SMART ASSISTANT AGRI-ECONOBOT

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REGISTRATION NO : COL/ME/2025/F/083
SUPERVISED BY :

INTRODUCTION

This robot is specially made for agricultural field to make sure the work becomes easy for farmers. Specially in providing correct amount of water and fertilizers while continuously monitoring environmental conditions. In addition farmers need to regularly check soil moisture, temperature and humidity to ensure healthy plant development. So this automated Smart Assistant AgriEconoBot helps farmers to reduce manual work, save water and fertilizers, and improve efficiency in crop management.

This robot is an autonomous system which is capable of spraying water and liquid fertilizers based on soil and environmental conditions. A soil moisture sensor is used to detect water content in the soil, while a temperature and humidity sensor measures the atmospheric conditions. In addition an ultrasonic sensor is placed at the front of the robot to detect obstacles and prevent collisions during movements.

The entire system is controlled by a microcontroller, which processes sensor data and activates the water and the fertilizer pumps when required. This robot can also be developed further using new technology to make it more efficient and more accurate.

AIM

The aim of this project is to develop a smart automated agricultural robot that can monitor moisture of soil, temperature and humidity, obstacles in its path, and automatically spray water and fertilizers according to the needs of the plans.

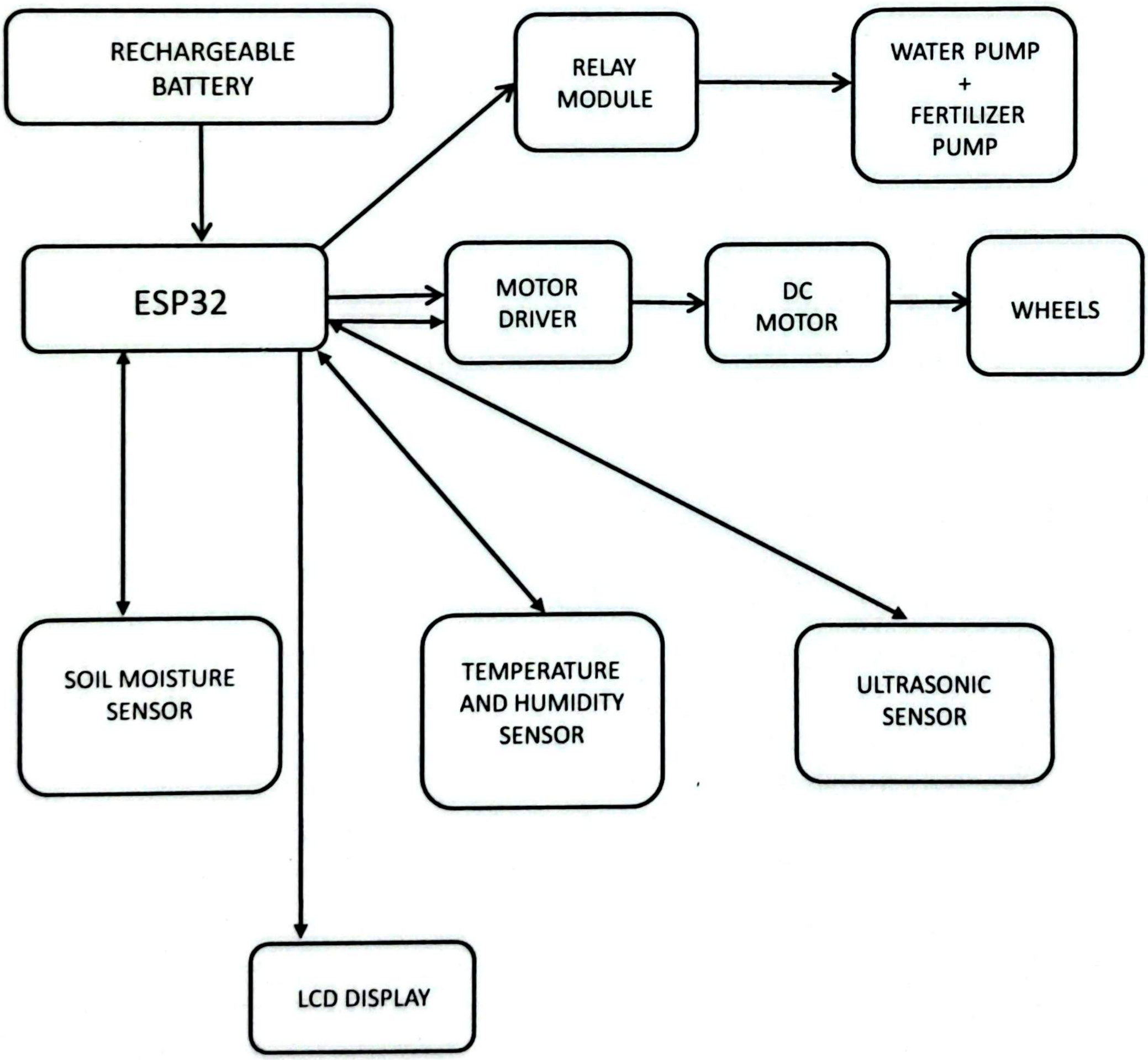
OBJECTIVE

- To construct an autonomous robot for agricultural irrigation and fertilizer spraying.
- Control water spraying based on the moisture level of the soil using temperature and humidity sensors, and displays the readings on a LCD screen for easy monitoring.
- To detect the obstacles infront of the robot to avoid collisions.

WORKING PRINCIPLE

The robot operatesbased on sensor data and microcontroller control. As said before the soil moisture sensor measures the the water content of the soil and when the value falls below a preset level, the microcontroller activates the water pump to spray water. And the temperature and humidity sensor continuously monitors the surrounding environment and displays the readings on the LCD screen. A separate pump is used to spray fertilizers at required intervals. In addition an ultrasonic sensor is placed at the front to detect obstacles and sends distance information to the controller, which stops or change the direction of the robot to avoid collisions. All these operations are automatically controlled by the microcontroller, making the system more efficient.

BLOCK DIAGRAM



BUDGETREPORT

No.	Items	Net Price (Rs.)	Quantity	Total Price (Rs.)
01	ESP 32	1500	1	1500
02	MOTOR DRIVER	600	1	600
03	DC GEAR MOTORS	500	4	2000
04	SOIL MOISTURE SENSOR	300	1	300
05	ULTRASONIC SENSOR	300	1	300
06	TEMP & HUMIDITY SENSOR	400	1	400
07	MINI DC PUMPS	400	2	800
08	RELAY MODULE	300	1	300
09	RECGARGEABLE BATTERY	1000	1	1000
10	LCD DISPLAY	500	1	500
11	PIPES + NOZZLES	200	2	400
12	SWITCH	150	1	150
13	ROBOT CHASSIS	500	1	500
14	IR LINE SENSOR MODULE	600	1	600
15	OTHERS	500		500
	TOTAL			9850

FUTUREENHANCEMENTS

- Automatic plant detection using a camera - This can be addes to identify plants and spray water and fertilizers only to the plant area.
- Solar Power System - A solar panel can be installed to charge the battery.
- GPS Based Navigation - by adding this, robot can move to specific locations in the field.
- Advanced Soil Analysing Sensors - Sensors to identify pH value and chemicals in the soil can be added to decide the correct type and amount of fertilizer.
- Weed Detection and Removal - A camera or colour sensors can be used to identify weeds and remove them mechanically or by targeted spraying.
- Weather Based Irrigation control - Internet weather can be used to stop irrigation when rain is expected and optimize water usage

Supervised by:- Eng. H.D.A. Gunasekara Signature

2026/01/21

Date