IoT based GreenHouse Environment Control and Monitoring System

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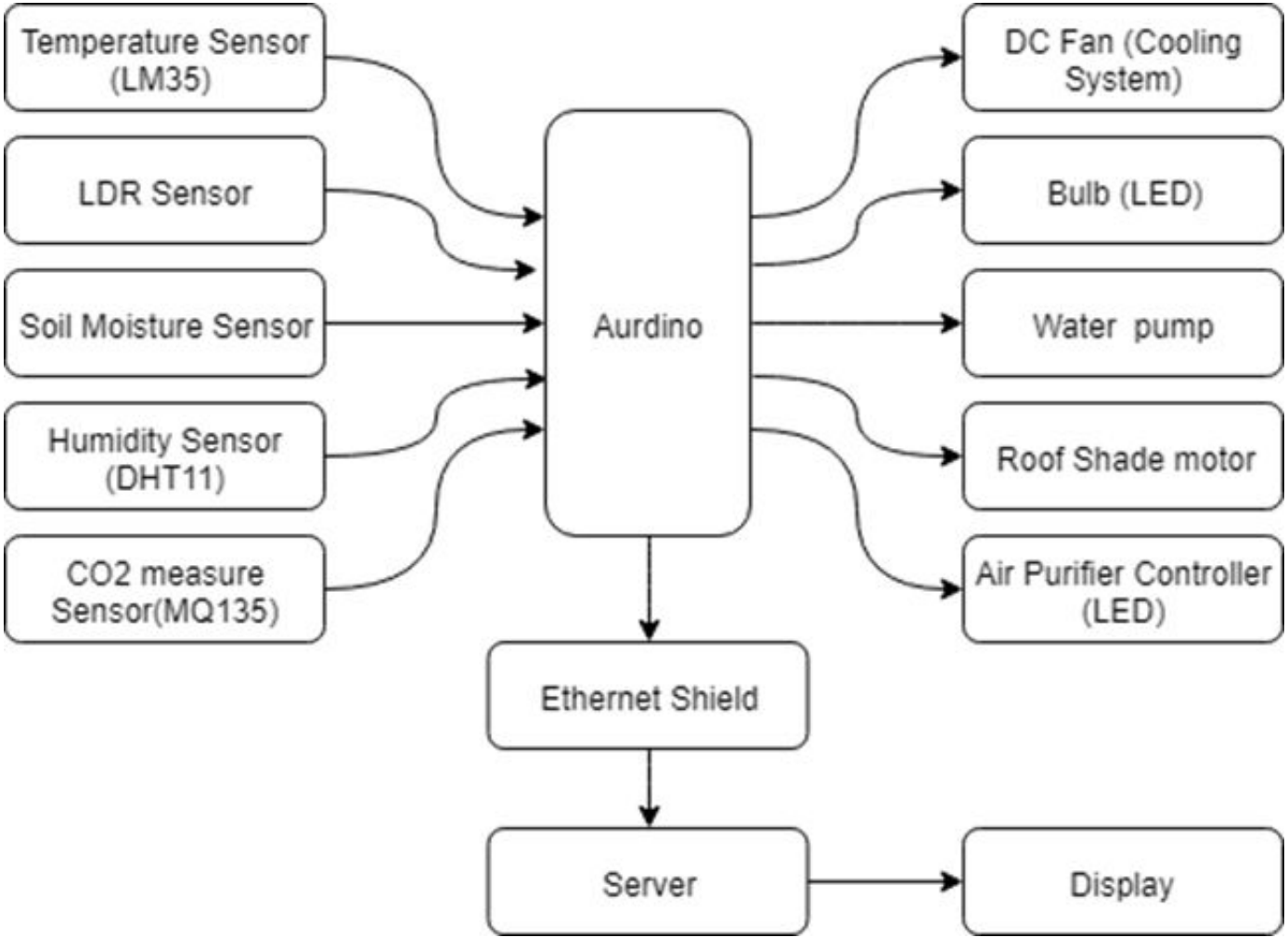
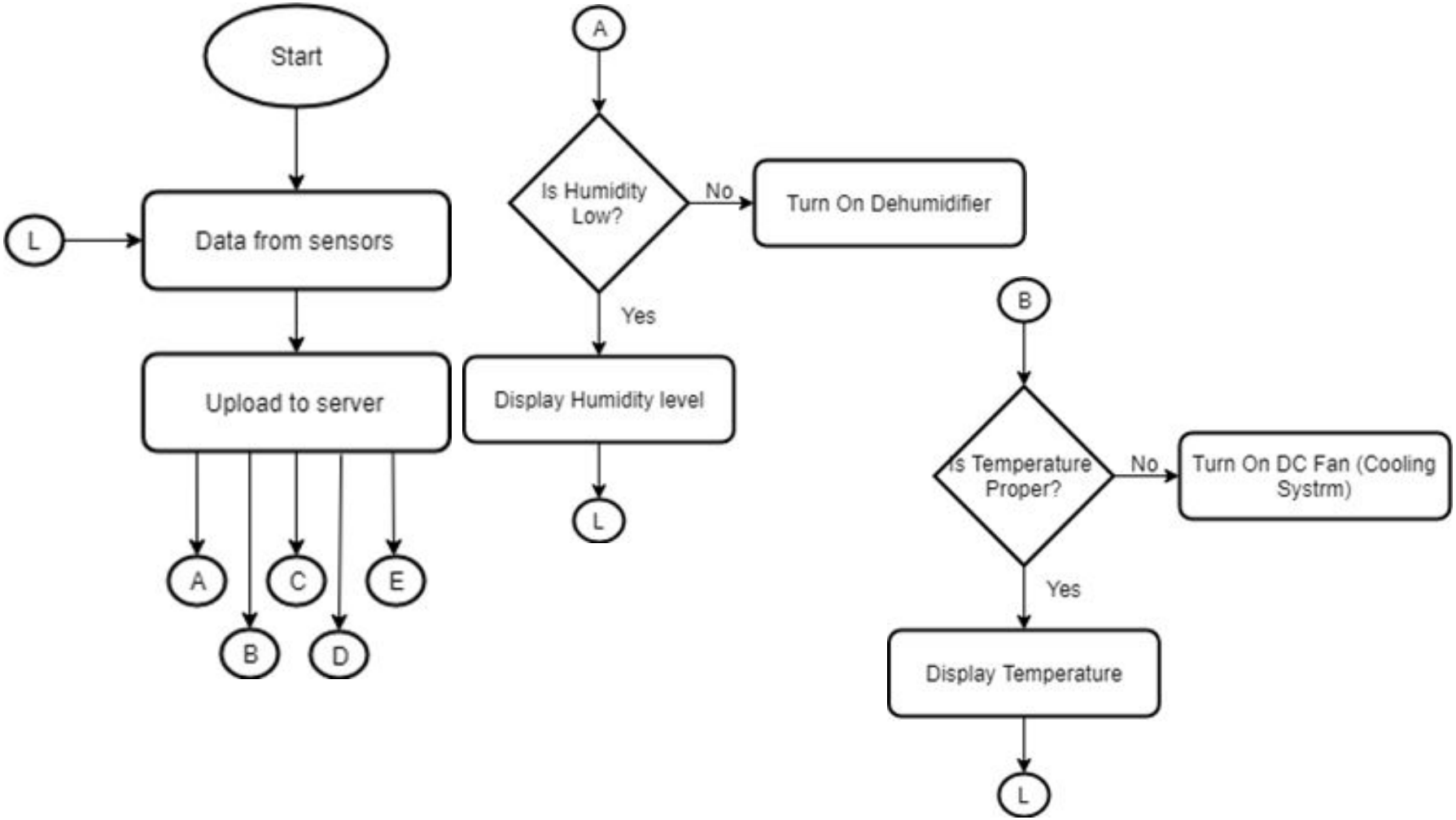
By,
Group - 13

