

# WEED CLASSIFIER

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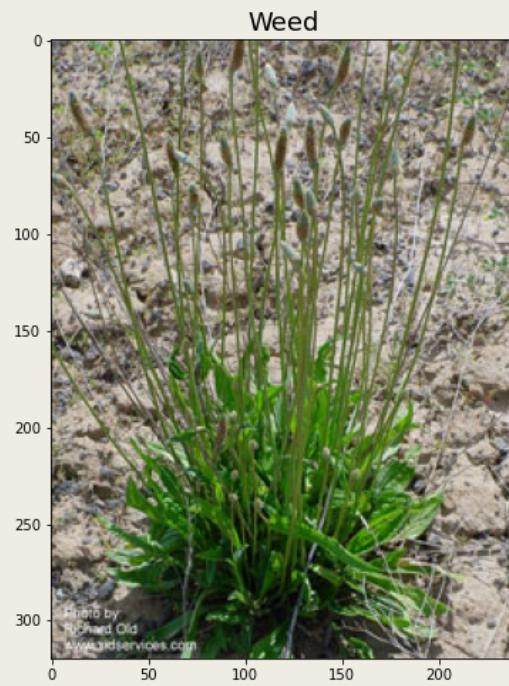
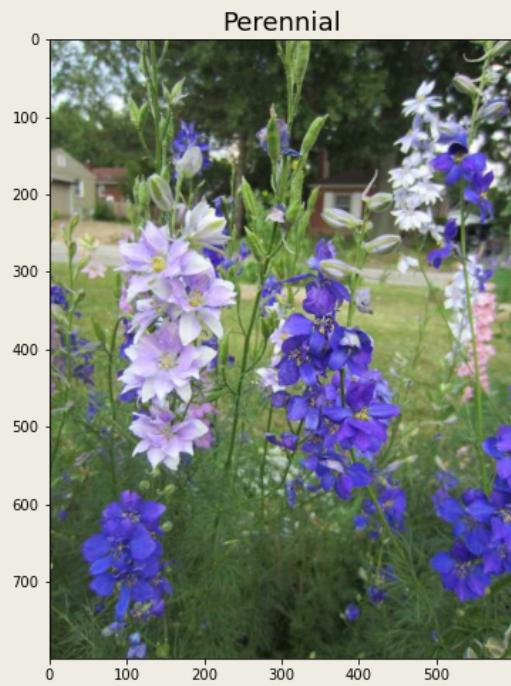
# Business Problem

- Help gardeners and/or homeowners with yards to determine whether or not to remove a plant
- If further developed, could be used in autonomous weed pullers for use on farms

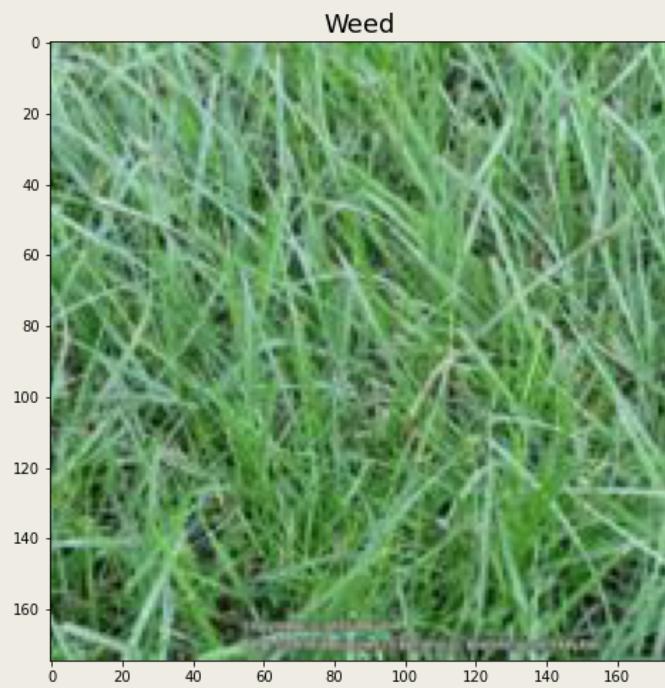
# Data Sources

- List of perennials from article in [www.midwestgardentips.com](http://www.midwestgardentips.com)
- List of weeds from [www.preen.com](http://www.preen.com)
- Plant photos:
  - [www.garden.org](http://www.garden.org)
  - [www.missouribotanicalgarden.org](http://www.missouribotanicalgarden.org)
  - [www.extension.umass.edu](http://www.extension.umass.edu)
  - [www.preen.com](http://www.preen.com)
  - 2812 photos of perennials; 2990 photos of weeds

