The Digital Flora

Project Report

Geo-spatial mapping of trees at
Institute of Technology (IoT) Campus Zakura

Supervisor

Dr. Baasit Abubakr

Coordinator

Prof. Syeda Afshana

Project Team

DYD 2nd Batch 2024

Project Execution Team

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Design Lead

Natiq Nabi Sofi

Introduction

Maintaining urban greenbelt takes more than intention—more than intention, it needs to be complemented with systematic data, continuous monitoring, and data-driven decision-making. Taking this into consideration, students from the Design Your Degree (DYD) Batch 2025 of IOT, University of Kashmir (Zakura Campus) initiated a geo-spatial mapping project aimed at digitally documenting and tracking the trees within the campus. The main goal was to create a spatially precise and centralized tree inventory, but also to increase student interaction with their natural environment through systematic database management techniques.

With the use of GPS-equipped devices and geospatial mapping technologies like Google Earth, every tree was precisely marked with its coordinates. The information was tabulated into a systematically arranged database using software like Microsoft Excel to enable effective management of the database and possible integration with larger ecological platforms. This database is now a cornerstone of future research, campus planning, and ecological monitoring — emphasizing the importance of effective database management and long-term database management practices.

In addition to its technical implementation, the project was based on conservation values. As the student volunteers learned about and recorded the campus's natural features, they came to possess an educated understanding of trees' ecological functions — from carbon storage to biodiversity and climate regulation. By combining field observation with systematic database management, this project establishes the foundation for an environmental stewardship culture informed by credible, accessible, and extensible data.

Total Trees Mapped

650+

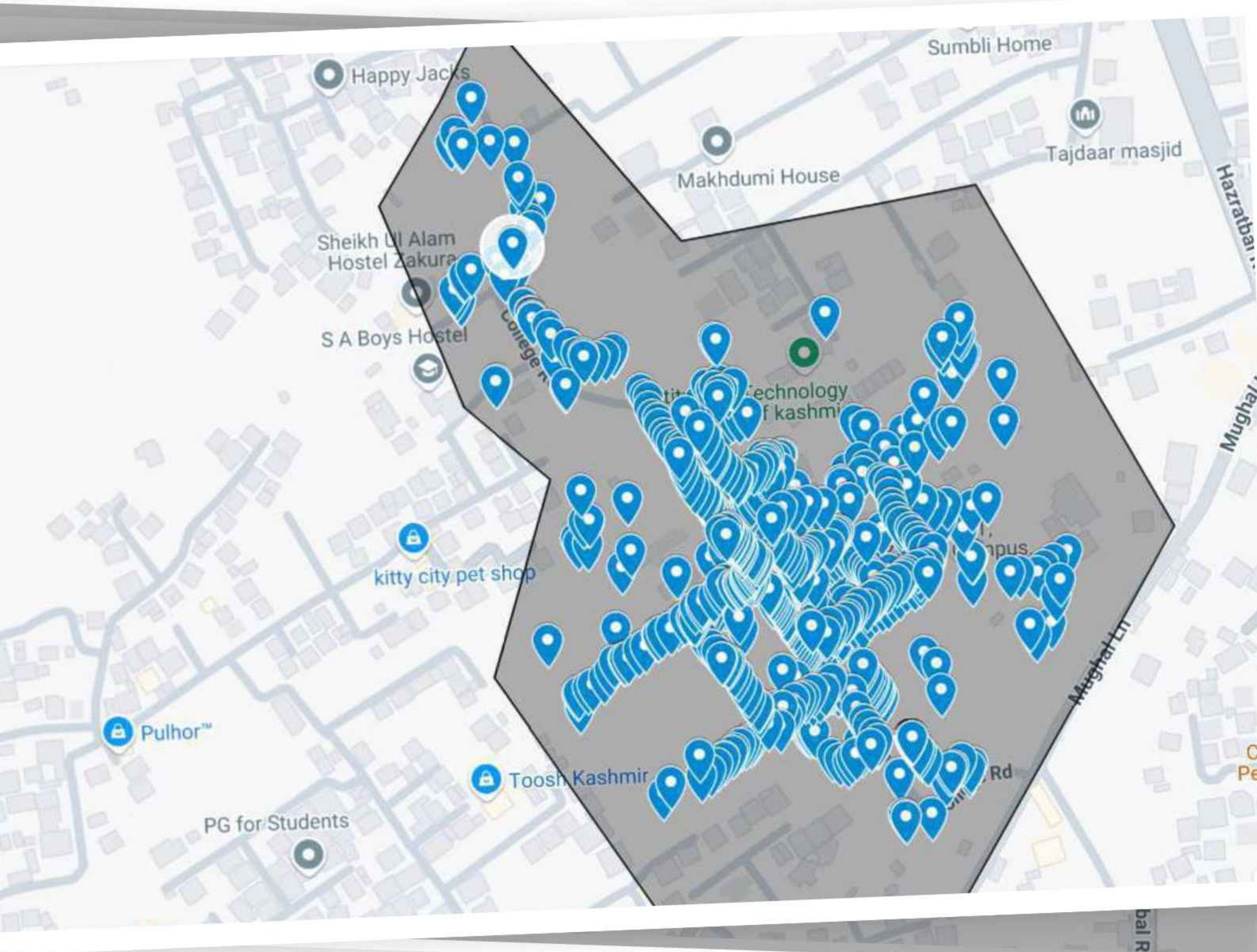
Timeframe

March + April

2025

- Campus Tree Map Overview -

This digital map presents a spatial overview of the trees documented across IOT Zakura Campus during our geo-spatial mapping initiative. Each mapped point is linked to detailed location data and structured within a centralized database, offering a comprehensive visual reference to support conservation efforts, informed campus planning, and future ecological research.