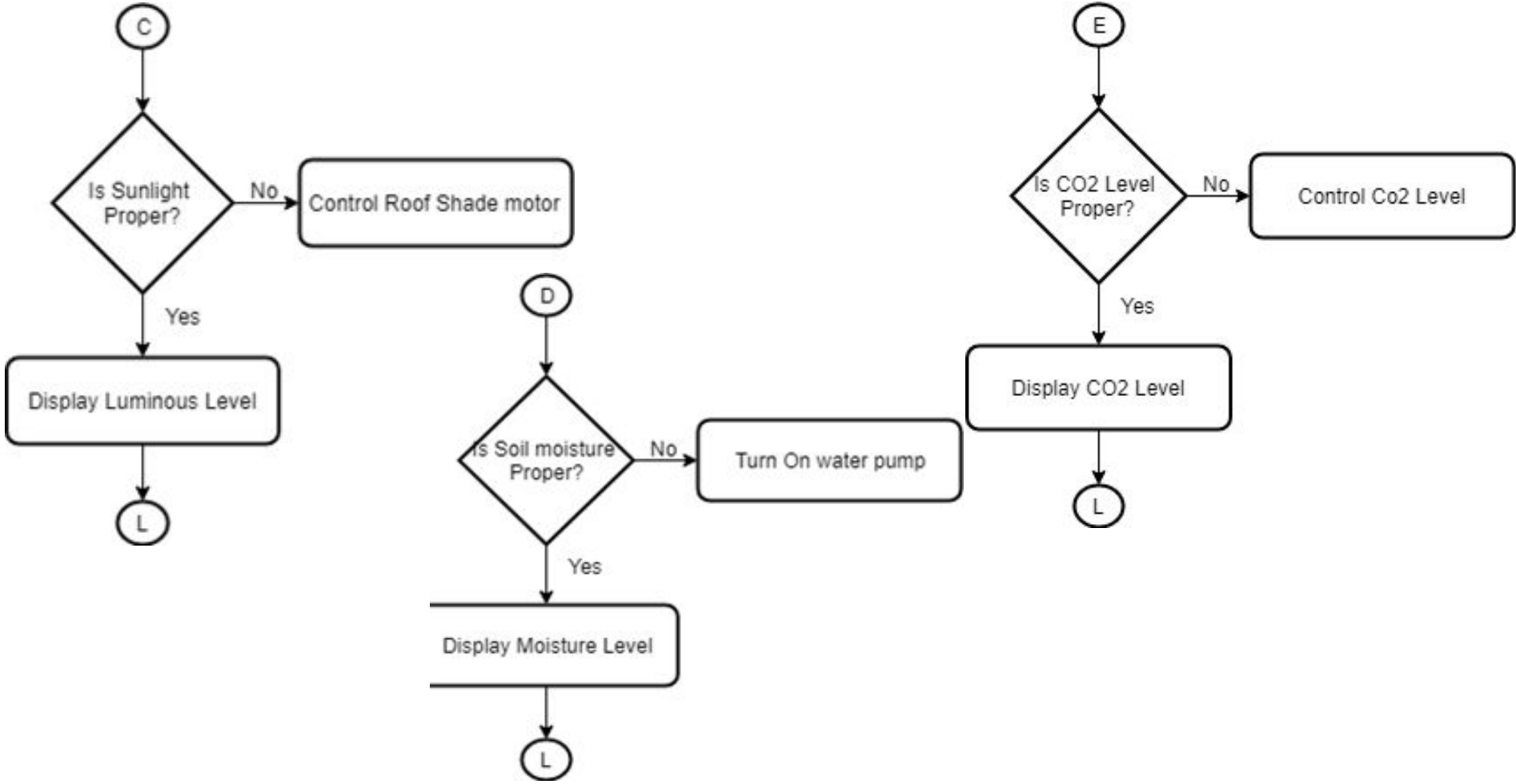
List Of Components Used :

