

Slide 1 - Introduction

Hello everyone!

My name is **Alexandra Onose**, and I'm here today to introduce you to a really exciting project — **SmartGarden**. This is an IoT-based system designed to help people take care of their indoor plants more easily and more efficiently.

Let me begin with a question:

How many of you love having plants at home? Raise your hand if you do.

(pause)

That's great! Now, **how many of you have had trouble keeping those plants healthy?**

(pause)

Well, SmartGarden was born out of that common challenge: people love having plants, but most of us forget to water them, or we water them too much.

This project is my solution to that.

Slide 2 - Outline

Now that you've heard a bit about the project and the problem it's trying to solve, **let me show you what we're going to cover today.**

I'll start by giving you a bit more context about the motivation behind the project and how I identified the problem.

After that, I'll guide you through the actual **components** I used to bring **SmartGarden** to life. I'll also go over **how these components are connected** to form a fully functional system.

Then, I'll show you the **software side** of the project, including the **app that allows users to control and monitor their plants** remotely.

And finally, I'll wrap up with some **key conclusions** and give you a **sneak peek** at what I'm planning to improve in the future.

Of course, I'll also leave some time for **questions at the end**, so feel free to note down anything you're curious about as we go along.

So, let's get started!

Slide 3 - Introduction & Motivation

In recent years, indoor gardening has become incredibly popular — especially in cities where green spaces are limited.

People want plants in their homes for decoration, relaxation, or even air purification. But according to the National Gardening Association, nearly half of new plant owners lose their plants within the first months — mostly due to incorret watering.

It's very easy to make these mistakes, especially when you're just starting out.

This is what inspired me to build SmartGarden: a system that automates care for your plants and makes the process intuitivie and accessible, even for beginners.

Slide 4 - Background & Related Work

When I first started thinking about this project, I didn't jump straight into coding or designing hardware — I began with **research**. I wanted to understand what I could bring to the table that existing solutions didn't already offer.

For example: PlantLinkPro is a commercial system with cloud-based monitoring, but it only checks data every 6 to 12h and requires a paid subscription.

Then i looked at Garduino, an open-source system based on Arduino, which is affordable but lacks a mobile app and is not user-friendly.

So, that's when I asked myself: **How can I create a better product that combines the strengths of both and adds something extra?**

SmartGarden improves on both by offering real time monitoring, a mobile app interface and a completely local setup.

Slide 5 - Hardware Components

So, **let's take a look at the hardware components** that power **SmartGarden**.

The **brain** of the system is the **Arduino Pro Mini** — a microcontroller that processes sensor data and controls the whole process.

I use a **soil moisture sensor** to measure how wet the soil is, and a **temperature and humidity sensor** to track the environment around the plant.

To connect the system to your phone, I use the **ESP-01 Wi-Fi module**, which works over a local network. It doesnt connect to any external server or require internet access — just local communication between the device and the app.

For watering, we have a **submersible pump** controlled by a **MOSFET relay**, and everything is powered by a **battery with a boost converter** to ensure a stable voltage supply.

Slide 6 - System Architecture & Wiring

Here you can see how all the components we've talked about come together to form a **fully functional system**.

The process starts with the **sensors**, which monitor **soil moisture** and **environmental conditions**. These values are sent to the **Arduino Pro Mini**, which it reads the sensor data, processes it, and makes decisions based on the **type of plant** and the **optimal moisture and temperature ranges** — based on predefined parameters.

If something's off — for example, if the soil is too dry — the Arduino takes action. It sends a signal to the **MOSFET relay**, which acts like an electronic switch. That triggers the **submersible pump**, delivering water right to the **roots** through a small tube.

At the same time, the **ESP-01 Wi-Fi module** sends all the updated data to the **mobile app**, and waits for any commands from the user — such as switching between **manual and automatic modes**.

Finally, the system runs on a **rechargeable battery**, which makes it fully **portable** and perfect for **indoor use**.

Slide 7 - Software & Mobile App

Now let's talk about the **software** and the **mobile app** that ties together the hardware and the entire SmartGarden project.

I designed the app to be as **simple and user-friendly** as possible.

When you open it, you'll see a **main dashboard** showing all your plants and their current status.

You can **sort them by room**, so it's easy to stay organized.

Each plant also has its own **individual dashboard**, with **live sensor data** and **visualized trends** — weekly, monthly, and yearly.

You'll also get access to **tips and tricks**, regularly updated to help users improve their plant care routines.

The app is being developed using **Flutter**, with plans to use **Firebase** or local storage to handle data syncing and persistence.

At this stage, the system **relies on the app** to function — it's essential for both monitoring and configuration.

Slide 8 - Conclusions & Future Work

To wrap things up, **SmartGarden** is more than just a project — it's something that can make both **your life and your plants happier**.

But I'm not stopping here. In the future, I'm planning to add even more functionality, like a **light sensor** to monitor whether your plant is getting enough sunlight.

I also want to integrate **AI-powered predictions**, so instead of just reacting to current conditions, the system can **learn from patterns** and **predict when a plant will need water**.

Another feature I'm working on is **push notifications**, so the app can send **reminders or alerts** if something needs your attention.

Slide 9 - Thank You!

In the end, this is the main idea behind the project.

Thank you all for your attention, and I hope you found the **SmartGarden** project as exciting as I did.

I'd love to hear your **thoughts, ideas, and questions**.

Feel free to ask anything you'd like to know about the product!