SMART AGRICULTURE (SAATHI)

PROJECT SYNOPSIS

OF MAJOR PROJECT

DIPLOMA

Computer Science & Engineering

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INTRODUCTION

Internet of Things has capacity to transform the lives of people in the world in an efficient manner. The ever growing population would touch more than 3 billions in few years. So to feed such an immense population, agriculture industry need to embrace IoT. The demand for more food has to address challenges that include excessive climate conditions, weather change and different environmental affects that results from farming practices.
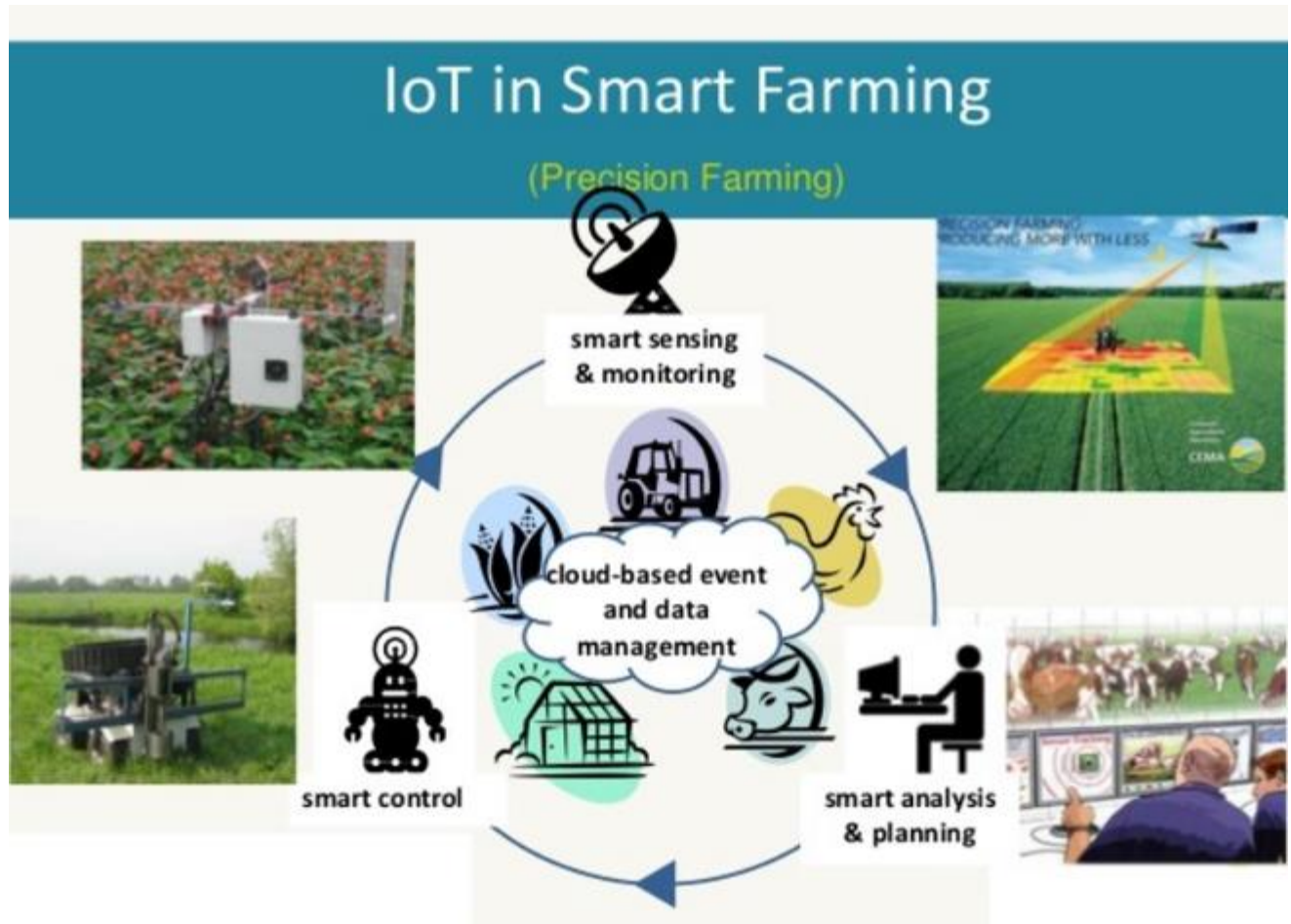

