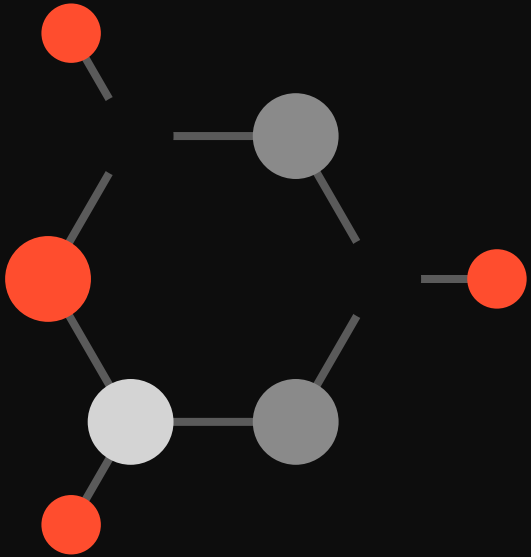




FINAL YEAR PROJECT · B.TECH ELECTRONICS & COMMUNICATION

Smart Irrigation System using IoT

Soil-moisture driven watering for small farms

PRESENTED BY
Aarav Sharma · Diya Patel

GUIDED BY
Prof. R. K. Mehta

DEPARTMENT
**Electronics & Communication,
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01

INTRODUCTION

KEY IDEA

**Up to half of irrigation
water on small farms is
lost to over-watering.**

Why this project matters

Introduction

- Agriculture depends heavily on timely, measured irrigation
- Manual watering wastes water, power and labour
- Low-cost sensors and microcontrollers make automation affordable
- This project builds a sensor-driven pump controller with a phone dashboard

CONTEXT

Flood irrigation is still the most common method on small Indian farms.

Problem statement

1

Over-watering

Fields are watered on a fixed schedule, not on actual soil need.

2

No visibility

Farmers cannot see soil conditions without visiting the field.

3

High cost

Commercial drip automation is too expensive for small plots.

02

LITERATURE & GAP

Literature survey

Study	Approach	Limitation
Kumar et al.	GSM-based pump control	No sensor feedback
Rao & Singh	Timer-based drip system	Ignores weather and soil
Fernandes	Cloud dashboard prototype	Needs constant Wi-Fi

Representative summaries — replace with your own citations.

03

PROPOSED SYSTEM

System architecture



Sense

Moisture, DHT11 and rain sensors read field data



Process

ESP32 compares readings with crop thresholds



Act

Relay switches the pump on or off



Notify

Readings and alerts sync to the app

Block diagram

Every module talks through one simple, testable interface.

Sensors feed an ESP32 controller. A relay module drives the pump, and readings are pushed every minute to a lightweight cloud database that the mobile dashboard reads.