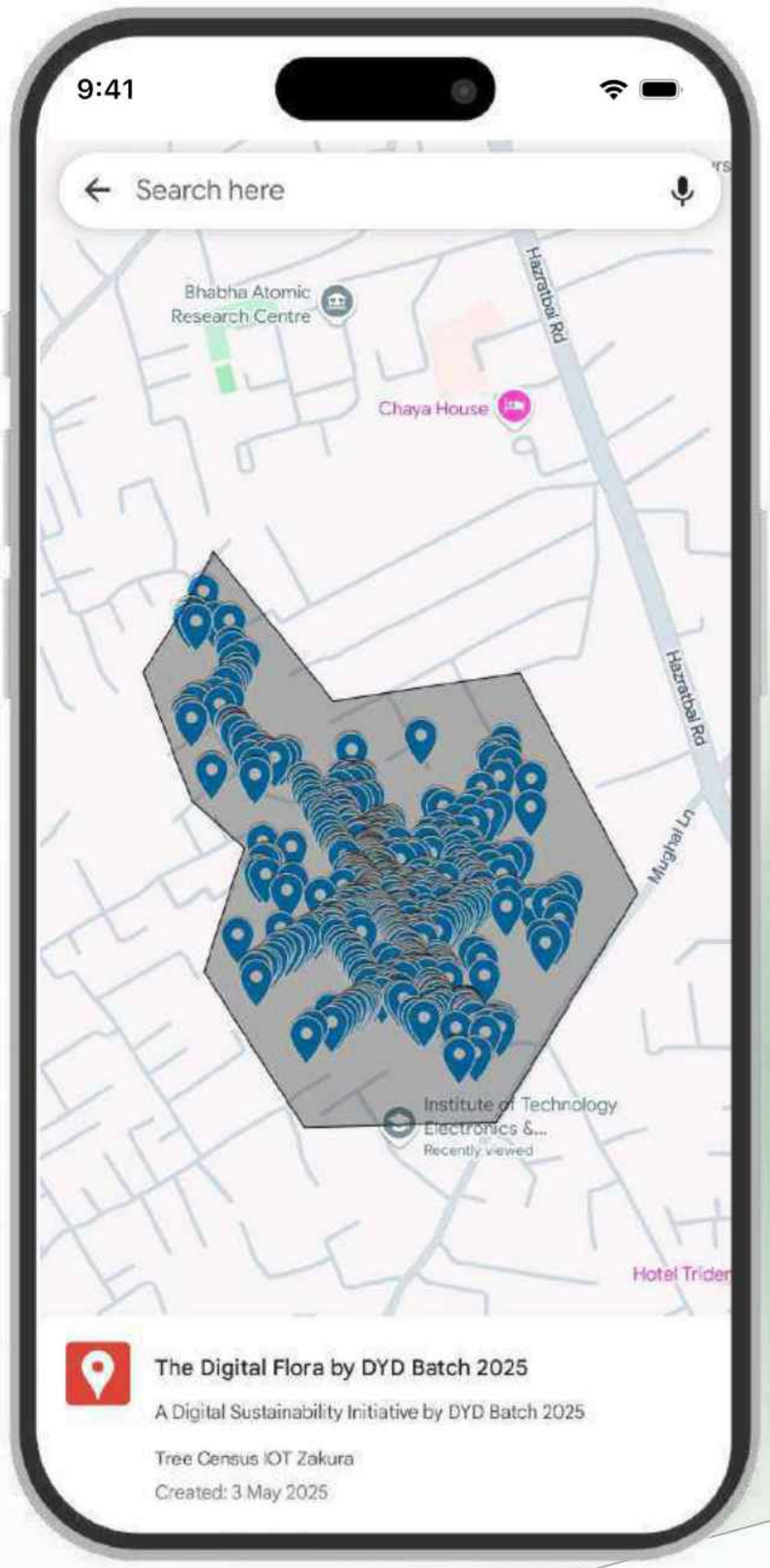
Keywords

Urban Green Spaces, Geo-spatial Mapping, Tree Inventory, Database Management, Environmental Conservation, Geospatial Mapping, Ecological Monitoring, GPS-enabled Devices, Sustainability, Climate Moderation, Biodiversity, Ecological Research.

