Using the Normalized Difference Vegetation Index to Identify Stresses Caused by Hydroponic Growth Mediums

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The Normalized Difference Vegetation Index (NDVI) measures the health of plants. This project used two cameras, one measuring red light and the other near infrared light, to calculate the NDVI. A Raspberry Pi (a low cost computer) monitored and controlled variables like light, watering, temperature and airflow in a setup modeled after Controlled Environment Agriculture (CEA). The strength of this project is the python code used to run this environment and analyze the camera images. The results indicated that while the hydroponic plants were statistically healthier than the soil control, there was not a significant difference between the Deep Water Culture and drip-through systems. This is explained by the weak airstone and low waterflow issues in the DWC system. Notably, the NDVI cameras were able to detect the issues in the plants before they were detectable to the human eye. This could indicate the potential for affordable monitoring of hydroponic plants with the NDVI scale to help farmers.

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