- ➔ Arduino Board
- ➔ LDR Sensor
- ➔ Humidity Sensor
- ➔ Air Quality Sensor
- ➔ Moisture Sensor
- ➔ Ethernet Shield
- ➔ Resistors
- ➔ Temperature Sensor
- ➔ Fan (DC Motor)
- ➔ LEDs
- ➔ Water Pump (DC Motor)
- ➔ Breadboard
- ➔ Connecting Wires

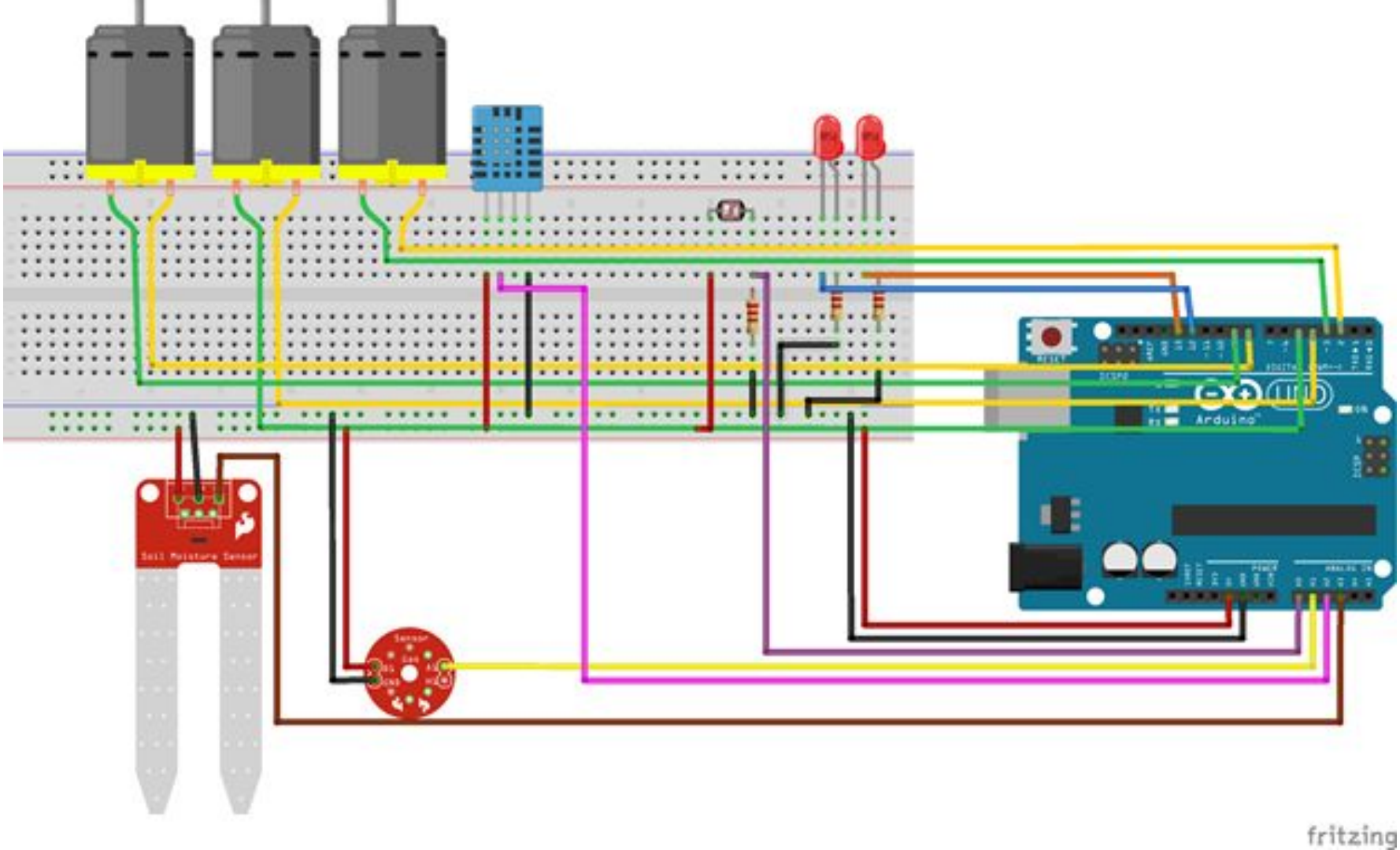
Flow Chart


Temperature Sensor (LM35)
LDR Sensor
Soil Moisture Sensor
Humidity Sensor (DHT11)
CO2 measure Sensor(MQ135)
Aurdino
DC Fan (Cooling System)
Bulb (LED)
Water pump
Roof Shade motor
Air Purifier Controller (LED)
Ethernet Shield
Server
Display


Start
L
Data from sensors
Upload to server
A
C
E
B
D
A
Is Humidity Low?
No
Turn On Dehumidifier
Yes
Display Humidity level
L
B
Is Temperature Proper?
No
Turn On DC Fan (Cooling Systrm)
Yes
Display Temperature
L


C
Is Sunlight Proper?
No
Control Roof Shade motor
Yes
Display Luminous Level
L
D
Is Soil moisture Proper?
No
Turn On water pump
Yes
Display Moisture Level
L
E
Is CO2 Level Proper?
No
Control Co2 Level
Yes
Display CO2 Level
L

Circuit Diagram


Soil Moisture Sensor
Arduino
fritzing

PBL Components

In-Depth Understanding of Working of Components : We may know the theory but some problems which arise practically are only encountered when actually working on the project.

Problem Solving Skills : The problem solving skills have become a lot more effective through the project, learning from the failures is an important aspect here.

Management and Workflow : Through project based learning you learn to follow a flow of tasks as all the members need to be involved, which leads to efficient communication among the team members.

Hardware Problems Faced

Shortage of Power Supply

There was a shortage in power as a result so some of the components were not functioning properly.

Arduino has limited power supply and hence could not support the DC motors and the sensors together.

