

ABSTRACT

Providing accurate soil humidity with a capacitive soil moisture sensor is challenging. The humidity of the soil is known to change slowly. However, due to the nature of the capacitive sensor, which is sensitive to environmental disturbance, the received humidity reading taken by the sensor could change drastically which is not reflecting the actual soil humidity condition.

In reducing the variation, data averaging could be incorporated. It is known that the longer the averaging points the lesser data fluctuation will be. However, in wireless sensor applications where energy usage should be as minimum as possible, the faster the sampling period gives more energy penalty.

In this research, an empirical experiment determined how fast the data sampling and the number of averaging points result in the best soil humidity data taken by a capacitive sensor. With the criteria of least data variance and Mean Squared Error (MSE) with the sampling period result in 200 ms data sampling with a 1000-point average gives the best data quality.

Keywords: soil humidity, capacitive sensor, wireless sensor, energy, sampling period, variance, MSE