



University of Southeastern Philippines
College of Information and Computing

Efficient Irrigation Strategies for *Calathea Louisa*: Harnessing Soil
Moisture Sensors to Achieve Precision Water Management

ICE 414: Emerging Trends (Microcontroller)

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I. Introduction

Whether you are a home gardener, a community gardener or a visitor, a garden can be a source of exercise, stimulation and relaxation. Most people enjoy being outdoors and digging in the soil, creating and watching plants grow. People with disabilities, people who are unwell, older people and children can find it especially rewarding to spend time in the garden tending plants and growing their own food (betterhealth, 2013).

When it comes to maintaining the health of indoor gardens, precise water management is crucial, especially for plants like *Calathea Louisae*. Calathea is a genus of tropical, perennial plants well known for its vibrantly patterned foliage, and unique leaf movements. The leaves of this plant fold up slightly at night, which is a movement called nyctinasty. This reveals the striking undersides of their leaves, and is also how they get their other name – “prayer plant.” These plants, known for their vibrant leaves, are sensitive to overwatering, leading to issues like root rot (unbeleafable.ph, 2022). Detecting and treating root rot early is essential to prevent irreversible damage to the plant. To address this challenge, our project leverages soil moisture sensors to implement smart watering practices. This guide explores how these sensors act as a helpful tool, ensuring optimal water levels and promoting the well-being of *Calathea Louisae*.

II. Rationale

Calathea Louisae requires careful watering due to its susceptibility to root rot. Traditional irrigation methods may lead to overwatering and compromise the plant's health. Using soil moisture sensors provides real-time data, enabling



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precise control over watering, preventing water wastage, and promoting sustainable plant growth (almostedenplants.com, 2023).

III. Plant Characteristics



Calathea Louisa, known as Thai Beauty, belongs to the Marantaceae family. It features dark green to light green foliage with a touch of purple on the underside (bwhplantco.com, 2023). Understanding the plant's characteristics is vital for tailoring irrigation strategies to meet its needs. Incorporating Plant Characteristics: In our project, we consider the unique characteristics of *Calathea Louisa*, such as its dark green to light green foliage and purple undertones. This understanding guides the development of irrigation strategies that align with the plant's natural habitat, ensuring optimal health and growth (outsideinco.com, 2023).



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IV. Maturity and Growth

The project considers the growth stages of *Calathea Louisae*, aiming to optimize water usage at each phase (ambius.com, 2023). Early development requires consistent moisture, while mature plants may exhibit different water requirements. Tailoring watering practices to growth stages enhances the plant's overall health and resilience.

V. Climate Considerations

Calathea Louisae thrives in specific climate conditions (ambius.com, 2023). The smart irrigation system adapts to the plant's preferences, considering temperature and humidity. This ensures efficient water usage and optimal growth, regardless of the external climate. Incorporating Climate Considerations: Our smart irrigation system takes inspiration from the plant's native climate considerations (plantsinsights.com, 2023). By adjusting watering practices based on temperature and humidity, the system provides a tailored approach that mimics the plant's natural habitat, promoting healthier growth.

VI. Humidity and Disease Mitigation

Higher humidity levels pose a risk of fungal diseases. The project addresses this by emphasizing the importance of proper air circulation and well-drained soil [2], promoting a holistic approach to plant health and longevity.



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VII. Watering Guidelines

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VIII. *Calathea Louisae* Moisture Spectrum Chart

MOISTURE SPECTRUM CHAT

FACTORS	VALUES RANGE	FACTORS	VALUES RANGES
DRY NEEDED OF WATER.	LESS THAN 330	WITHIN THE PRESCRIBED CONDITION	330-550
DRY(OPEN AIR	0-20	TO WET	GREATER THAT 550
JUST WATERED	GREATER THAN 550		
DIP IN WATER	640-658		
IDEAL SOIL MOISTURE	330-550		



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IX. *Calathea Louisae* and Its Soil Table Interpretation

Factors	Value(Range)	Moisture Percentage(%)
Dry (Open Air)	0-20	0-3.3%
Dry (Need of Water)	Less than 330	3.5%- 70.5%
Soil Moisture (Ideal)	330-550	83.17%
Just Watered	Greater than 550	99.83%
Dip in Water (Cup or Basin)	648-658	100%
To Wet	Greater than 550	99.83%
Within the Prescribed Condition	Less than 430	83.17%

X. Conclusion and Recommendation

In conclusion, the smart irrigation system incorporating soil moisture sensors offers an innovative solution to the challenges posed by maintaining the health of *Calathea Louisae*, commonly known as Thai Beauty or the prayer plant. The unique characteristics of this tropical plant, such as its vibrant foliage and susceptibility to root rot, necessitate a tailored approach to watering. Traditional methods may fall short in providing the precise control needed to prevent overwatering and associated issues.



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By considering the plant's growth stages, climate preferences, and humidity sensitivities, our project ensures a comprehensive and adaptive solution. The integration of real-time data from soil moisture sensors allows for optimal water management, promoting sustainable growth and preventing water wastage.

Recommendation

We recommend the adoption of this smart irrigation system for *Calathea Louisae*, particularly for enthusiasts, home gardeners, and community gardens. The system not only simplifies the task of watering but also contributes to the overall well-being of the plants. For those who may face challenges related to mobility or health, the smart irrigation system offers an accessible way to engage with gardening.

XI. References

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