# Data – Visual Inspection



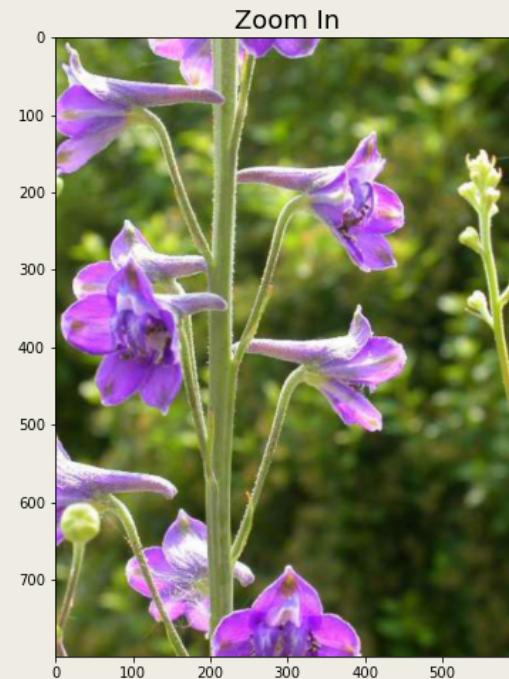
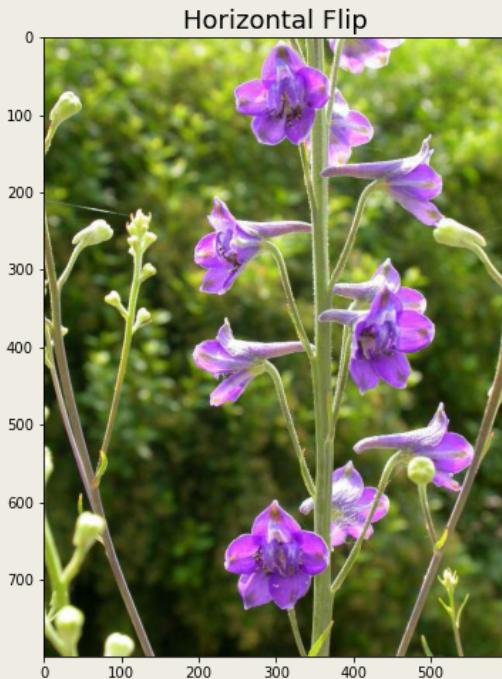
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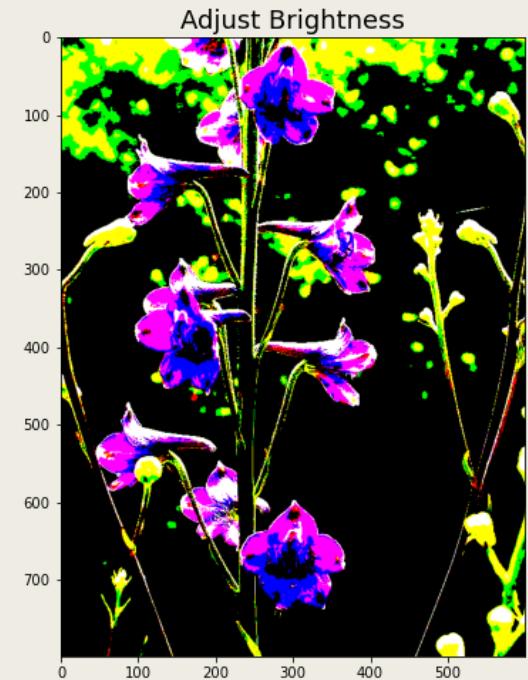
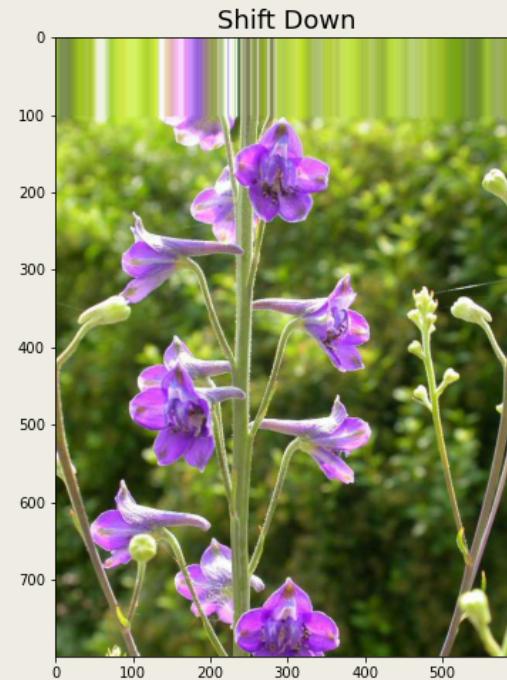
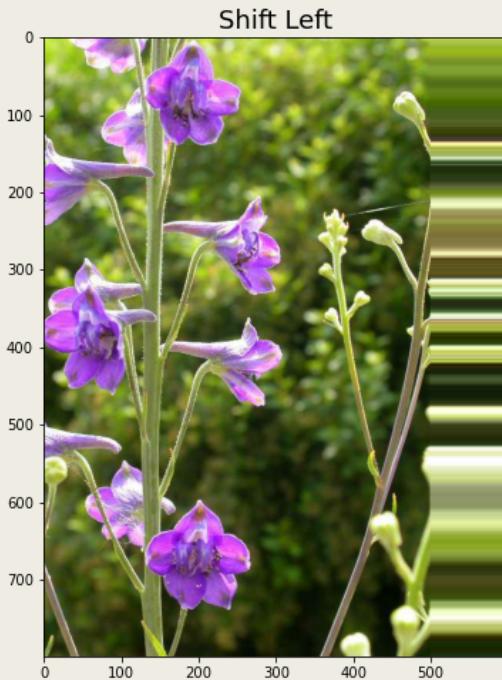
# Data Augmentation



