Cicada Zombies: Identifying Diseased Hosts & More

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1) Introduction

This spring, two broods of periodical cicadas will emerge in parts of the South and the Midwest singing their love songs. The co-emergence of these two broods has not happened since Thomas Jefferson was president. Like many animals, they, too, are susceptible to diseases. And one of those diseases they get is a fungal infection by a fungus called Massospora cicadina where a third of the body has been replaced with fungal tissue. This causes something called active host transmission causing erratic mating behavior spreading the disease (basically making other Cicada ”Zombies”). The identification of this disease with image recognition has inferences of many possibilities. This disease is visually apparent from specimens within these broods. If there was more information about Cicadas which could be recognized as infected and studied further, implications on other studies, such as climate change impacting soil temperatures, host heat tolerance for infection regardless of the host, and medicinal research for treatment of fungal diseases could be enhanced.

2) Dataset and Approach

Utilizing multiple image record sets (such as iNaturalist, images.cv), there are multiple classified of individual labeled images with Cicada broods that have Massospora cicadina and images that do not. By using multiple image recognition classifier models, the goal is to evaluate the models based on loss and accuracy. We can also use other factors in the confusion matrix to assist with measurement of the different models. There are also additional different models to add context of impact and implicationsl

3) Stakeholders

- Entomologists
- Cicada enthusiasts
- Pharmaceutical Research scientists investigating fungal disease therapies

4) Key Performance Indicators (KPIs)

- Model prediction accuracy
- Model prediction precision
- Model prediction recall

5) References

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