



Smart IoT Botany STEM Kit

Empowering Young Botanists

~ Group 11

About

Introducing an innovative Smart IoT Botany STEM Kit designed to engage and inspire teenage kids aged 10-13 in the captivating world of botany and STEM learning. Immerse them in a hands-on, interactive experience that fosters their passion for science and the natural environment. This comprehensive kit provides the tools and resources needed to cultivate a new generation of young botanists, empowering them to explore, learn, and grow.

Target Audience:

The target age group selected for the Smart IoT Botany STEM Kit is teenage kids aged **10-13**. This age range was chosen because it represents a pivotal stage of development where children are typically curious, eager to learn, and responsive to hands-on, interactive educational experiences.

Concept and Design

1 Hands-On Learning

The kit enables hands-on plant exploration for budding botanists.

2 IoT Integration

IoT tech enables real-time monitoring and control for optimal plant growth.

3 User-Friendly Design

User-friendly design with acrylic panels, waterproofing, and simple assembly instructions.

4 Gamification Elements

Gamification includes daily watering streaks, leaderboards, and positive feedback emojis.

5 Educational Value

The kit educates on botany, environmental science, and technology, fostering STEM skills.

Design Thinking Process

This Process was chosen to ensure the Smart IoT Botany STEM Kit meets teenage users needs and sparks their interest in botany and STEM.

Empathize

Understanding the needs, motivations, and pain points of the target audience (teenage kids aged 10-13).

Define

Defining the problem and identifying opportunities for innovation.

Ideate

Generating creative solutions to address the defined problem statement.

Prototype

Developing a tangible prototype to test and refine ideas.

Test

Testing the prototype with real users to gather feedback and iterate on the design.

Implement

Bringing the final design to life and preparing it for production.

Materials and Parts Used

MDF Board

We selected MDF (Medium-Density Fiberboard) for the prototyping base due to its durability, stability, and ease of customization via CNC laser cutting.

Acrylic Panels

Transparent acrylic panels were incorporated to allow visibility of the internal electronics, fostering curiosity and engagement.

MSEAL Clay

MSEAL clay was used to **waterproof** the kit, ensuring the electronic components are protected from moisture and spills.

Sensors and Parts

1. Water Level Sensor
2. Soil Moisture Sensor
3. Temperature & Humidity Sensor
4. NodeMCU
5. LCD Screen

Conditional logic used in Project

Soil Moisture Monitoring:

The Arduino board continuously reads data from the soil moisture sensor. If the soil moisture level falls below a predefined threshold, the system triggers an alert to remind the user to water the plant.

Water Level Monitoring

The Arduino board reads data from the water level sensor in the water tank. If the water level in the tank reaches to a maximum, the system triggers an alert.

Temperature and Humidity Monitoring

The Arduino board reads data from the temperature and humidity sensor. If the temperature or humidity exceeds or falls below acceptable ranges for plant growth, the system triggers an alert.