Solution

We connected an external power supply. This external source supplied power to all the DC motors.

Whereas the sensors obtained their power from the arduino.

Shortage of Memory

Arduino has limited dynamic memory which can be used.

As a result, when we tried to supply the data collected to two servers simultaneously, it showed an error regarding shortage in memory.

Solution

We used logical loops and transferred the data to the servers one after the other with some delay in between the two transfers.

Software Problems Faced

Transfer of Data to Server

When sending the data to the server, the server was storing garbage values while when read/displayed in Arduino it showed accurate results.

Solution

When data is sent to server, it is sent in the form of string, while we had expected that the data would be numerological and hence the data fields were set to double.

Later, the string value was converted to double.

Retrieval of Data from Server to Arduino

The arduino was not able to get the data sent by the server

Solution

The server sent data to arduino in the form of a php file.

We converted the data from server using json.array.

References

Dan, L. I. U., et al. "Intelligent agriculture greenhouse environment monitoring system based on IOT technology." 2015 International Conference on Intelligent Transportation, Big Data and Smart City. IEEE, 2015.

Pallavi, S., Jayashree D. Mallapur, and Kirankumar Y. Bendigeri. "Remote sensing and controlling of greenhouse agriculture parameters based on IoT." 2017 International Conference on Big Data, IoT and Data Science (BID). IEEE, 2017.

Li, Li, et al. "Application of IoT technology in greenhouse management." 2012 Dallas, Texas, July 29-August 1, 2012. American Society of Agricultural and Biological Engineers, 2012

Thank You!