Competition Project: Phase 1

Machine leaning approaches towards classifying  
 visual water-stress for soybeans

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# Introduction (*Heading 1*)

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# Methodology

## Data

A training set consisting of 1025 agricultural soybean photos each with a resolution of 640X480 pixels was provided. The training set consisting of 5 classes listed in Table 1. Visual inspection of the photos revealed a wide range of exposure levels with some photos being underexposed and rather dark while others overexposed and rather bright.

Table . Soybean plant classifications and descriptions.

|  |  |
| --- | --- |
| **Categorical Number** | **Classification Description** |
| 0 | No Wilting |
| 1 | Leaflets folding inward at secondary pulvinus, no turgor loss in leaflets or petioles |
| 2 | Slight leaflet or petiole turgor loss in upper canopy |
| 3 | Moderate turgor loss in upper canopy |
| 4 | Severe turgor loss throughout canopy |

Image augmentation was performed by using Keras ImageDataGenerator class to synthetically extend the training set to 3075. The first 1025 images were the original training set while the remaining 2050 consisted of 2 complete rounds of augmentation using the parameters found in Table 2. The parameters and values were chosen to emulate the variation found in the provided data set.

Table . Keras ImageDataGenerator parameters

|  |  |
| --- | --- |
| **Parameter** | **Value / Boolean** |
| Rescale | 1.0/255 |
| Shear Range | 0.1 |
| Zoom Range | 0.25 |
| Horizontal Flip | True |
| Rotation Range | 25 |
| Fill Mode | ‘Wrap’ |

## Architecture

First attempts of the

# Results

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##### Acknowledgment *(Heading 5)*

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