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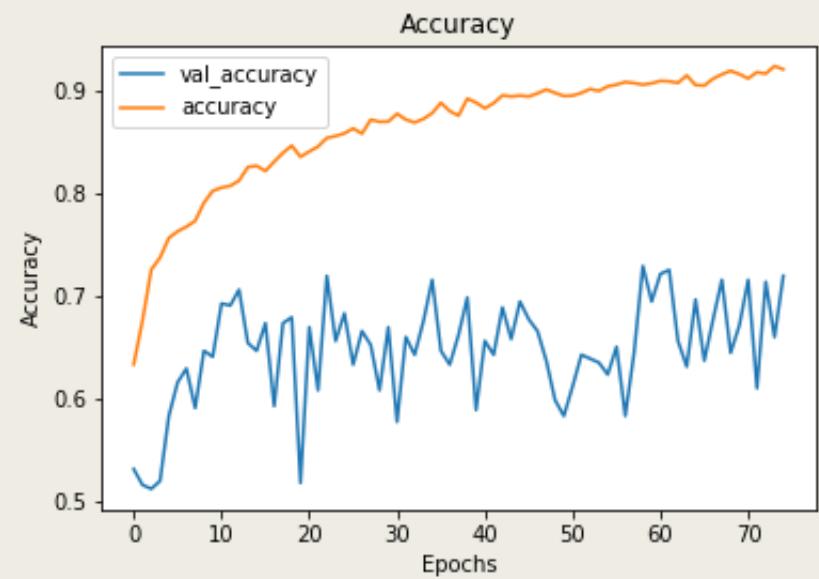
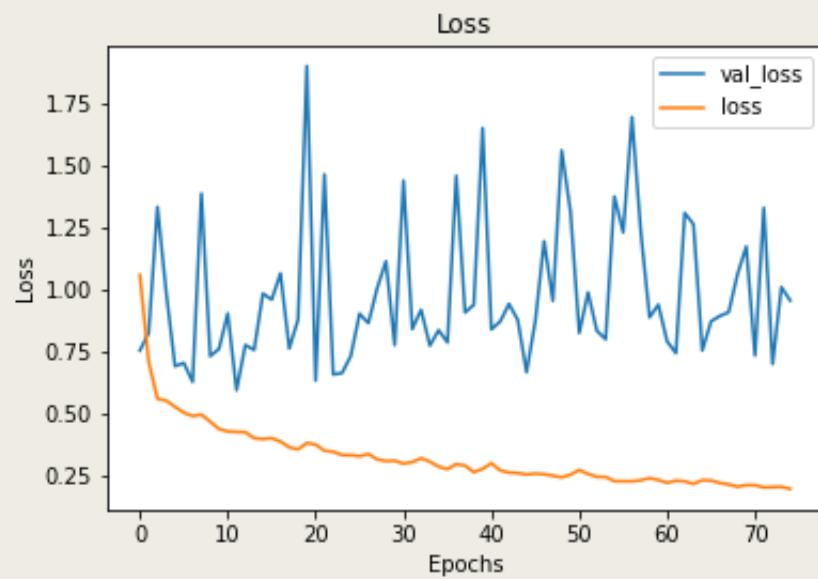
# Data Augmentation

- Rotate +/- 30°
- Horizontal flip
- Zoom in and out
- Shift left and right
- Shift up and down
- Adjust brightness

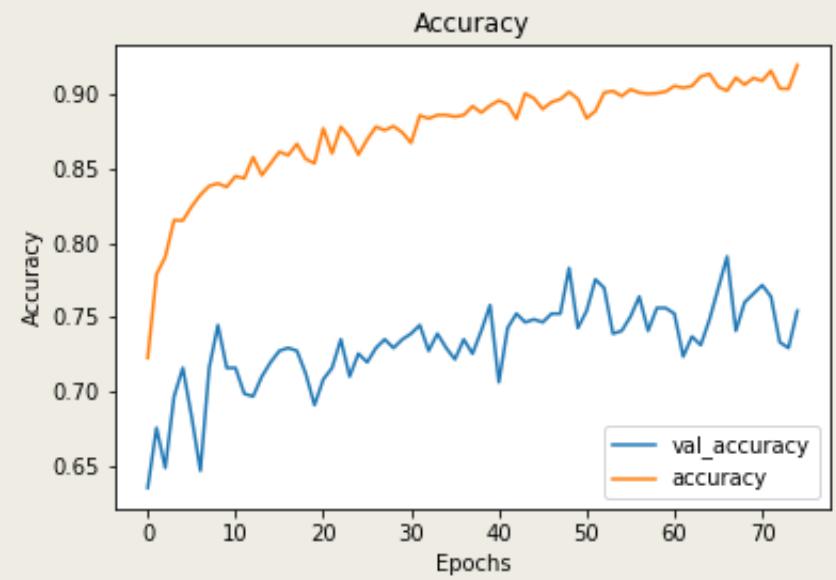
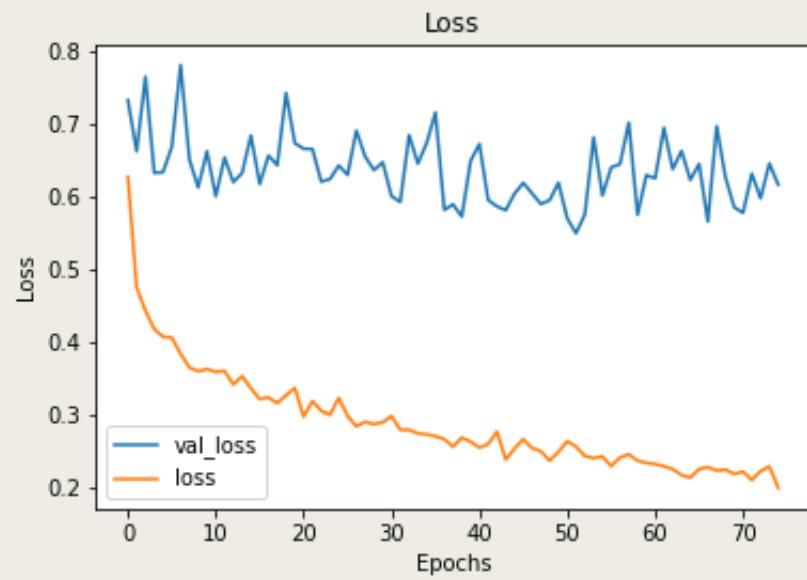
# Methods – Model Development

- Simple Models
- Deeper Models
  - *One to Three Convolutional Layers*
  - *One to Five Dense Layers*
- Classic Architectures
- Pretrained Model

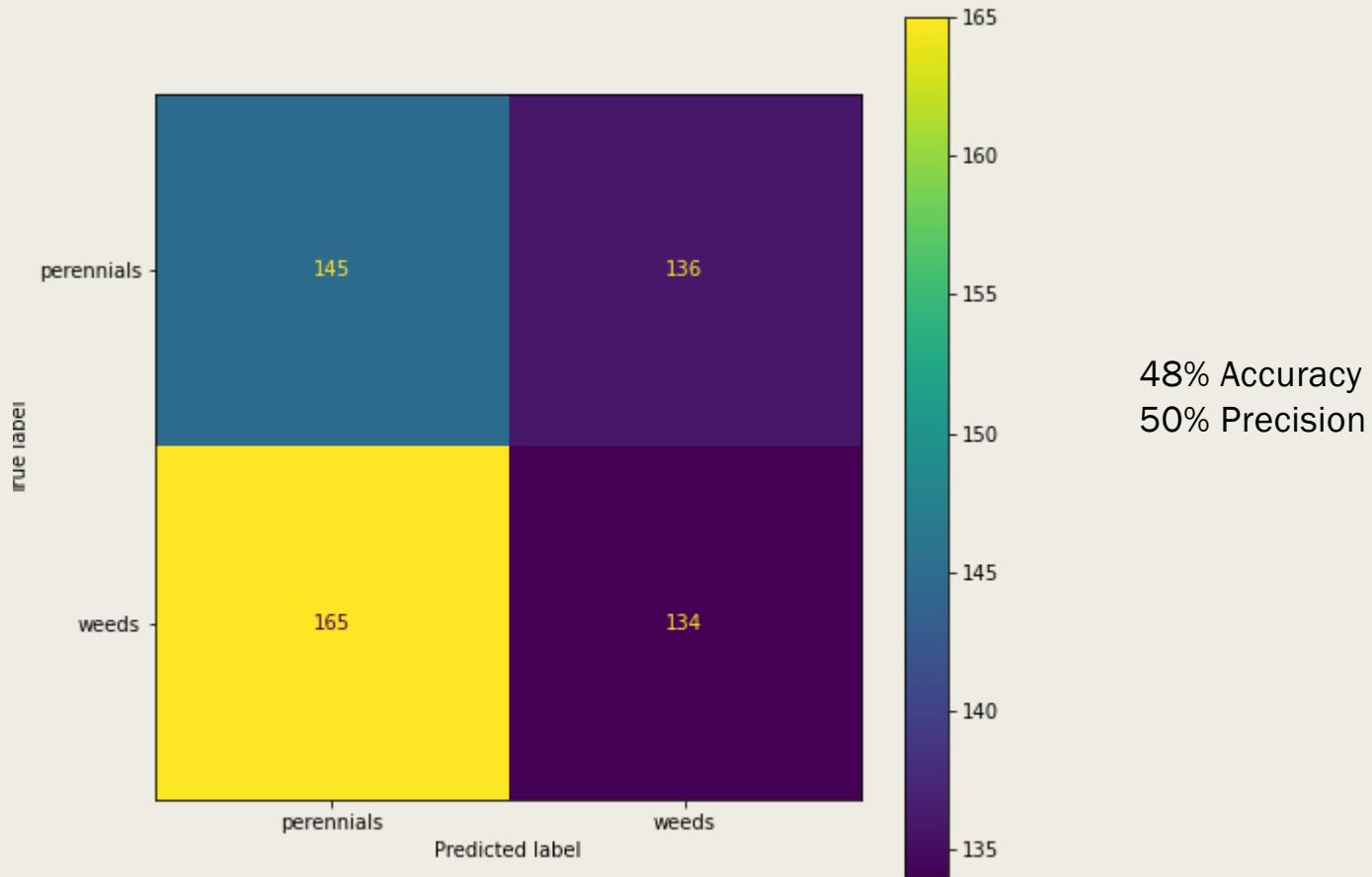