Digital Map Access

Our project includes an interactive digital map built using Google Earth and Google Maps, enabling users to visually explore the documented tree data across the Institute of Technology, Zakura Campus. Each tree entry is geo-tagged with precise coordinates, offering an intuitive spatial overview of green coverage.

Scan to explore our live geo-spatially tagged campus tree map



Main Objectives

01

To Promote Environmental Conservation

Encourage awareness of the ecological value of trees and promote long-term preservation of campus green cover through structured documentation.

02

To Provide Practical Exposure to Geospatial Tools

Enable students to gain hands-on experience in using GPS-enabled devices and digital mapping platforms for environmental fieldwork.

03

To Establish a Functional Environmental Database Management System

Create and manage a structured, accessible digital repository of tree data that can be updated and utilized for long-term monitoring, academic research, and maintenance planning.

04

To Support Informed Campus Planning

Offer data-driven insights for future development and landscaping decisions that account for existing natural resources.

Methodology

01 Field Data Collection

Students conducted on-site surveys using GPS-enabled smartphones to record the precise location of each tree across the campus.

02 Digital Mapping and Integration

The collected data was uploaded to Google Earth, where each tree was plotted and visually represented, forming the basis of a digital campus tree map.

03 Database Structuring and Management

All data collected were handled with care to be cleaned, categorized, and stored within a structured database management system for accuracy, ease of retrieval, and long-term applicability to future monitoring and academic research.

Key Learnings

Technical Proficiency

- Acquired hands-on experience with geo-spatial mapping and geospatial software.
- Learned to organize and handle field data through efficient database management techniques.
- Gained experience in using digital mapping tools such as Google Earth for structured data visualization.

Environmental Insight

- Identified and documented the diversity of tree species on campus.
- Gained a deeper understanding of trees as ecological assets—crucial for air quality, temperature regulation, and biodiversity.
- Observed variations in tree health and growth, informing potential maintenance priorities.

Collaborative Work

- Strengthened communication and coordination in team-based fieldwork.
- Developed problem-solving skills in real-time data collection scenarios.
- Improved attention to detail, especially in verifying GPS accuracy and species identification.

Field Work Gallery

A glimpse into our on-ground geo-spatial mapping activity. These photos capture the students documenting tree locations, and working collaboratively in the field. The experience blended technology with nature, offering practical learning beyond the classroom.

Field Work Gallery

Tree Gallery

Our Team Effort

This project was undertaken by the Design Your Degree 2nd Batch 2024 (University of Kashmir) at IOT Zakura Campus, in five groups. Each group dealt with a particular zone, geo-spatial mapping, field documentation, and structured database management.

From database management to GPS photography, every group helped in putting together a combined digital map that was accurate and organized. This unified conservation record rests on teamwork and managed information.

Group A (The Think Tank)	**Group B** (The Scribblers)	**Group C** (Tech Titans)	**Group D** (Nexus Thinkers)	**Group E** (Innovator's Hub)
Mohammad Sadeq Beigh	Gazifa Amin Malik	Tarannum Gulzar	Mohammad Hamzah	Arwa Majeed
Owais Aziz	Natiq Nabi Sofi	Bilal Ahmad Bhat	Sajid Nayeem	Wasik Altaf Lone
Mohammad Waris	Zuhaib Manzoor	Mohammad Murtaza Khan	Furkan ul Nisa	Wani Ahsan ul Haq
Aisha Ashiq	Aiman Amin	Nadeem Bashir	Basima Noor	Mohammad Kashif Kamran
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Meet the Team

The group photograph is the embodiment of the full force of the Design Your Degree Batch 2025 (University of Kashmir) which was involved in **The Digital Flora** project at IOT Zakura.

Every student played a part in this endeavor—be it in the field, overseeing data, or assisting coordination among groups. This photo is a reminder of the energy, teamwork, and combined purpose that allowed the project to exist.

In the future, the team aims to scale up this project and reach newer heights in conservation through smartphone apps, ecologic metadata like species name, growth habit, canopy spraed and health status. Such tools would minimize errors in observation and significantly enhance the scientific merit of gathered data.

Conclusion

IOT Zakura's geo-spatial mapping project was an earnest convergence of fieldwork, digital technology, and sustainability. By using systematic data gathering, geospatial mapping, and database management, students have developed a useful, centralized document that can aid continuous conservation work and strategic planning for the campus.

This project makes a substantial contribution to conservation through the creation of a precise digital map of the campus's ecological resources. With ordered and available data, it becomes feasible to locate areas that need to be conserved, facilitating sound, sustainable decision-making. The project emphasizes how combining environmental consciousness with systematic data management can contribute to long-term ecological resilience.

Aside from the technical skills, the students became more aware of the ecosystems in their environment. The project stressed the importance of data-driven stewardship of the environment, with practical experience on handling sensitive data with precision and responsibility.

We thank our mentors for their wisdom and our peers for their cooperation in this endeavor. This project is not only a digital archive, but a testament to what can be achieved when observation is combined with purpose—where technology, collaboration, and conservation unite to create a more sustainable world.