📝Internship Weekly Progress Report

Internship Title: Automate Irrigation using Soil Moisture and Weather Data **Organization:** Edunet Foundation (AICTE Collaboration) **Intern Name:** Aniket Redekar **Domain:** AI/ML, Data Analytics, IoT Integration **Internship Duration:** July – August 2025 **Mode:** Virtual **Project Type:** Software Development (ML-based IoT solution)

Week 0 – Orientation & Project Allocation

Date: 11 July 2025

- Attended internship orientation session.
- Understood internship structure, weekly milestones, and evaluation criteria.
- Selected **Project 5**: Automate Irrigation using Soil Moisture and Weather Data (Software-focused implementation).
- Discussed project objectives:
    - Build an ML model for predicting irrigation needs.
    - Optimize water usage using sensor and weather data.
- Created initial folder and GitHub repository structure for the project.

Week 1 – Project Planning & Data Preprocessing

Dates: 15 – 16 July 2025 *Mentoring Session Activities:*

- Imported and explored the provided dataset (irrigation_machine.csv).
- Performed Exploratory Data Analysis (EDA):
    - Used .head(), .info(), .describe() to understand structure.
    - Checked for missing values and anomalies.
- Cleaned dataset:
    - Dropped unnecessary column (Unnamed: 0).
- Defined:
    - **X** → Features (sensor_0 to sensor_19).
    - **y** → Target labels (parcel_0 to parcel_2).
- Applied **MinMaxScaler** for normalization.
- Designed the ML workflow plan for next stages.

Master Session: DevOps Code to Production (18 July 2025)

- Learned how to move from development code to a production-ready environment.
- Understood CI/CD pipelines, containerization (Docker), and deployment practices.
- Gained insight into maintaining clean, modular, and deployable code.

Week 2 – Model Selection & Building

Dates: 21 – 22 July 2025 *Mentoring Session Activities:*

- Selected **RandomForestClassifier** with **MultiOutputClassifier** for multi-label classification.
- Performed train-test split (80-20).

- Trained the model on scaled features.
- Generated predictions and evaluated:
    - Accuracy, Precision, Recall, F1-score per parcel.
- Used classification_report for multi-output metrics.
- Documented results in Smart_Irrigation.ipynb.

Master Session: Resume Resonance (25 July 2025)

- Learned how to align resume with job descriptions for AI/ML and IoT roles.
- Understood ATS-friendly formatting and impact-based bullet points.
- Gained tips on showcasing projects effectively for internships and job applications.

Week 3 – Visualization, Model Evaluation & Optimization

Dates: 28 – 29 July 2025 *Mentoring Session Activities:*

- Created visualizations for:
    - Sensor value distribution.
    - Feature importance analysis.
- Optimized model parameters for better performance.
- Saved the trained model using Joblib.
- Updated GitHub repository with improved README.md and cleaned code.

Master Session: Managing Codebase with GIT (01 August 2025)

- Learned advanced Git operations for collaborative projects.
- Understood branching strategies, version control best practices, and pull request workflows.
- Applied Git commands to maintain an organized project repository.

Week 4 – Project Submission & Final Presentation

Project Submission: 05 – 07 August 2025

Activities:

- Created final PPT based on provided template.
- Finalized README.md including:
    - Problem Statement & Solution.
    - Dataset description.
    - Model details.
    - Future scope.
- Uploaded final code, model, and PPT to GitHub.

Key Learnings

- Practical experience in multi-output classification for IoT applications.
- Effective data preprocessing and feature scaling techniques.
- Integration pathway for ML models with IoT hardware.

- Knowledge of production deployment and version control.
- Improved technical communication and presentation skills.

Future Improvements

- Integrate with real-time IoT sensor feeds.
- Enhance model with weather API data.
- Build a Streamlit or Gradio interface.
- Implement automated pump control via microcontrollers.