App-Based Control

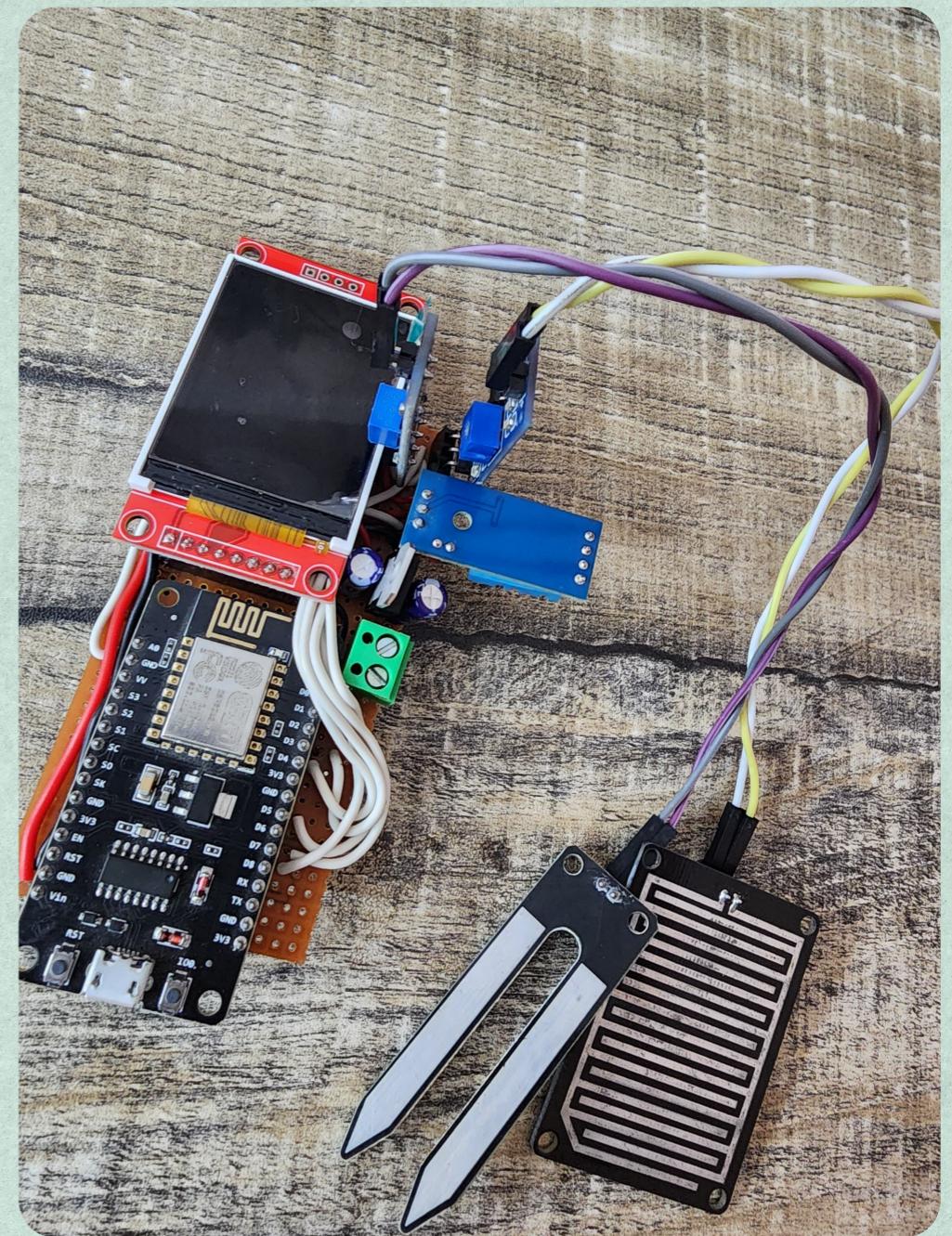
The Arduino board receives commands from the Blynk app via Wi-Fi connectivity. If the user adjusts watering schedules or environmental parameters through the app, the system updates its settings accordingly.
Action: The system adjusts watering intervals or environmental thresholds based on the user's input, providing flexibility and customization options.

