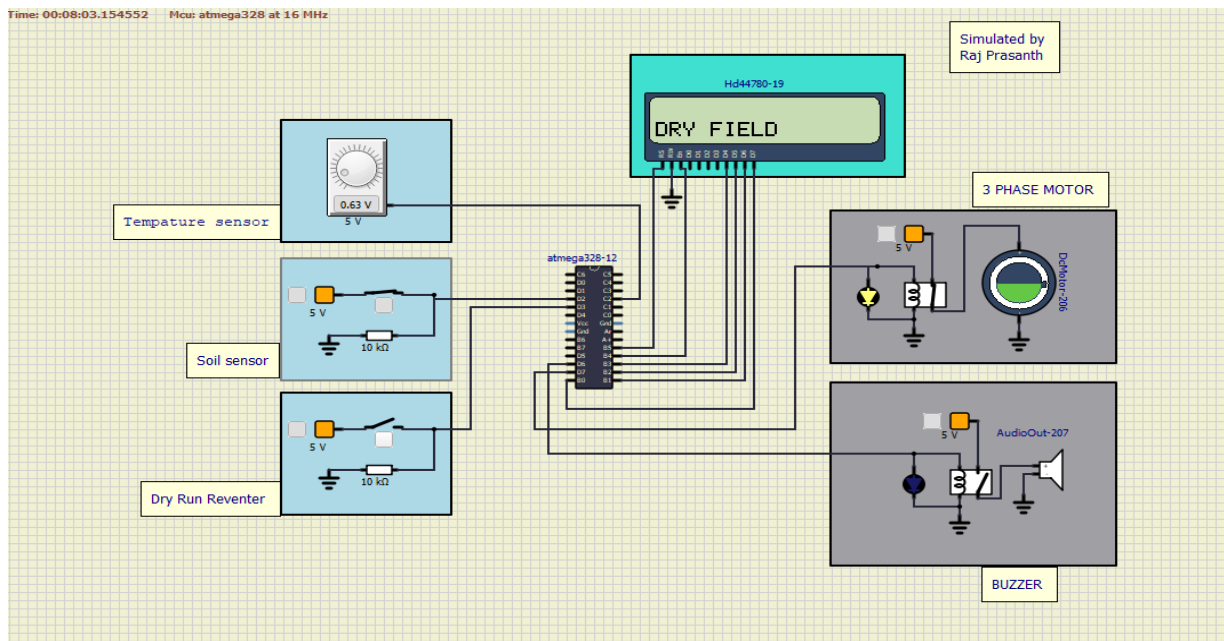
### i. Crop Monitoring system:



### iii. Fire detection system:



### iv. Dry Run Prevention:



## **Conclusion:**

### **I. summary:**

Agriculture is one of the economic developments of country. In this case study Mobile Starter is provided to monitor and control the status of agriculture motor pumps at anytime from anywhere motor can on/off through SMS. So, farmers take full control without visiting the agriculture field. They have some features like starting at the motor and stopping the motor and checking the status of the motor. Even if any low water detected the water level sensor it stops running and intimated to the controller to avoid the dry run prevention and the additional features can be added by changing into IOT technology.

- **Advantages:**
  - It shall be controlling the motor by Starting and Stopping, checking the status of the motor through the mobile phone.
  - It shall use for Dry run prevention.
- **Disadvantages:**
  - It may cause some network issues based the locations.
  - It must recharge sim which has been inserted in GSM module.
- **Applications:**
  - It shall be used for Agriculture Field
  - Building water tank can be controlled.

### **iii. REFERENCES:**

- [1] J Lokesh Heda, Pritesh Vinita Singh, Fault Monitoring and Protection of Three-Phase Devices, International Journal of Innovative Research in Electrical, Electronics, Instrumentation, and Control Engineering, Vol. 4, Iss. 4, 2016, 208-210.
- [2] Biswarup Nandi, Bhutada, Rinkesh Thakur, Piyush Bhattad, Mobial Stater based GSM Automation, International Research of Computer Science Engineering, 2015978-17281-5374- 2 2 2 (ICIRCA-2020).