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INTRODUCTION

1. **Project Domain:** Internet Of Things & Web Development
2. **Project Sector:** Smart Agriculture
3. **Topic:** Smart Irrigation System
4. **Subject:** Mini Project (ITUDPV1)
5. **Institution:** SOS Engineering and Technology GGV-(A Central University) Bilaspur, Chhattisgarh
6. **Mentor:** Dr. Amit Kumar Khaskalam Sir

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WHY ARE WE SOLVING?

Agriculture uses over 70% of the world's freshwater. Yet, most farmers rely on guesswork for irrigation, resulting in:

- Water wastage
- Crop stress or damage
- Reduced productivity

Because there’s a critical lack of data-driven irrigation systems. We aim to:

- Conserve water resources
- Empower farmers with smart, actionable insights
- Contribute to sustainable agriculture
- To develop an affordable, real-time smart irrigation solution.

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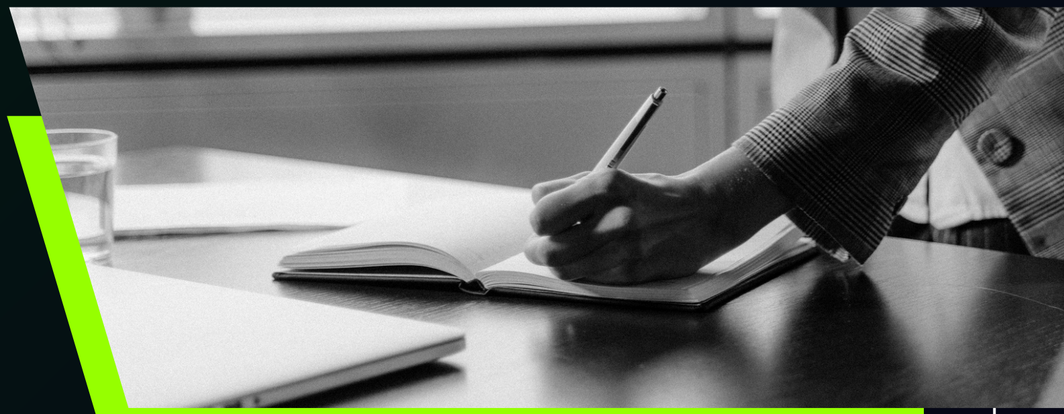
PROJECT OVERVIEW

The Smart Agriculture Predictive Irrigation System is an IoT solution that seeks to optimize water usage with a promise of maximum crop yield in drought-sensitive farming regions. It merges real-time data from soil moisture sensors, weather APIs, and water requirements specific to crops into one channel. Display on web application.

- Sensors are used to collect soil moisture data.
- Weather API to get forecast information.
- Check irrigation schedules.
- Creating a web application that will provide information to the user.



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CORE FEATURES

1. Real-Time Soil Moisture Monitoring
   - Continuously tracks soil moisture levels using sensors.
   - Sends live data to a dashboard or cloud server.
2. Automated Irrigation Control
   - Automatically turns ON/OFF the water pump based on moisture levels and weather conditions.
   - Adjusts irrigation automatically based on weather forecasts (e.g., delays watering if rain is expected)
3. Web dashboard
   - User-friendly interface to view live data, analytics.
4. Low power consumption.

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TECH STACK

Hardware:

ESP8266 (NodeMCU)
Soil Moisture Sensor
Power Supply (5v Battery)
Relay module
Submersibe Pump

Web Development:

HTML, CSS
JAVASCRIPT
CHART.JS

Software:

