

## Abiotic Stress Detection Device

### Utility

This is AI-enabled mobile device for real time identification of abiotic stress in field crops with the aim to assist crop breeding and precision crop input management. The device assembles a Raspberry Pi single board computer and a digital RGB camera. A validated transfer-learning based deep learning model



“AlexNet” was used to process the captured images and classify into stressed or non-stressed categories in real time. The captured images and results are being displayed on a custom graphic user interface. The device is also capable of predicting the stress in-house from historically collected images input to the device. The results are produced in 200 milliseconds post-capture/feeding of the images. The device was field evaluated in wheat, maize and rice crops and pertinent stress classification accuracies were 81.5%, 68.3% and 80.2%, respectively for nitrogen stress. However, water stress occurred only on wheat and maize and it was classified with an accuracy of 68.6% and 67.5%, respectively. The experiment for rice was conducted under water logging condition, hence water stress not considered for rice. The developed device offers a user-friendly GUI to identify abiotic stress in real time for the crop breeders, researchers, and ultimately growers for timely decision making on plant health and crop yield improvement.

**Design:** ICAR-CIAE, Bhopal

**Commercialization Status:** Ready for Commercialization

**Proposed stakeholders:** farmers, sensor based equipment’s manufacturers etc.

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