


WEED DETECTION USING MACHINE LEARNING

White Paper

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Eagle Eye Imaging, LLC™
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Picterra

We are excited to team with [Picterra](#) bringing the local grower the latest technology powered by artificial intelligence (AI). Our world today is changing faster than ever before. We all have experienced this change in our daily lives, whether it is purchasing a new car and getting accustomed to the car's latest technology, connecting your home appliances through the internet, or just helping our grandparents get accustomed to Instagram. This exponential growth of technology in our everyday lives has transformed the world we live in. This fast-paced change can be daunting, especially to growers who already are pressed for time.

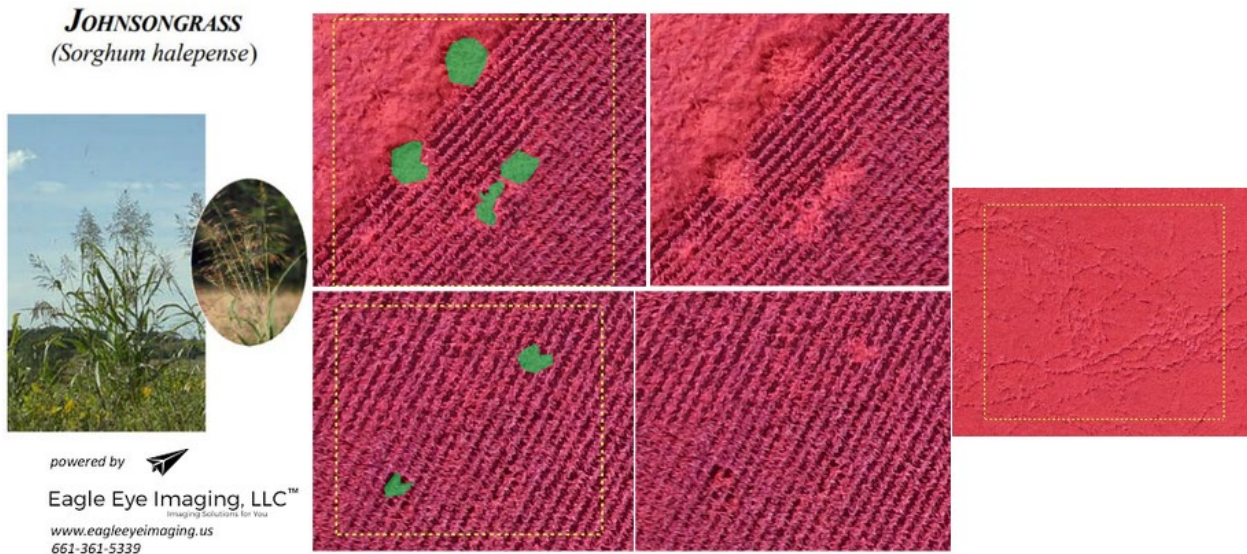
Picterra cracked the code on making their advanced AI code user friendly. Eagle Eye Imaging, LLC will bring this new technology for stand counts and identify weeds in fields. We teamed with Picterra to test their AI software over this past winter to verify the software would make accurate stand counts and identify weeds. The below article shows how the AI software identified weeds in a field.

Weed Detection using Artificial Intelligence

Today's drone technology provides a handy tool for our food producers. However, when weed detection is done manually from drone imagery, it's so time-consuming that it makes weed detection nearly impossible to be economically feasible. Weed detection using AI is a game-changer as it allows us to significantly cut the time spent.

With the Picterra platform, it's possible to train and run the detector that will localize the exact geolocation of the weed. It doesn't require any background in AI, machine learning, data science, or even coding. All that needs to be done is to register on Picterra, upload good-quality images (multiple formats are available, including .tiff,.tif, .png, and .jpg) and to train the detector to differentiate between what you want to find and what you don't.

Below you can see some of the training areas and counterexamples provided to train the model:



Example of training areas and weed plants annotated.

Within the training areas, the weed has been annotated with polygons. It has a different texture than the regular crops and a strong intensity in the near-infrared (NIR) band. Then, Eagle Eye Imaging LLC highlighted training areas without annotation to give the detector a counterexample of plants that the user is not interested in detecting. Discrimination with animal tracks was also made as an example. The training of the detector took about 30 minutes. However, once the detector has been developed, it can be run on any number of other images. Running the detector over the entire image took about 5 minutes on a field size around 75 acres.

In this example, the detector spotted all the weeds manually identified by photointerpretation. In addition, it detected weeds which were missed during the manual photointerpretation.



Blue Tacks Indicate Geolocation of Detected Weeds.



Example the Detector Applied to a Different Field.

Important Takeaways

1. Drone technology is a game-changer for food producers. For successful weed detection data must be carefully analyzed. It can be done manually, but the process is time-consuming and prone to errors. Using Picterra's AI architecture allows local growers to have access to this powerful software allowing them to make critical business decisions in a short period of time.
2. The best weed detection results possible can be achieved with the combination of drone images and AI algorithms. Thanks to Picterra, it was possible for Eagle Eye Imaging, LLC to find the weed geolocation in just a few minutes.

If you want to build your own detector, [create an account on Picterra](#), and feel free to contact us at david.kivioja@eagleeyeimaging.us or contact@picterra.ch.

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