

# AI-ENHANCED PRECISION IRRIGATION

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SCIENCE AND TECHNOLOGY

**Team name:** Delta

**Theme:** Agriculture, FoodTech & Rural Development

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# Problem

Traditional methods of manual control of irrigation results in the extreme **wastage of water**.

1



2

Inconsistency in water distribution and the inability to synchronize irrigation with crop water requirements result in **poor agricultural yield**, and loss for farmers.



# Solution

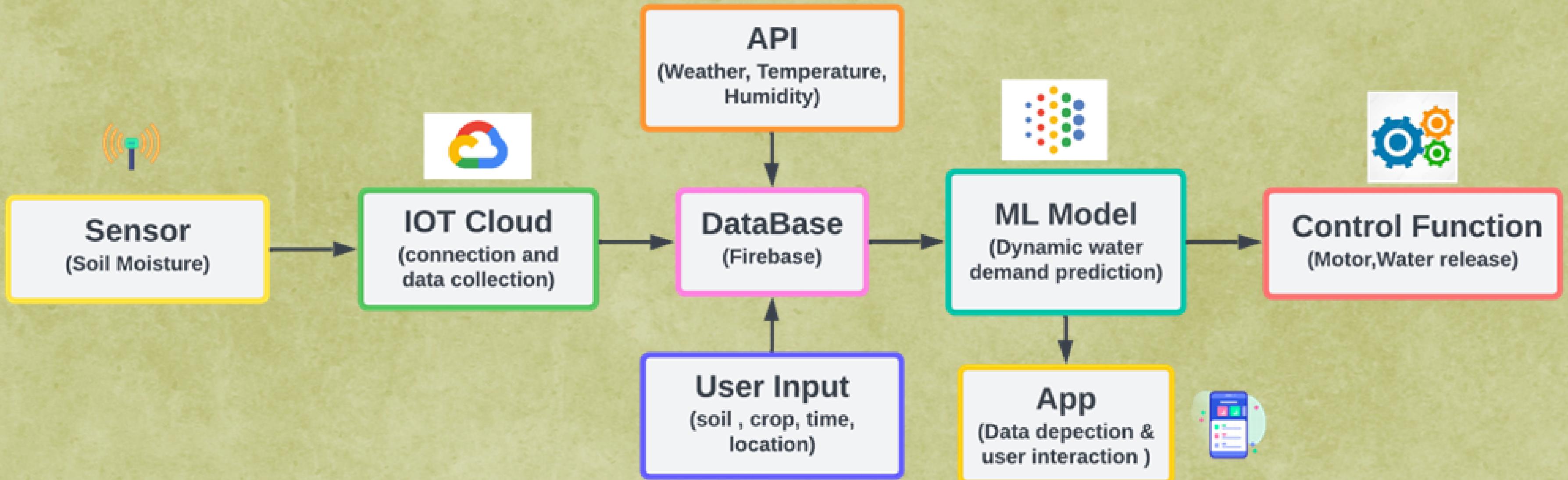
## AI powered automatic water regulation

- Dynamic water demand prediction by centralized AI system
- Automated sprinkler irrigation network
- Human intervention via GUI based app
- Alerts to indicate abnormalities

## Crop specific solution

- Wireless sensor network deployment
- 3 level architecture using multi hop communication
- Real Time data acquisition and integration from various sources