Firebase(cloud)
Arduino IDE

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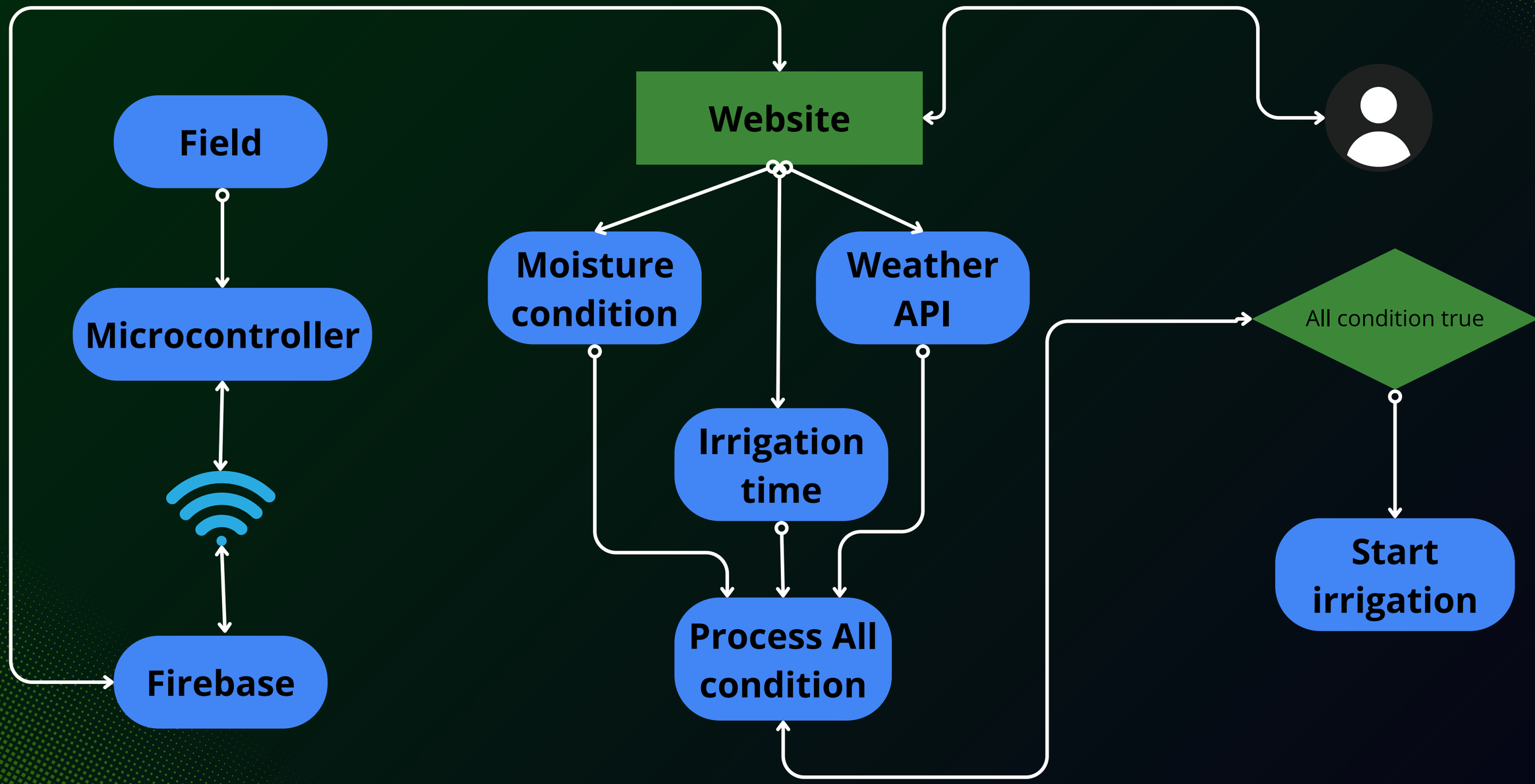
SYSTEM ACHIETECTURE