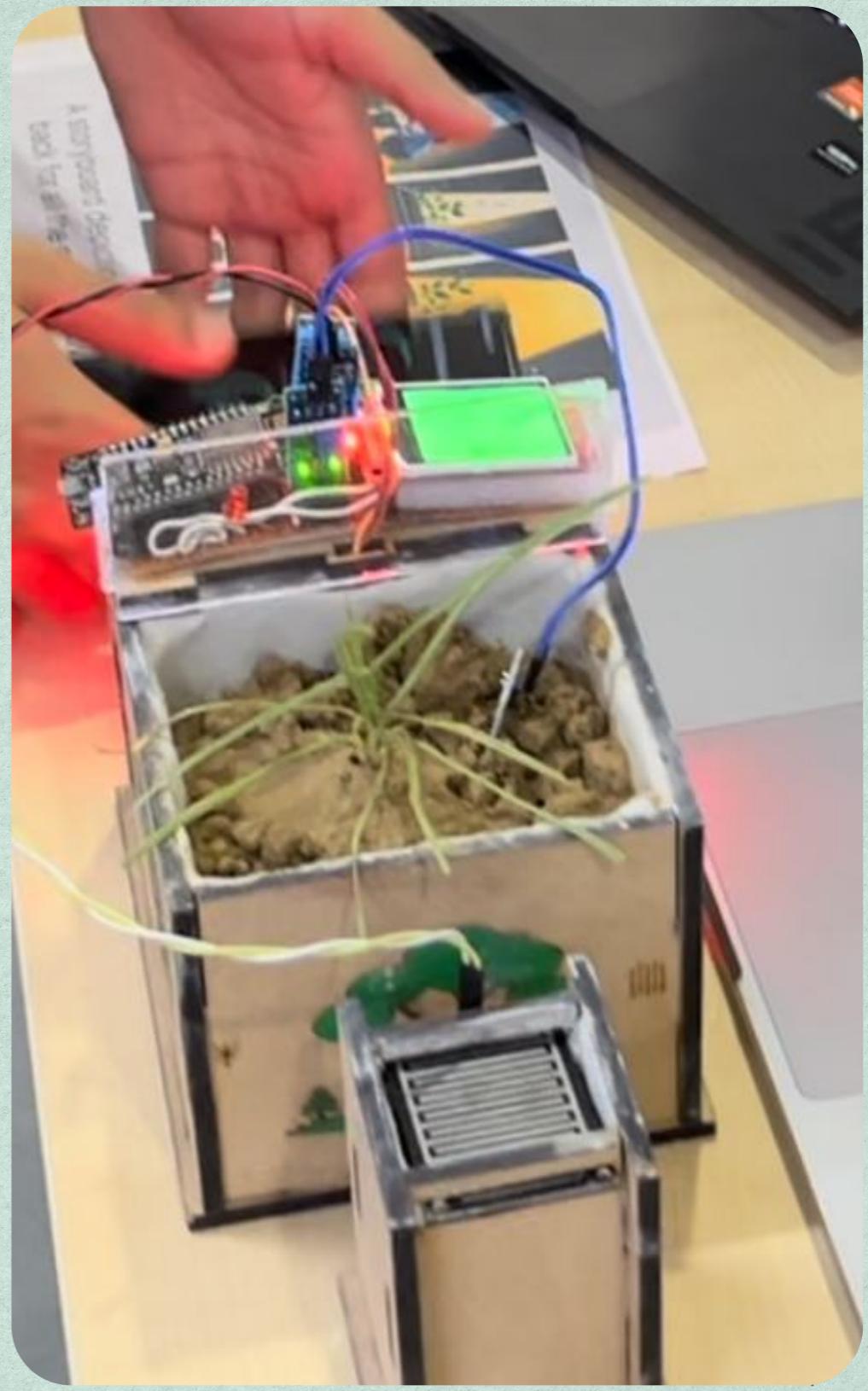
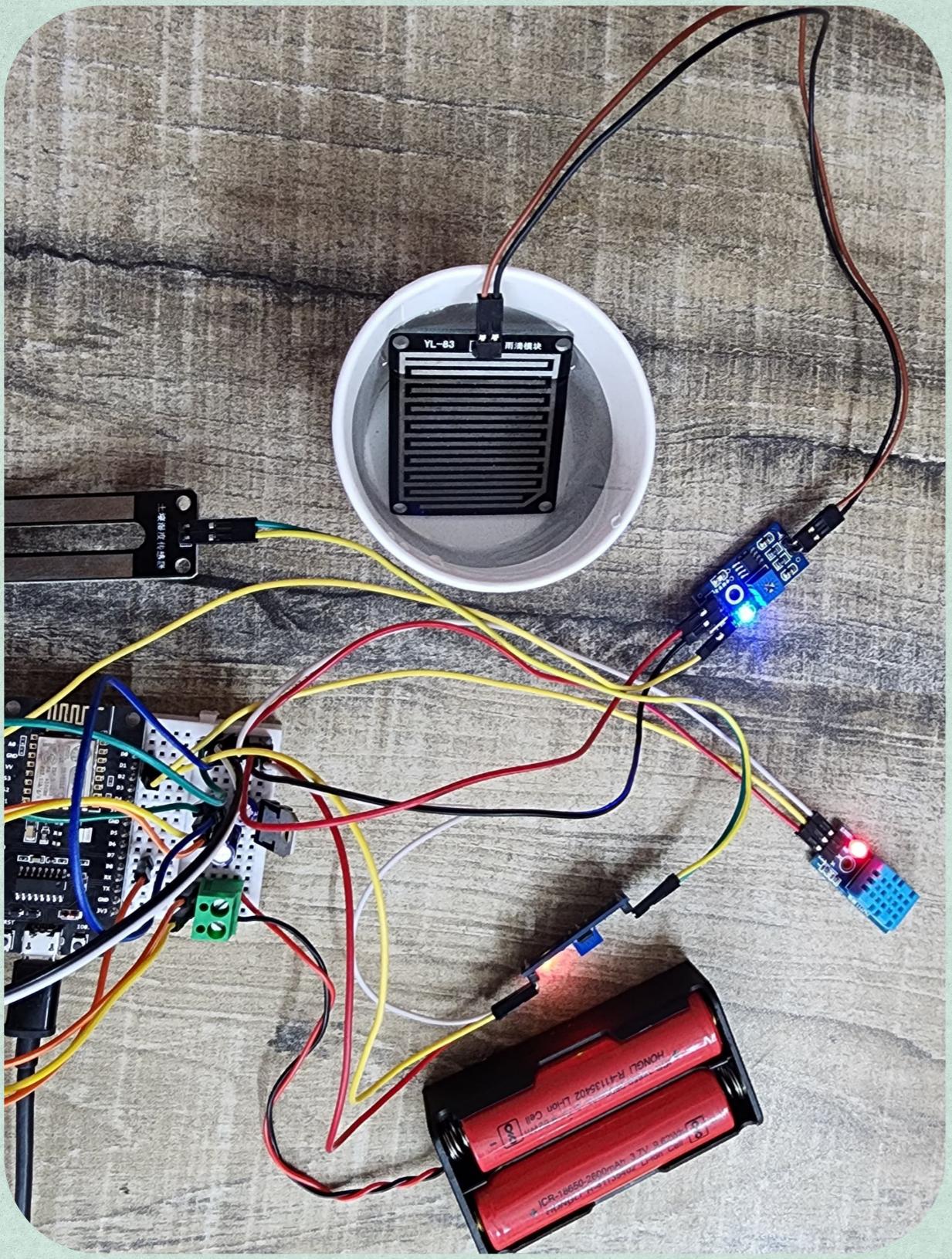


