CROP MANAGEMENT USING ESP32 AND LOCAL SERVER

BATCH NUMBER:10

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ABSTRACT

AIM OF THE PROJECT:

- To design a crop monitoring system based on the Internet of things (IoT) and increase the productivity of the farmer in growing a particular crop in a Green House.

PROBLEM ANALYSIS:

- OPTIMIZED CONDITIONS:
  - Primarily we need to know the optimized conditions for the plant (example : tomato), that are suitable to produce higher and effective yield.
- VARIABLES:
  - Variables such as pH value, temperature, light levels, humidity, soil moisture should be monitored for ideal yield.
- DATA RELAY:
  - A local server is used to gather data from the sensors to perform analysis and extract the necessary statistics.
- APPLICATION:
  - the farmer needs an application where all the data is organized and can be controlled anywhere in the world and it should help him/her to make the decisions.

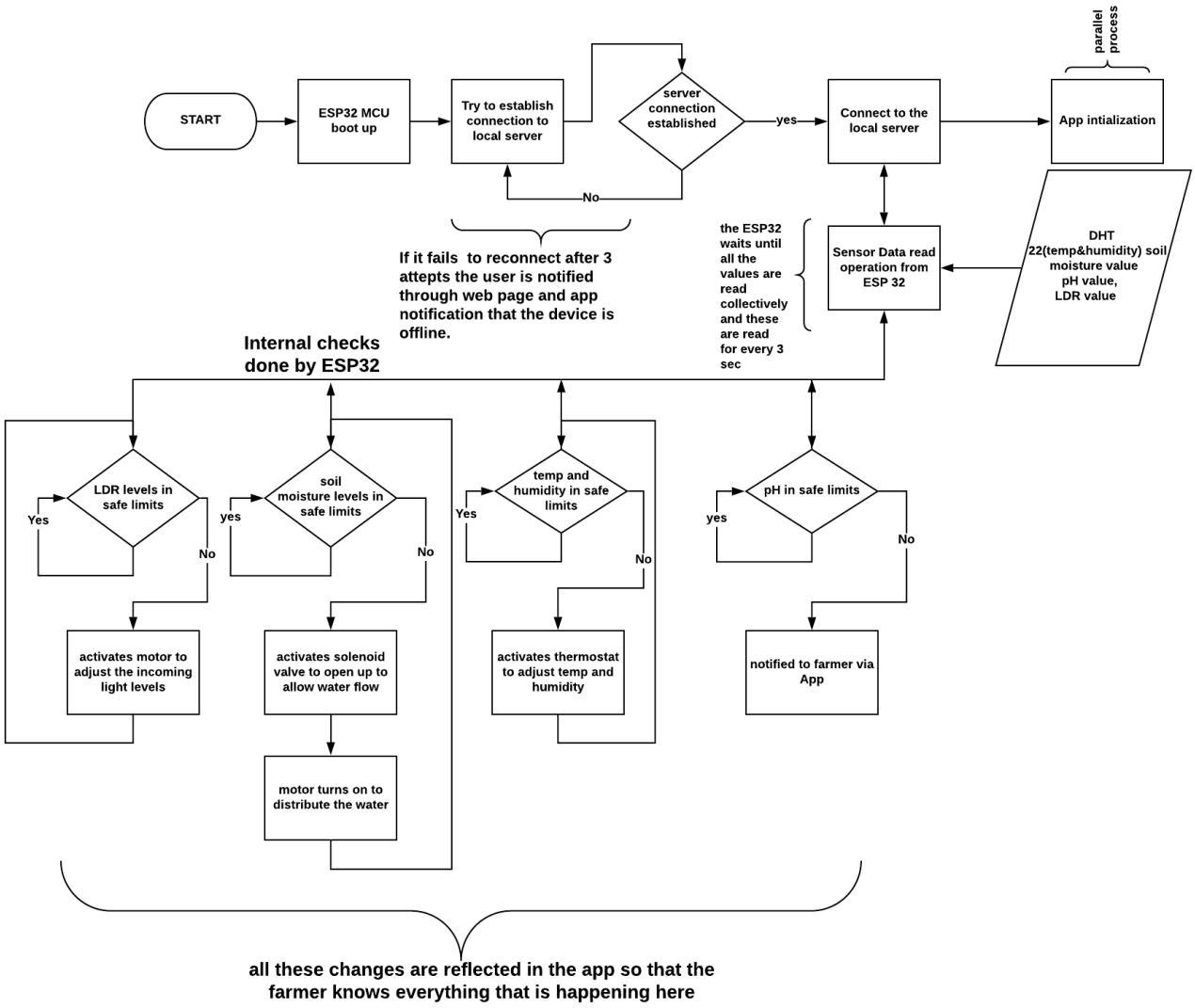
PROPOSED SOLUTION:

- BRAIN OF THE PROJECT:
  - We are using ESP32 as the brain of the project to sense and actuate things
- MONITORING VARIABLES:
  - pH sensor, Digital Humidity and temperature sensor, Light Dependent Resistor, Soil Moisture sensor are used to measure pH levels, temperature, humidity, luminosity, soil moisture levels respectively.
  - Water pump, servo motors attached to windows, solenoid valve to control water distribution, light inlet and allowing water respectively.
- DATA RELAY:
  - For relaying data we chose to use a local server and transmit the data to the app.
  - The local server uses the MQTT protocol with the help mosquitto library.
- APPLICATION:
  - Our application is an android app instance created using MQTT Dashboard.

BASE PAPER LINK:-https://ieeexplore.ieee.org/document/7855968

Some features of the paper were selected and modified considering the scope of the project.

FLOWCHART:


START
ESP32 MCU boot up
Try to establish connection to local server
server connection established
yes
No
Connect to the local server
parallel process
App intialization
If it fails to reconnect after 3 attepts the user is notified through web page and app notification that the device is offline.
the ESP32 waits until all the values are read collectively and these are read for every 3 sec
Sensor Data read operation from ESP 32
DHT 22(temp&humidity) soil moisture value pH value, LDR value
Internal checks done by ESP32
LDR levels in safe limits
Yes
No
activates motor to adjust the incoming light levels
soil moisture levels in safe limits
yes
No
activates solenoid valve to open up to allow water flow
motor turns on to distribute the water
temp and humidity in safe limits
Yes
No
activates thermostat to adjust temp and humidity
pH in safe limits
yes
No
notified to farmer via App
all these changes are reflected in the app so that the farmer knows everything that is happening here

BLOCK DIAGRAM: