Dept. of Biomechatronics Engineering, National Taiwan University

Intelligent Control

Homework 2: Familiar the programming for fuzzy control

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Source: [Soil Moisture: Methods Of Measuring & Tools For Monitoring (eos.com)]

According to the explanation in this article, the ideal soil moisture will have varying needs based on the soil's characteristics and the plants, but, to put it simply, the ideal soil moisture may be set between 20% and 60%. As a result, we prioritize soil moisture as our first priority and then make adjustments in accordance with temperature. As a result, we primarily concentrate on dry soil conditions in our watering approach.

We changed the temperature unit from Fahrenheit to Celsius to make it easier for users to input, and this design is also more user-friendly.

Membership Function:

The humidity is regulated between 10 and 65%, while the temperature is controlled between 10 and 65 degrees Celsius. We were unable to locate any pertinent publications that may serve as a foundation for establishing the watering time. Several variables, like the kind of soil, its characteristics, water content, the plant's planting location, etc., have an impact on how long plants need to be watered. As a result, we have only set the watering time restriction at 15 minutes.

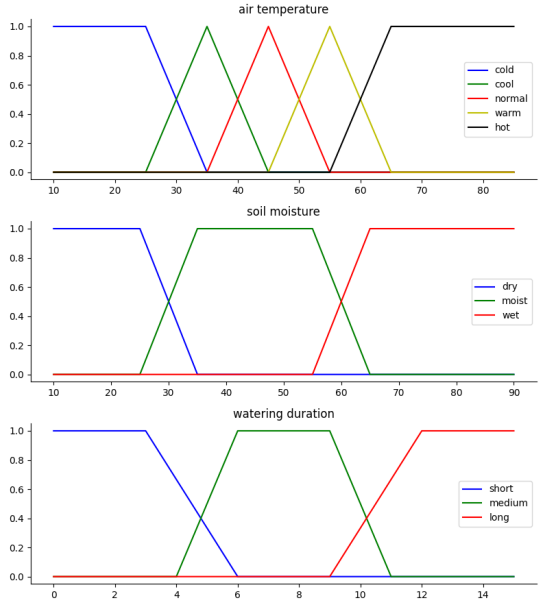
```
temp_MF = [[10, 10, 25, 35], [25, 35, 45], [35, 45, 55], [45, 55, 65], [55, 65, 85, 85]]
soil_MF = [[10,10,25,35],[25,35,55,65],[55,65,90,90]]
time_MF = [[0,0,3,6],[4,6,9,11],[9,12,15,15]]
```

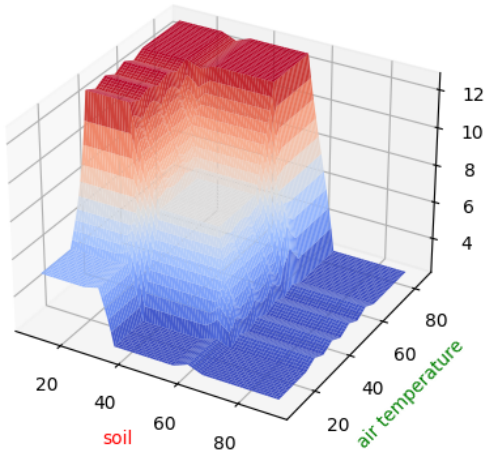
Rule Table

	Cold	**Cool**	**Normal**	**Warm**	**Hot**
Dry	Medium	Long	Long	Long	Long
Moist	Short	Medium	Medium	Medium	Long
Wet	Short	Short	Short	Short	Short

Test Table

Temp	20	20	85	85	35	50	60	72	53
Soil	40	70	40	70	64	50	48	42	57
Time	2.33	2.33	12.67	2.33	3.05	7.5	9.75	12.67	6.6





Code:

https://drive.google.com/file/d/1AbRng9ZvLgYIKnlOCD3Zpr2Luh0utGzg/view?usp=sharing