Block diagram / flowchart

Technology stack

1

ESP32

Wi-Fi
microcontroller
running the control
loop

2

Sensors

Capacitive soil
moisture, DHT11, rain
sensor

3

Firebase

Real-time database
for readings

4

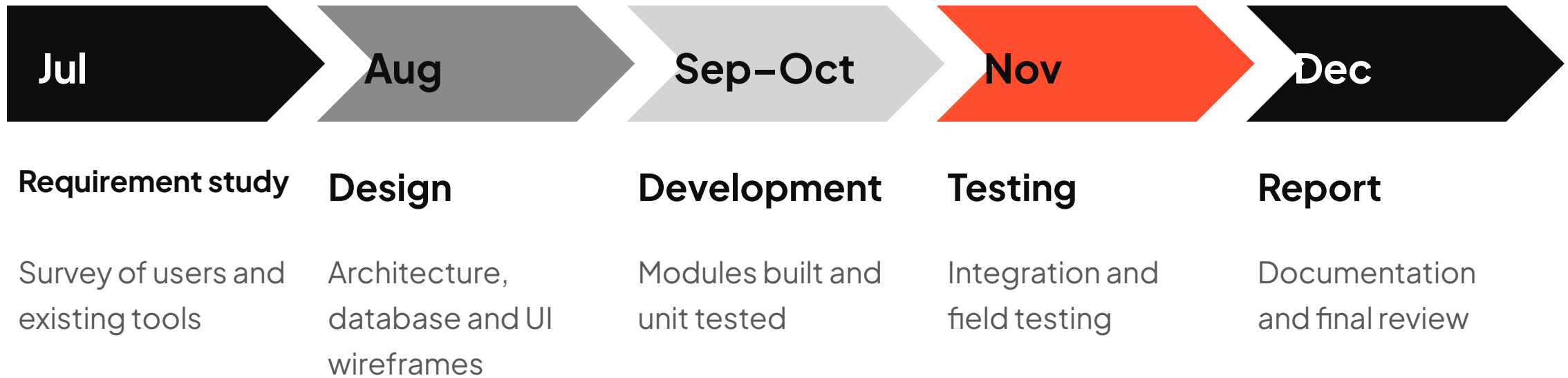
Flutter

Cross-platform
mobile dashboard

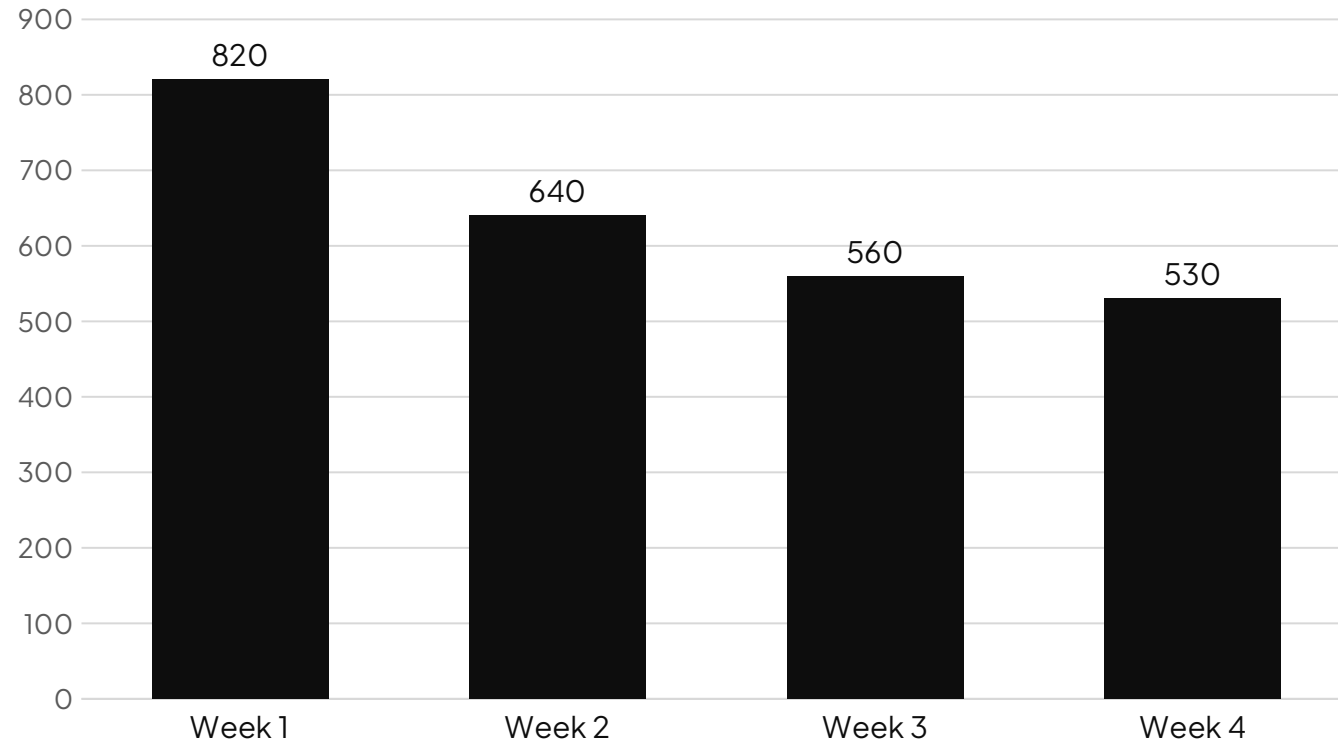
04

IMPLEMENTATION

Project timeline



Results



Sample data for illustration — replace with your own figures.

35%

less water than the manual baseline

Automatic switching cut water use steadily as thresholds were tuned for the crop.

Conclusion

- A low-cost controller can automate irrigation reliably
- Sensor feedback avoids over-watering and saves power
- The dashboard gives farmers visibility without field visits

Thank you

Questions and suggestions are welcome.

Aarav Sharma · Diya Patel

Dept. of Electronics & Communication

