



Plant-Tamagotchi System

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Overview

The **Plant-Tamagotchi System** is an interactive plant care project inspired by the nostalgic virtual pet, Tamagotchi. Designed to automate and enhance plant care, this system introduces engaging feedback mechanisms to make plant ownership feel more personal and dynamic.

Built using **Arduino** hardware and integrated with **MATLAB** for real-time data visualization, the system addresses common issues like neglect due to busy schedules or forgetfulness — while also raising awareness about indoor air quality.



Concept

The goal was to create a plant care system that's more than just a utility — turning a plant into a responsive companion through sensors, visual indicators, and auditory cues. This system not only automates watering based on soil moisture but also monitors indoor CO₂ levels and provides manual control with interactive feedback.



Features

- **Automatic Watering:** Activates based on real-time soil moisture readings.

- **CO₂ Monitoring:** Alerts the user when indoor CO₂ levels become unfavourable.
 - **Manual Watering:** Push-button control for manual watering.
 - **Interactive Feedback:** Visual (LEDs, OLED display) and auditory (buzzer) cues mimic a pet-like interaction.
 - **Data Visualization:** Real-time CO₂ data plotted via MATLAB.
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Components

- **Arduino Grove Board (Microcontroller)**
 - **MOSFET**
 - **LED**
 - **Push-button**
 - **SGP30 CO₂ Sensor**
 - **Soil Moisture Sensor**
 - **Water Pump**
 - **9V Battery**
 - **Water Reservoir**
 - **Plant (named ‘Ferry’)**
 - **Buzzer**
 - **OLED Display**
 - **MATLAB**
 - **Arduino IDE**
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System Design

System Flow Overview:

- Monitor soil moisture and CO₂ levels continuously.
- Water the plant automatically when moisture is low.
- Alert the user via buzzer and display when CO₂ levels are outside

the ideal range.

- Allow manual watering via button press.
 - Display introductory messages and feedback through OLED.
 - Visualize CO₂ trends over time using MATLAB.
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Development Process

1. **Upgraded Existing Project:** Began with a basic watering system and added CO₂ monitoring functionality.
 2. **Live Graphing:** Modified MATLAB script to graph CO₂ levels against time.
 3. **Alert System:** Implemented conditional triggers for buzzer alerts based on CO₂ readings.
 4. **Manual Watering:** Integrated a button for user-triggered watering.
 5. **Interactive Features:** Added OLED messages and visual/audio cues to simulate pet-like behavior.
 6. **System Testing:** Validated each feature independently for reliability and responsiveness.
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Testing Summary

- Verified **moisture sensor accuracy** with varying soil conditions.
 - Tested **CO₂ sensor response** by simulating different air quality environments.
 - Ensured **manual watering button** correctly activated the pump.
 - Observed **feedback cues** under all system states for accuracy and clarity.
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Challenges & Improvements

While the project was a success, one planned feature wasn't fully realized:

- **Continuous plant health updates on the OLED display.**

Integration issues prevented this in the final implementation. A future revision would focus on synchronizing sensor data with the display in real-time.



Environmental Impact

This project holds meaningful **social and environmental value**: - Promotes plant care among busy individuals. - Raises awareness about indoor air quality and its effects on health. - Encourages sustainable practices through automated, efficient watering.



Conclusion

The **Plant-Tamagotchi System** successfully blends functionality with playful interactivity. It enhances traditional plant care by combining automation, environmental monitoring, and gamified feedback. This project highlights the potential of small-scale IoT systems to improve everyday habits while fostering environmental consciousness.



Project Showcase

