

Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	03 October 2022
Team ID	PNT2022TMID52856
Project Name	SmartFarmer - IoT Enabled Smart Farming Application
Maximum Marks	4 Marks

Technical Architecture:

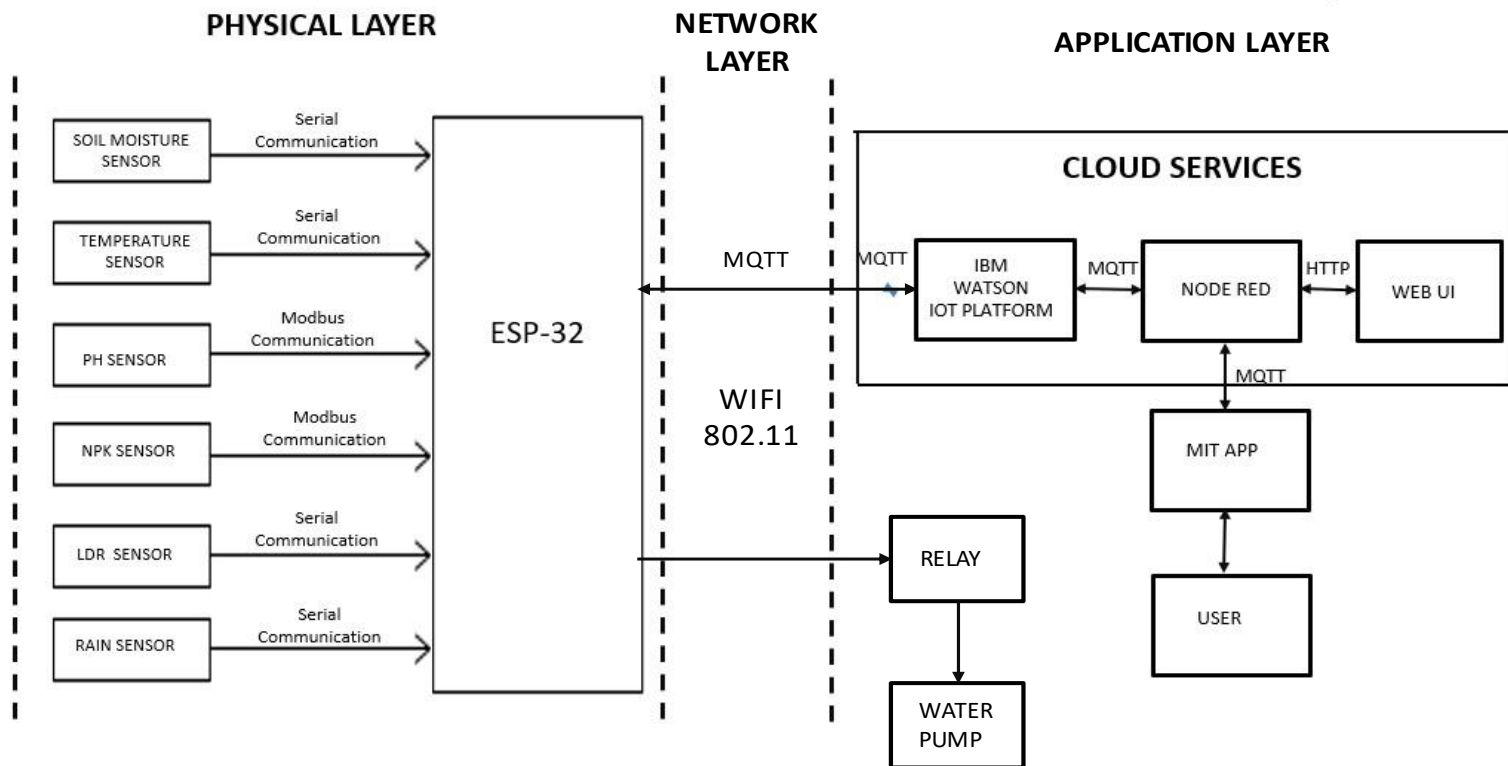


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	LM393 Soil Moisture Sensor	This sensor collects the data from the soil and it is transmitted through ESP-32.	Serial Communication Protocol
2.	DHT11 Temperature Sensor	This sensor measures the temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of $\pm 1^\circ\text{C}$ and $\pm 1\%$.	Serial Communication Protocol
3.	WQ201 PH Sensor	This sensor measures the Ph level of the soil within the range of 0-14.	Modbus Communication
4.	NPK Sensor	The soil nutrient content can be easily measured using NPK Soil Sensor and easily interfaced with ESP32 using MAX485 module	Modbus Communication
5.	LDR Sensor	This sensor determines the amount of light required for the crop yield	Serial Communication Protocol
6.	Rain Sensor	This sensor is mainly used for the irrigation purpose and used to detect water beyond what the humidity sensor can detect	Serial Communication Protocol
7.	ESP32	ESP32 monitors and sends the sensor values to the MIT app through cloud. It also controls the water level.	Microcontroller/edge device
8.	Database-1	Database to store login credentials.	Firebase
9.	IBM WATSON-IoT Platform	Monitor and log events (sensor data)	MQTT & cloud
10.	Node Red	Dataflow and interconnecting hardware.	Node red on cloud
11.	MIT App	Android application to monitor and control field parameters	User application - apk
12.	Relay	Actuate water pump based on user input	Electromagnetics

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Usability	<ul style="list-style-type: none">• User friendly guidelines for users to avail the features.• Most simplistic user interface for ease of use.	MIT App- simple and user interactive.
2.	Security	<ul style="list-style-type: none">• All the details about the user are protected from unauthorized access.• Detection and identification of any malfunction of sensors.	Encryption Secure server
3.	Availability	<ul style="list-style-type: none">• Easy to access without much expenses• App is compatible with most devices and easily accessible	Sensors (MEMS), actuators, microcontroller, cloud
4.	Scalability	<ul style="list-style-type: none">• More users can be added easily• Multiple sensors/ features can be introduced in future without replacing current system.• Easy to update	IoT-Watson platform Node red
5.	Performance	<ul style="list-style-type: none">• Big data analytics• Robust system• Uninterrupted communication networks• Ease of use	IoT Data analytics Cloud computing
6.	Reliability	<ul style="list-style-type: none">• Secure server maintenance• Accurate data monitoring• Real time error detection and updation	Secure server Failsafe connections