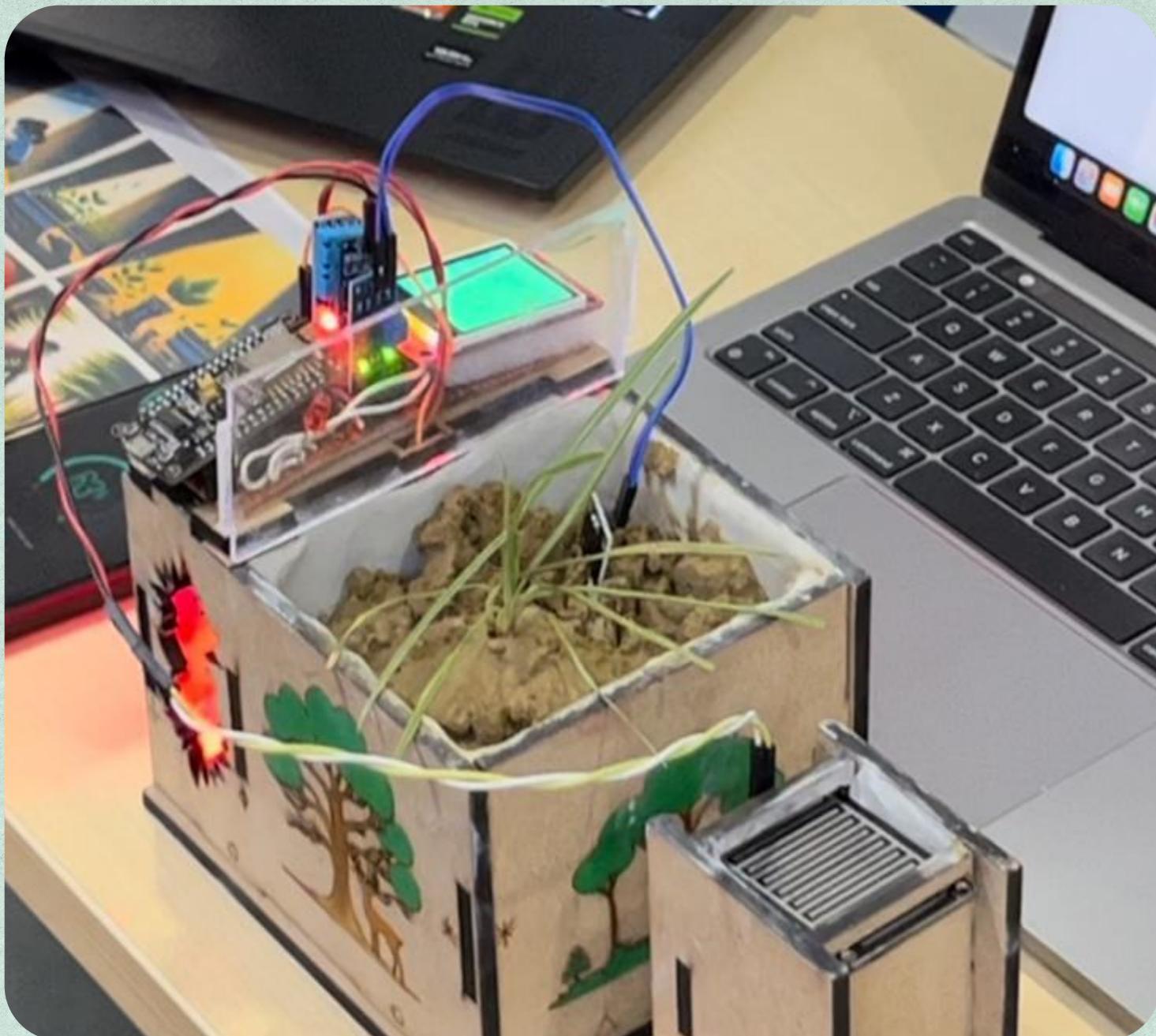
A storyboard depicting how a plant becomes a Superhero and pays back for all the care and love we give them