# Methods – Model Development



# Methods – Pretrained Model



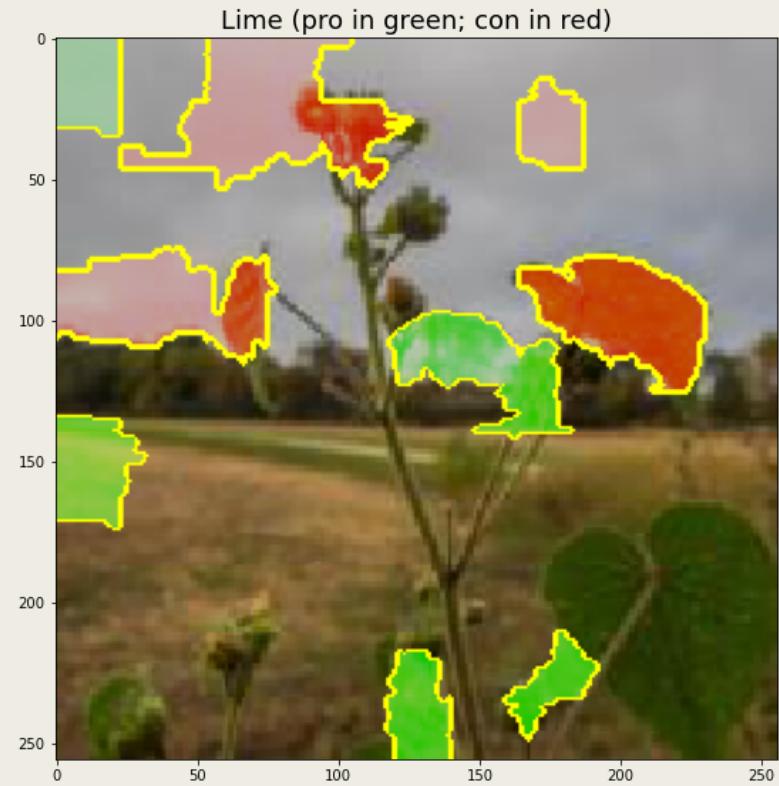
# Results – Final Model



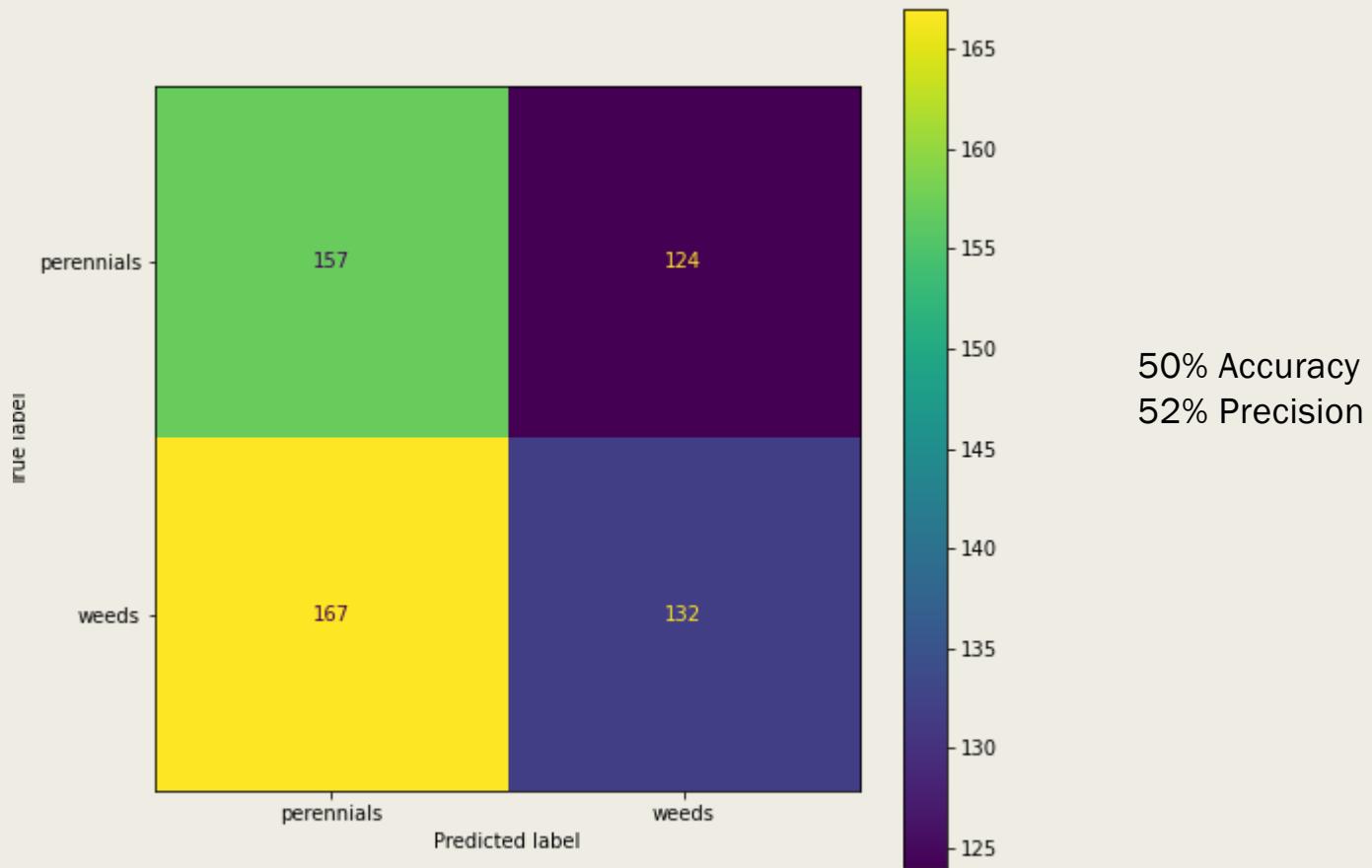