# Workflow



# Technology Stack

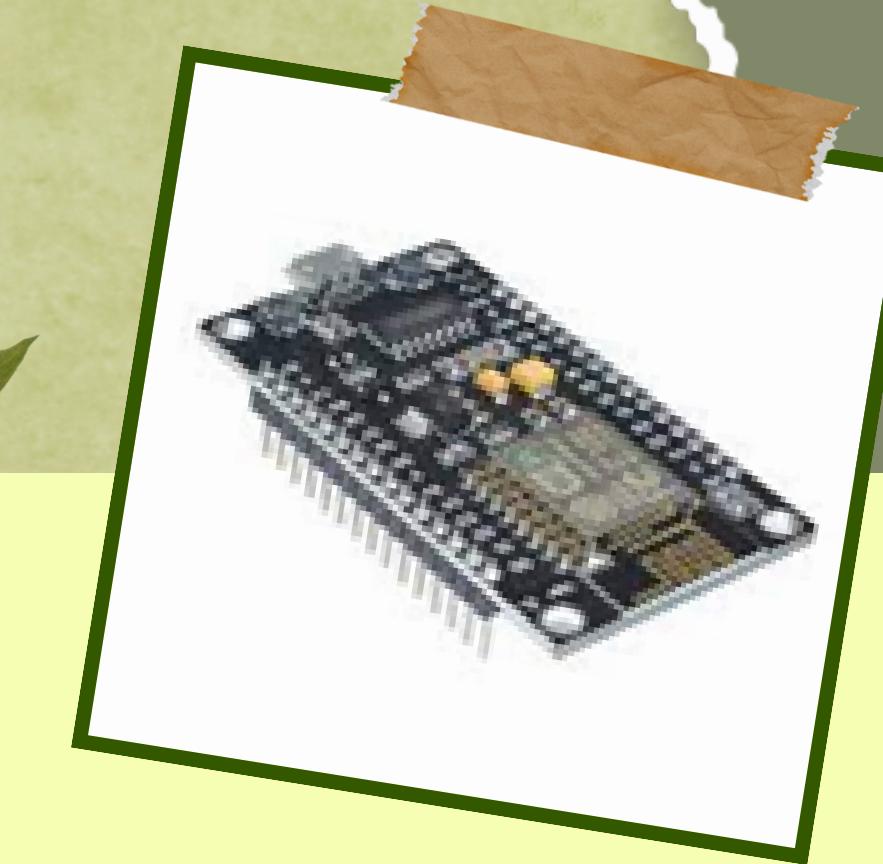
## Software

- Kotlin + Flutter
- Firebase
- ML algo (KNN)
- Google Cloud Services



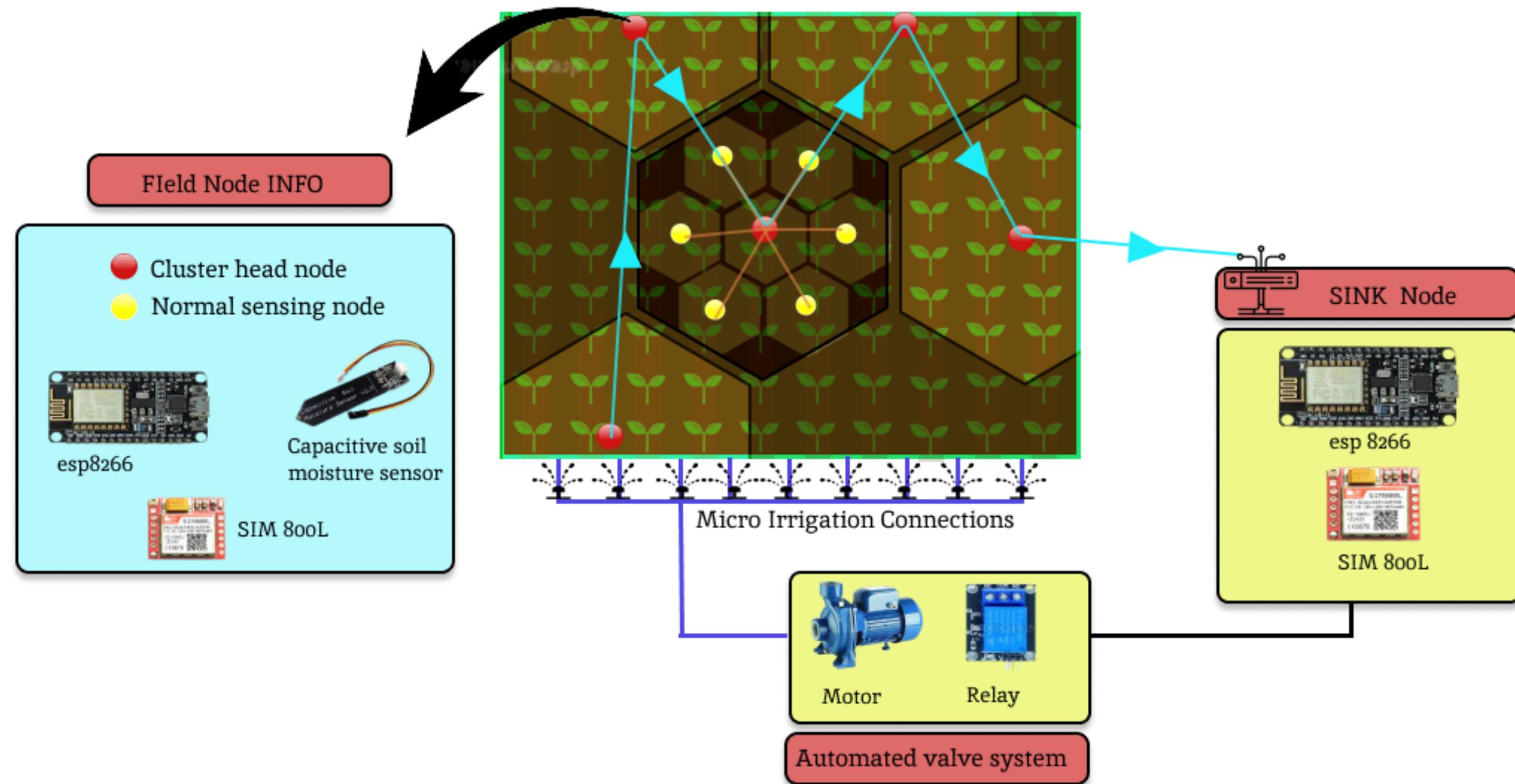
## Hardware

- NodeMCU (esp8266)
- Capacitive Soil moisture sensor

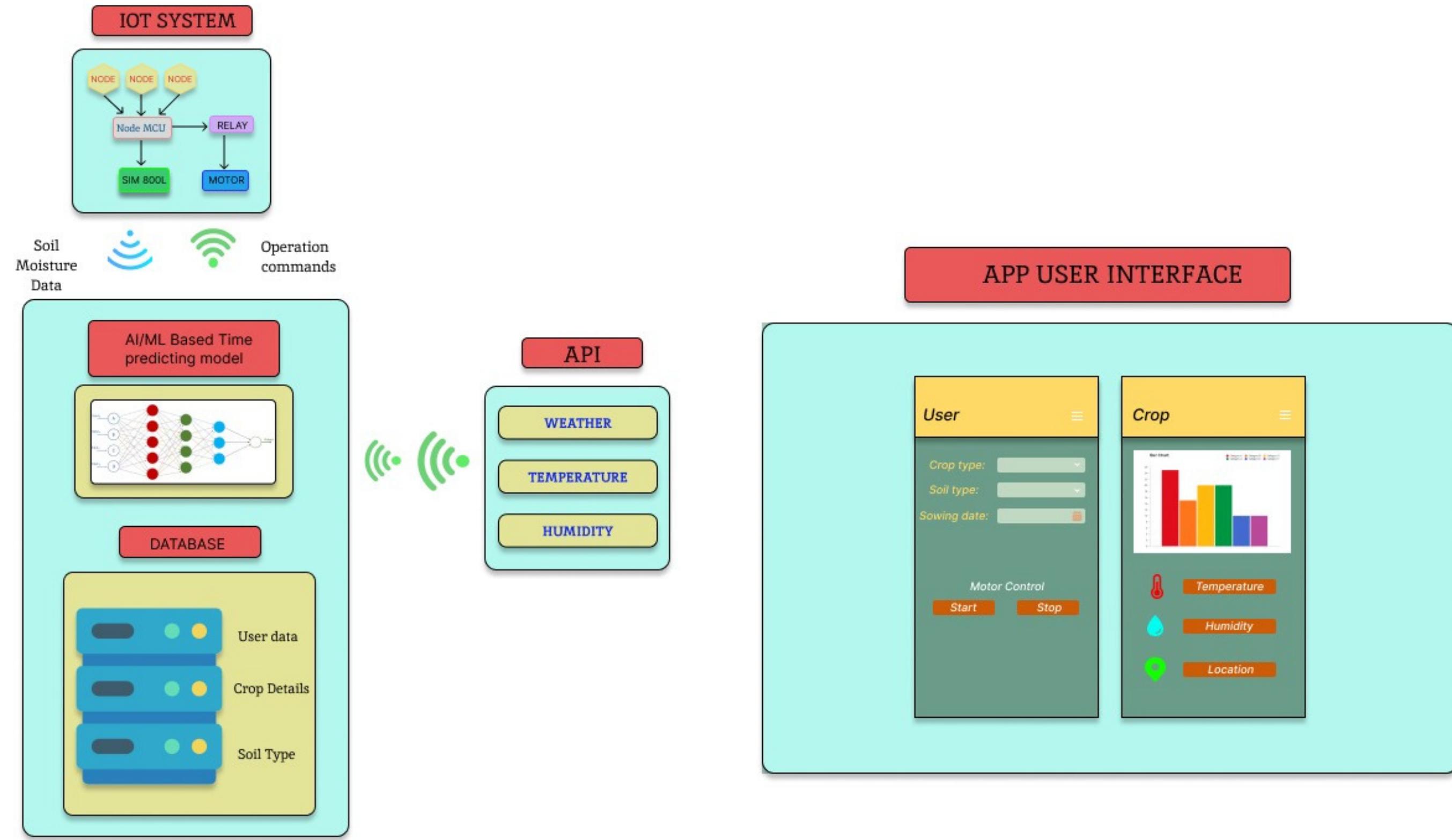


# AI ENHANCED PRECISION IRRIGATION

## HARDWARE CONNECTIONS



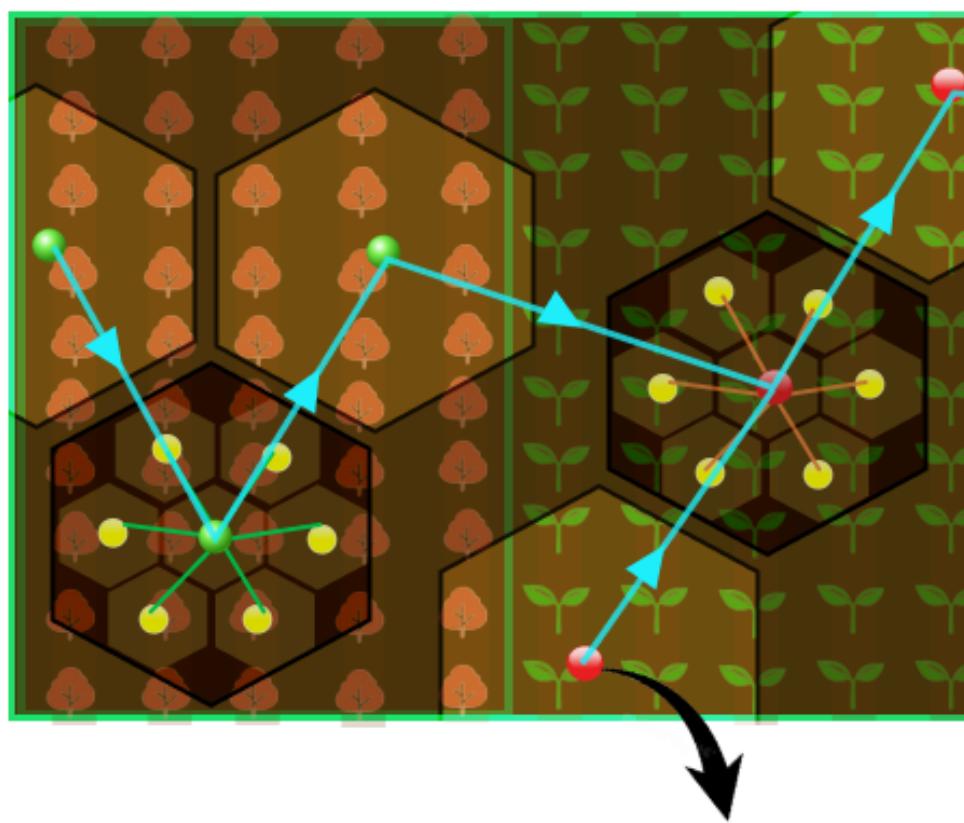