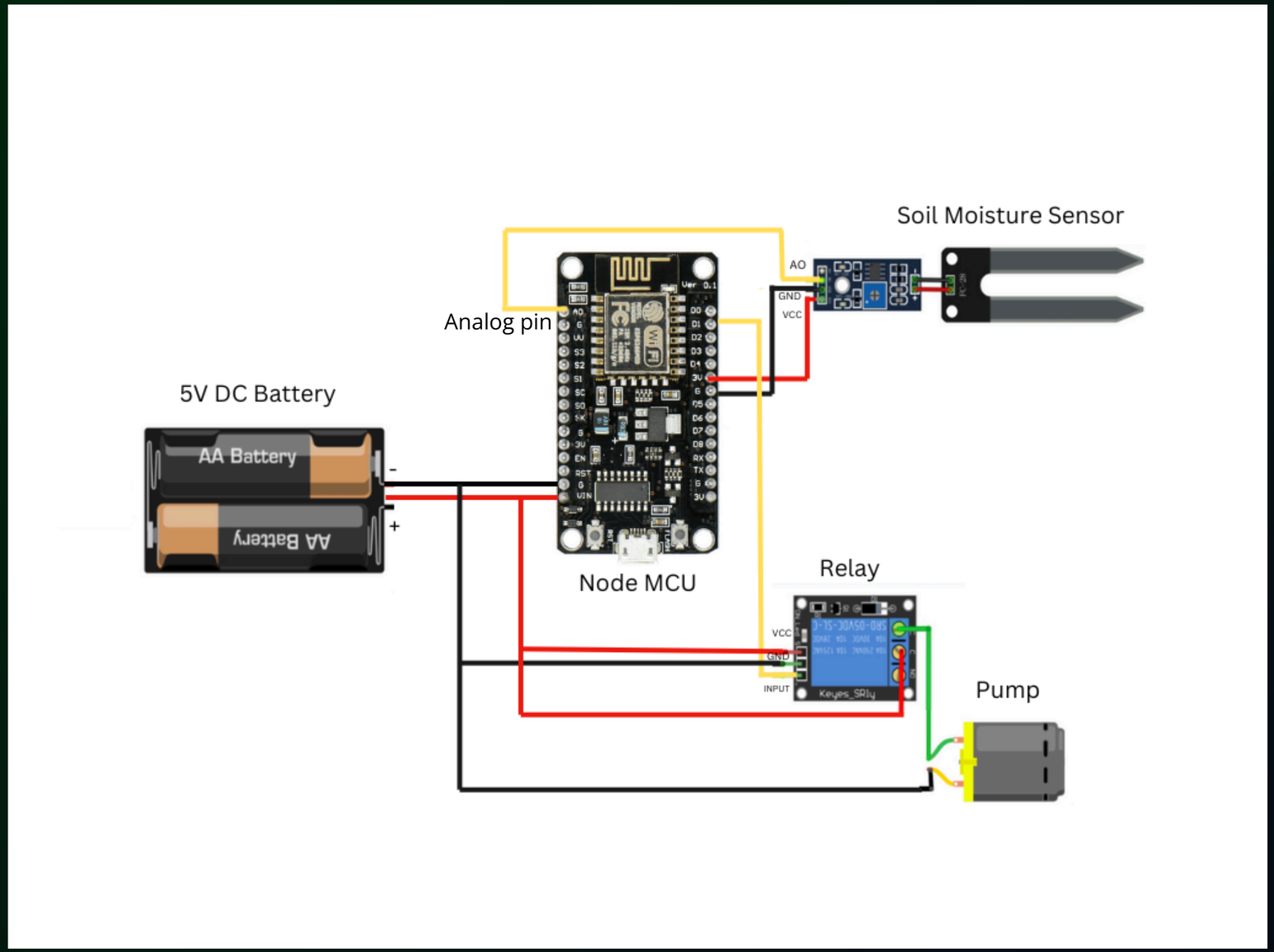


HARDWARE ARCHIETECTURE

Hardware Requirements:

- Micro Controller : ESP8266 Node MCU
- Soil Moisture Sensor
- 5v Relay Module
- Submersible Pump
- 5V Power Supply
- Jumper Wires, Resistors, Transistors, etc.

