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Using the InfraBlue22 Lens for NDVI Field Measurements

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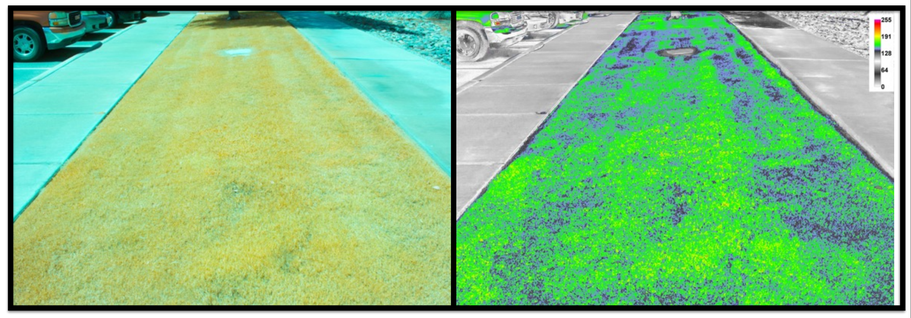
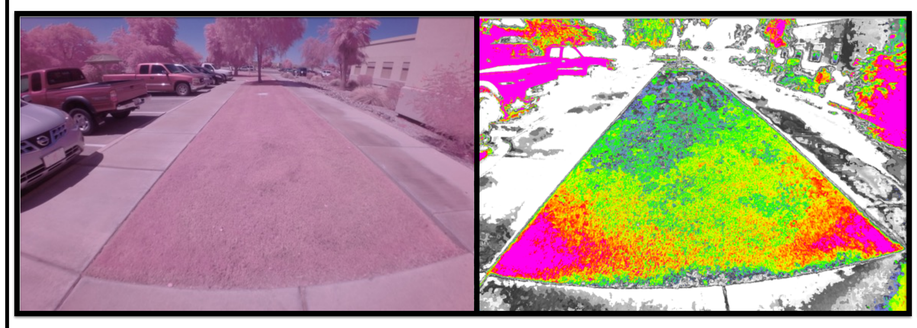
Abstract:
NDVI - Normalized Difference Vegetation Index is a numerical indicator which uses the visible and near-infrared bands of the electromagnetic spectrum to assess plant health. Healthy plants tend to reflect larger levels of the NIR spectrum than non-healthy plants. The GoPro modified camera (InfraBlu22) captures NIR, Green and Blue spectra, and has been used in NDVI indexing in some precision agriculture applications. As these small action cameras can also be used in UAV platforms, this effort compared the use of 2 action cameras to assess field level, NDVI measurements.

GoPro Hero4 RBG

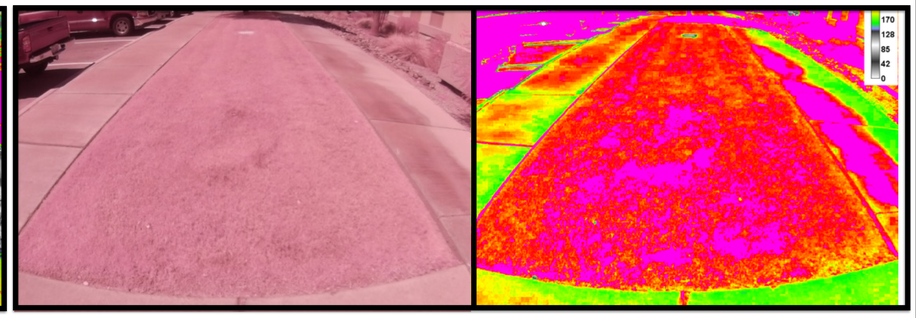
Canon EOS SL1 NDVI



GoPro NDVI InfraBlue22



IrPro NDVI InfraBlue22



Cameras Used to Determine NDVI Indexing

NDVI: Normalized Difference Vegetation Index is the amount of NIR captured by a sensor relative to the visual amount captured

$$\frac{\text{Near Infrared} - (\text{GREEN} + \text{RED} + \text{BLUE})}{\text{Near Infrared} + (\text{GREEN} + \text{RED} + \text{BLUE})}$$

NDVI can be used as an indicator of crop stress.

Reflected NIR	Reflected VIS	NDVI	Plant Status
HIGH	LOW	+1	HEALTHY
LOW	HIGH	-1	STRESSED

Summary:
Our work suggests that the IrPro (InfraBlu22) camera generates NDVI images that are not as suitable for precision ag uses, when compared with other sensor systems that we evaluated such as the Canon EOS SL1 NDVI modified camera. However, we found that the GoPro modified camera (InfraBlu22) can be used as an accompanying tool in precision agriculture creating actionable data by the user with appropriate software and ability. With relevant selections and modifications, action cameras can be useful in some agricultural applications.