Images of the model and making process



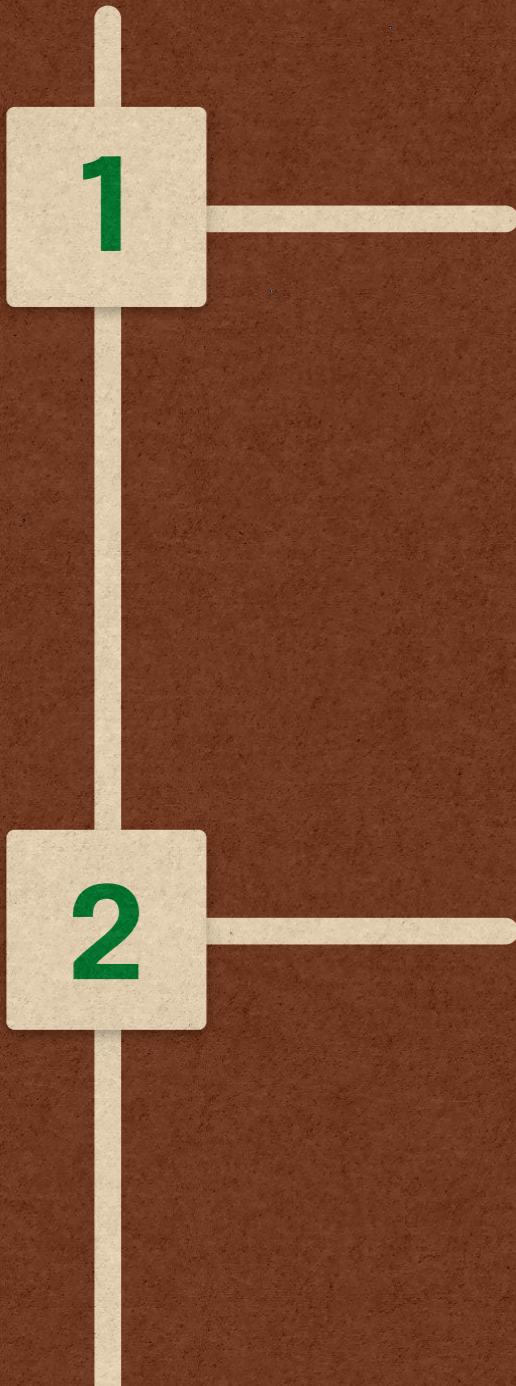






[Link to the Demo Video](#)
(click)

Practical Usage



Artificial Plant Botany

The smart IoT botany STEM kit can be used to teach kids about the fundamentals of plant care and horticulture, even with artificial or low maintenance plants.

Larger-Scale Applications

Similar sensor-based technology can be scaled up for monitoring and managing larger agricultural and horticultural operations, helping to optimize plant health and resource usage.

Assembly and Setup

1

Unbox

Remove all components from the packaging.

2

Waterproof

Apply MSEAL clay to the enclosure for water resistance.

3

Plant

Carefully place your favorite plant into the designated planting area.

The smart IoT botany STEM kit is designed for easy assembly and setup. Simply unbox the components, apply a protective layer of MSEAL clay to the enclosure, and then place your chosen plant into the designated planting area. The user-friendly design ensures a seamless experience from start to finish.

Benefits

- The smart IoT botany STEM kit offers a wealth of benefits for engaging teenage kids aged 10-13 in STEM learning and environmental stewardship. By immersing students in hands-on botany and horticulture activities, the kit fosters a deeper appreciation for the natural world and inspires the next generation of young scientists and environmentalists.
- Through interactive features like real-time sensor monitoring, gamification, and intuitive app controls, the kit cultivates practical skills in plant care and nurtures a sense of responsibility towards the ecosystem. Ultimately, this innovative STEM solution empowers kids to explore the fascinating world of botany while developing critical thinking, problem-solving, and digital literacy abilities.

THANK YOU

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