

1M1B Green Internship

(1M1B Green Internship, Batch 3)

1. Basic Details

- **Intern Name:** Devi Sri Kanaka Nandini Yelugubanti
- **College/University:** Pragati Engineering College
- **Course/Year:** B.Tech-CSE(AI&ML), 4th year
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2. Project Overview

- **Project Title:** Smart Rain Water Harvesting
- **Project Theme (Waste, Water, Carbon Footprint, Energy):** Water
- **Group/Solo:** Group
- **Group name:** Pragatians
- **Group member's full official name:** Patneedi Naga Venkata Sri Sailaja, Ganga Bhavani Taruna Kodamanchili, Addanki Satya Niharika
- **Problem Statement:** Urban and rural regions face challenges in utilizing rainwater effectively due to a lack of real-time prediction and tank monitoring. Water overflow, underutilization of harvested water, and overdependence on municipal sources are prevalent issues. This project aims to solve this by building a data-driven system that can forecast rainfall and optimize tank usage accordingly.
- **Tools, Frameworks and Softwares used:**
 - Python, Pandas, NumPy
 - Keras / TensorFlow (LSTM model)
 - Matplotlib (visualizations)
 - Genetic Algorithm (custom code)
 - Tableau (dashboard)
 - Google Colab (experiments & execution)
- **Summary of Work Done :** This project focuses on designing a Smart Rainwater Harvesting Management System that leverages machine learning and optimization to enhance water conservation efforts. It uses an LSTM model to forecast rainfall and a Genetic Algorithm (GA) to compute an optimal monthly water usage schedule. The goal is to minimize water wastage through overflow and manage storage efficiently. Visual insights are provided through a Tableau dashboard.

3. Links to Project Deliverables

SNO	Item	Google Drive Link
1	Master Google Drive Link	Master Google Drive Link
2	Final PPT (PPT or PDF)	Final PPT Link
3	Final Project Report / Concept Note(Word Document)	Final Project Report Link
4	Tableau Dashboard (Direct link or link to the dashboard screenshot uploaded on google drive)	Tableau Dashboard Link
5	Project Photos (All the relevant photos of stakeholders interaction, implementation uploaded on a google drive folder)	Project Photos Link
6	Project Videos (Project Video compiled, uploaded on the google drive folder)	Project Video Link
7	Calculate the the final count of your LIP(Create a word document with a summary of your LIP engagements)	LIP Summary Link
8	Any other supporting document (Raw data, surveys conducted etc)	Other Documents Link

4. Impact Created

- **Quantitative Impact :**
 - Achieved **up to 20% reduction** in water overflow through optimized usage.
 - Simulated tank usage resulted in **up to 10,000 liters** of potential water savings annually.
 - Dashboard insights can support **awareness in schools and communities**, reaching **100+ individuals**.
 - Enabled **predictive planning** for water needs across **12 months** using AI models.
- **Qualitative Impact:**
 - Promoted **behavioral change** by encouraging planned and efficient water use.
 - Raised **awareness** about smart rainwater harvesting and sustainability through data visualization.
 - Demonstrated the role of **AI in environmental conservation**, engaging students and local stakeholders.
 - Fostered **community involvement** by enabling data-driven water usage decisions.

5. Learnings from the Internship

- **Green Skills:**

I learned the importance of sustainable water management and how technology can reduce water wastage through smart harvesting systems.

- **Data Skills:**
I gained experience in data analysis, LSTM forecasting, and optimization using Genetic Algorithms, along with creating insightful dashboards using Tableau.
- **Professional Skills:**
I improved my problem-solving, communication, and project execution skills while applying machine learning to a real-world environmental issue.

6. Challenges Faced

One major challenge was gathering accurate and relevant rainfall data for model training. Tuning the LSTM model for precise forecasting also required multiple iterations. Additionally, integrating the optimization algorithm with real-world constraints and visualizing the results effectively in Tableau took careful planning and testing.

7. Acknowledgments

Grateful to 1M1B mentors and program leads for continuous guidance. Thanks to faculty and peers for their feedback. Special thanks to stakeholders and early testers of our model and dashboard.

8. Future Roadmap

Timeline	Planned Action
	(Write your responses below)
Next 1 month	Add real-time rainfall APIs and real consumption data
Next 2 months	Build UI using Streamlit or Web app tools
Next 6 months	Conduct a small-scale field pilot
Next 12 months	Collaborate with civic bodies for broader adoption

9. Final Notes / Comments

This project reinforced how AI and data science can contribute to grassroots environmental solutions. We aim to take this forward into real deployment and impact. Thankyou for this opportunity 1M1B .