CONNECTION DIAGRAM



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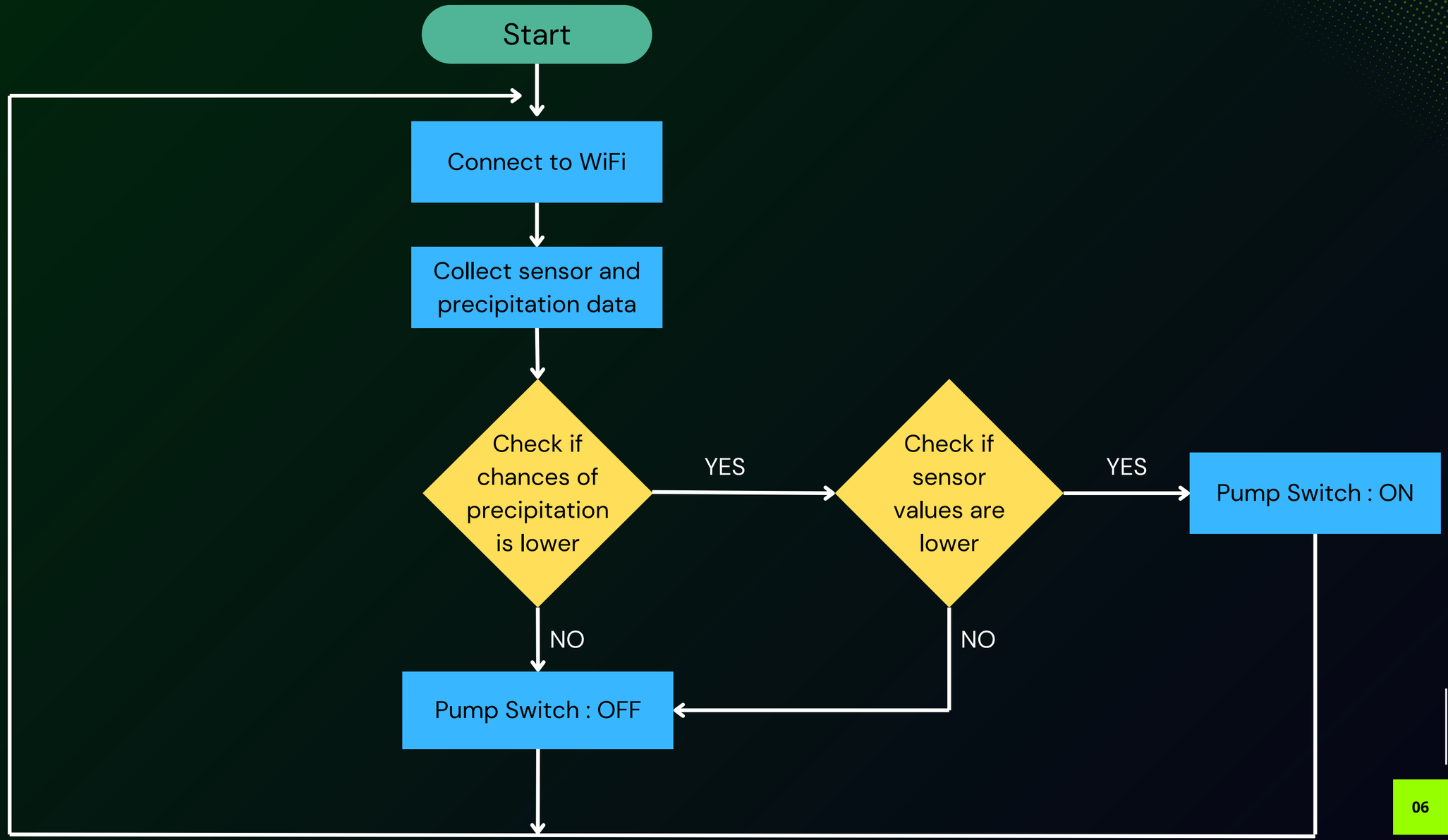
LOGIC



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LITERATURE OVERVIEW

The IoT is very useful in various fields including Agriculture by enabling real world interaction .
IoT technologies such as sensors, communication systems and data analysis transformed conventional farming into smart agriculture.

Its potential is high but it faces major challanges, as slection of appropriate sensors , data analysis need advanced algorithms.
IOT is expected to drive smart agriculture with the global market projected to grow to **3.39** billion dollor by 2030.

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THANK YOU