# SOFTWARE DETAILS AND INTERFACING WITH THE HARDWARE



# VARIATIONS IN THE IDEA FOR DIFFERNET SCENARIOS OF IRRIGATION APPLICATION

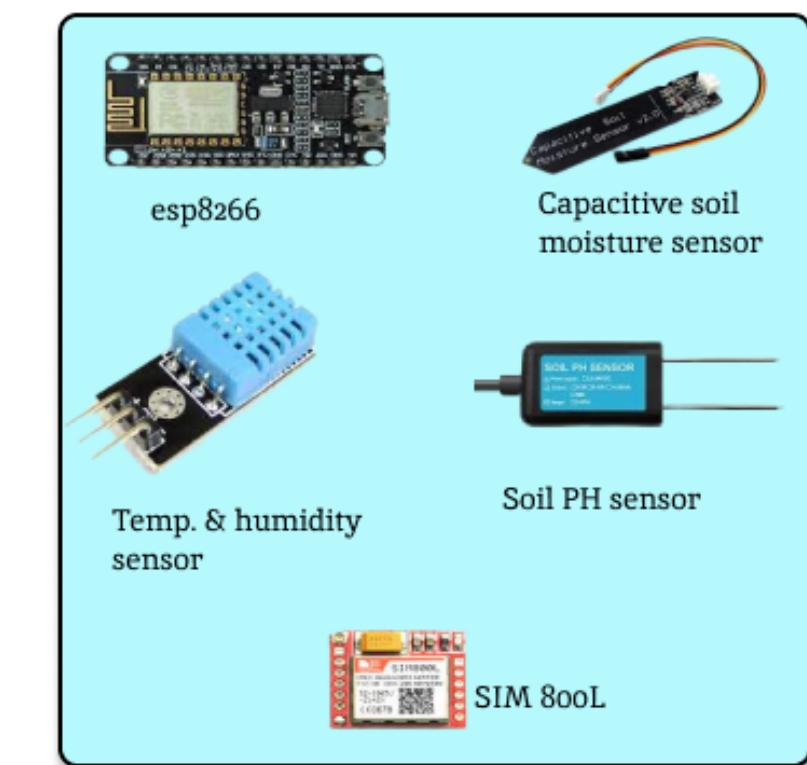
## MULTICROP FARMING

TYPE 2 CROP AREA      TYPE 1 CROP AREA

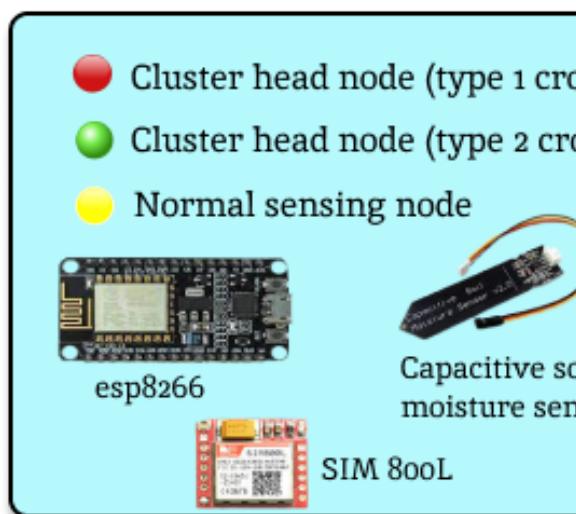


## INDOOR FARMING like Green House farming

NODE CONFIGURATION



And many more sensors can be configured in the WSN node as per the application



# Use cases

**Case 1**

Farming in drought-prone regions

**Case 2**

Crop specific solutions

**Case 3**

Remote monitoring and control

**Case 4**

Integrated pest management

**Case 5**

Smart green house

**Case 6**

Process automation

# Dependencies

1.

Google cloud services for  
flexible and remote access

2.

Weather API for precision  
(for web application)

# Show Stoppers

- Honeycomb arrangement of heterogeneous nodes
- Wireless Multi hop communication
- Different working modes of nodes
- Detection of leakage/ faulty system
- Applicable to all micro irrigation techniques
- Amount of water saved (50-70%)



# Thank You