Fig. 1 Smart Agriculture [1]

The destiny of Indian agriculture must be worked with understanding and excessive cease technologies that can expand production and furthermore regains the attention of farmers in this industry. So these smart farming techniques would assist farmers to lessen scrap and enhance capacity. It is basically a high tech and capital intensive system for growing crops in a sustainable manner for masses. This technology can help farmers to monitor field conditions from anywhere with the help of sensors and can also irrigate fields with an automated system. It is the application of Information and Communication Technology into the field of agriculture.

Available Solutions For Farmers:-

- SAATHI now offer IoT solutions by providing affordable sensors that monitor soil humidity/moisture levels and soil/air temperatures/ nearby animals and automatically report it directly to the Internet without needing any Wifi, GSM or regular Internet connection.

- This helps farmers know what is best for their crops without having to manually estimate or make an educated guess. With better data being fed to them live from their own crops, farmers can be the best possible decisions for planting, watering, and pest control.

- Less trips out to the crop field parcels to manually check soil humidity levels, checking of animals harmful for crops and soil temperature means more time can be spent on other parts of the business, like bookkeeping or meeting with customers.

- By using the Internet of Things to better monitor soil conditions, farmers will find that: There is better management of the land through data (which is more accurate than human testing). Farmers can combine outside data (like weather forecasts) with their own land parcel data to optimize crop watering and maintenance.

- There are less costs for employee time, water, and crop care Farmers have healthier crops by optimizing water and soil care Having real-time data can help landowners and farmers reduce manpower, water usage, and other maintenance costs, thus reducing costs and environmental impact.

- Diagnose issues: Run diagnostics to determine device errors or issues Provide better calibration for reporting and data analysis: Run cloud calibration to ensure data is always up-to-date and relevant.

LITERATURE SURVEY

S NO.	WORK AND ARTICLES	OUTCOME	RESOURCES
01.	The National Institute for Occupational Safety and Health (NIOSH)	- Every day, about 100 agricultural workers suffer a lost-work-time injury. - From 2008-2010, 50% of all hired crop worker injuries were classified as a sprain or strain. - In 2014, an estimated 12,000 youth were injured on farms; 4,000 of these injuries were due to farm work	https://www.cdc.gov/niosh/topics/aginjury/default.html#:~:text=In%202017%2C%20416%20farmers%20and,the se%20farmers%20and%20farm%20 workers
02.	The time tribune India, dated 4 February 2021	Stray cows and wild boars enter farmers' fields and destroy crops. It has become a common problem for them and the growers have been left troubled and worried	https://www.tribuneindia.com/new s/jalandhar/stray-cows-wild-boars-damage-crops-46849
03.	THE Times of India article, dated 9 February 2021	The unusual changes in weather have landed the farmer community in a spot again this year. The unprecedented rainfall in January has caused huge destruction of crops for many individual farmers, for both commercial and individual cultivation.	https://timesofindia.indiatimes.com /city/kochi/farmers-hit-by-unusual-climate-change/articleshow/80756284.cms

04.	INDIA TODAY article, dated 20 January 2020	Locusts' attack in western Rajasthan leaves farmers high and dry, ruin lakhs of hectares of crops	https://www.indiatoday.in/india/story/locusts-attack-in-western-rajasthan-leaves-farmers-high-and-dry-ruin-lakhs-of-hectares-of-crops-1638357-2020-01-20

Problem Defination:-

From the literature survey we concluded that these are not done by the different research work.

Lots of physical maintenance required	Difficult and inaccurate water estimates	Unexpected costs and water waste	Planting times	It is hard to manually track soil temperature and moisture levels	Damage to crops due to unwanted entry of animals
Many trips have to be taken in order to manually check the soil humidity on a regular basis. Also farmers face many injuries and health issue due to this	Many trips have to be taken in order to manually check the soil humidity on a regular basis. It can be difficult to know the exact amount of water to give plants, thus causing stress for the crops by over or underwatering	Overwatering crops could lead to higher water costs than what is really needed.	It is sometimes difficult to know the optimal time to plant without data	Manually measuring key data points about crops is often difficult, time-consuming, and more likely to be inaccurate	Stray cows and wild boars enter farmers' fields and destroy crops. It has become a common problem for them and the growers have been left troubled and worried.

METHODOLOGY

- We install different sensor at different place in our prototype:-
    - **Ultrasonic Sensor Module :-** It is used to detect the distance of coming object towards the field.
    - **Water Level Sensor:-** It is use to detect the water level of storage tank.
    - **Rain Detector:-** It is used for detecting if there is rain or not.
    - **Piezo Buzzer:-** It is used as a alarm if anything happening in the ground like for intruder alert, raining ,etc.
    - **PIR Motion Sensor:-** It is used to detect the presence of object.
    - **Humidity and Temperature Sensor:-** It is used for sensing the climate of the ground.
    - **Servo Motor :-** It is used for opening the flap of water tank.
    - **Soil Moisture Sensor:-** It is used for detection of water in soil and measures in volumetric.
- We connect all these devices with breadboard using jumper wires and also we connect Arduino Uno with breadboard.
- And we connect Arduino Uno with computer system using USB and also we upload code via this USB.
- After getting all data we display output on farmer's screen in different blocks like for moisture, temperature, etc.
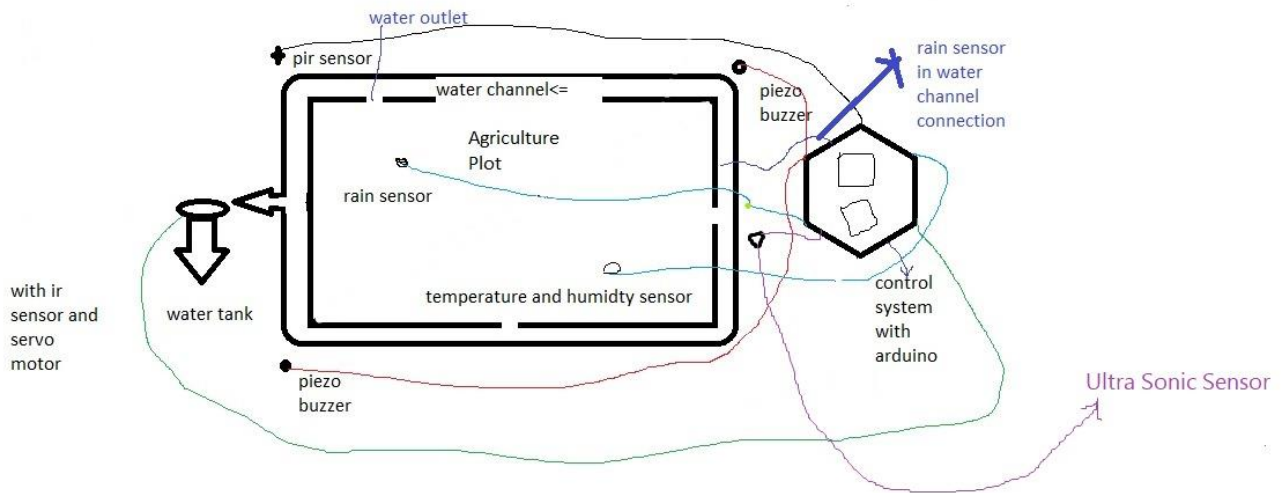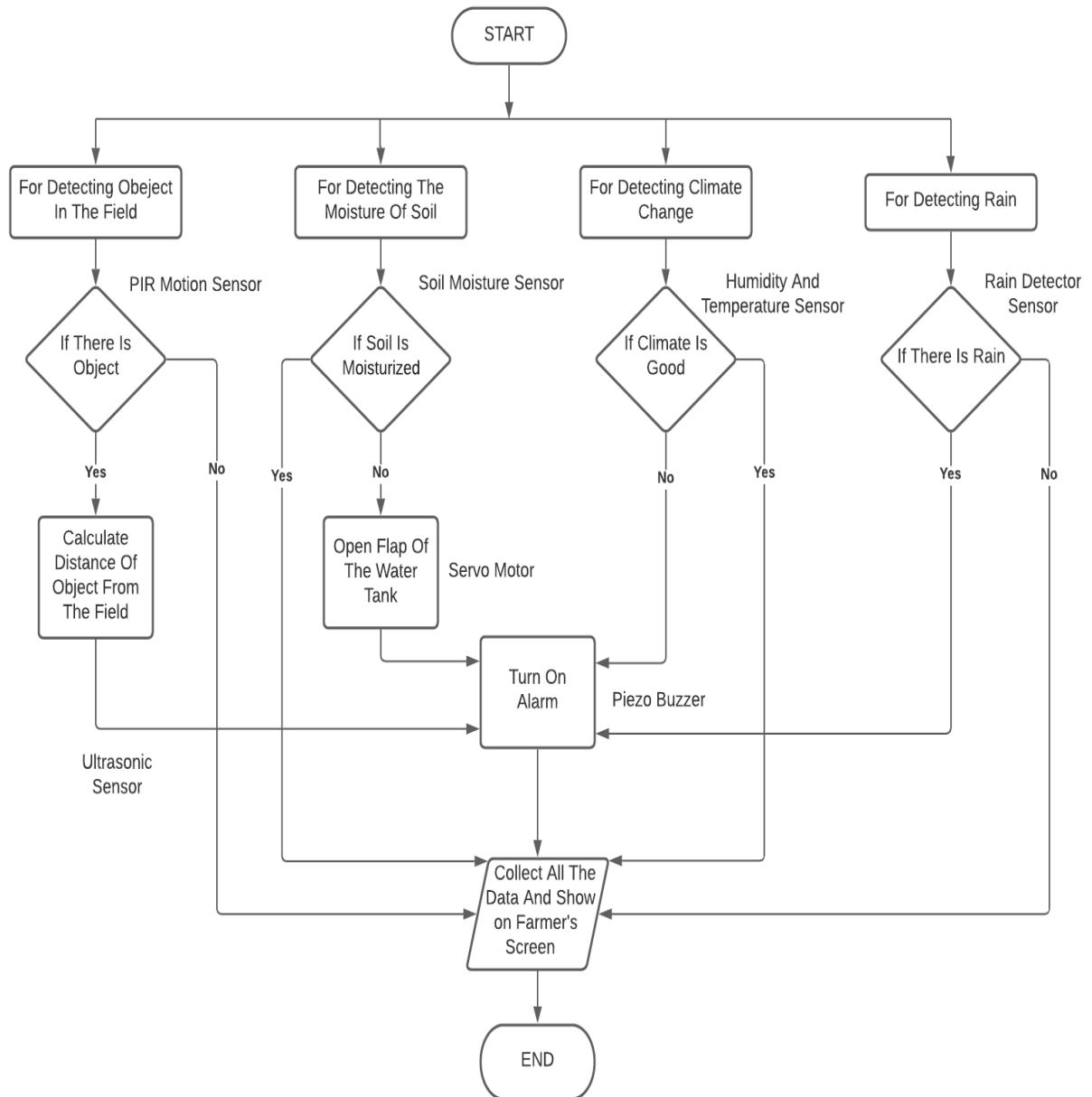

Fig. 2 Project Layout

Flow chart

START

For Detecting Obeject In The Field — PIR Motion Sensor
If There Is Object
- Yes → Calculate Distance Of Object From The Field
- No

Ultrasonic Sensor

For Detecting The Moisture Of Soil — Soil Moisture Sensor
If Soil Is Moisturized
- Yes
- No → Open Flap Of The Water Tank — Servo Motor

For Detecting Climate Change — Humidity And Temperature Sensor
If Climate Is Good
- No → Turn On Alarm — Piezo Buzzer
- Yes

For Detecting Rain — Rain Detector Sensor
If There Is Rain
- Yes
- No

Turn On Alarm — Piezo Buzzer

Collect All The Data And Show on Farmer's Screen

END

Fig. 3 Flow Chart

GANTT CHART

WEEK / TASK	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9
RESEARCH	■	■	■						
PLANNING		■	■						
MATERIAL COLLECTION			■	■					
APPLICATION DEVELOPEMENT			■	■	■	■	■		
PHYSICAL MODEL DESIGNING				■	■	■			
TESTING							■	■	
PROBLEM RESOLUTION							■	■	
DOCUMENTATION						■	■	■	
FINAL EXECUTION									■

Fig. 4 Gantt Chart

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