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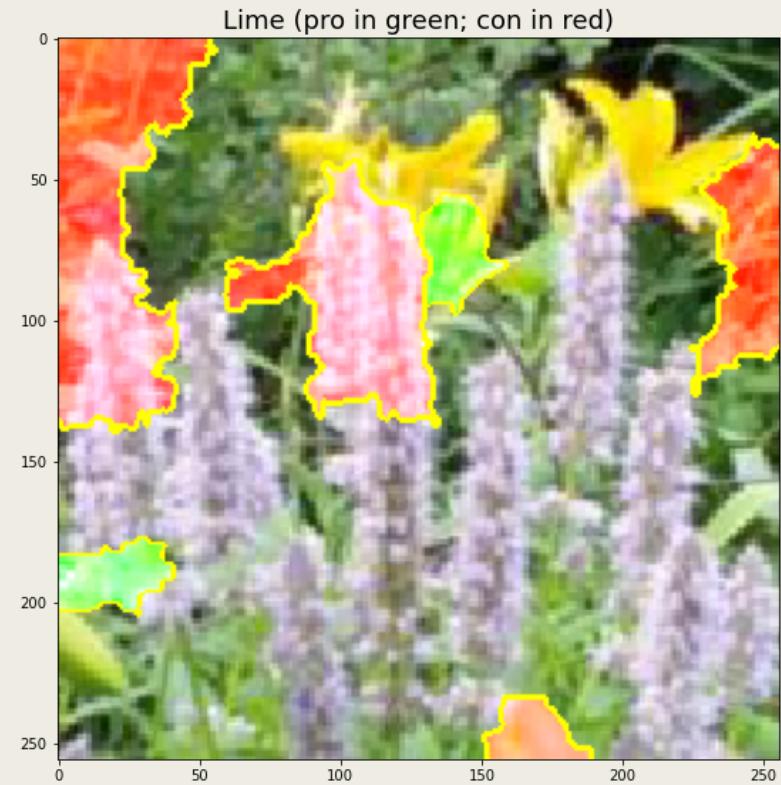
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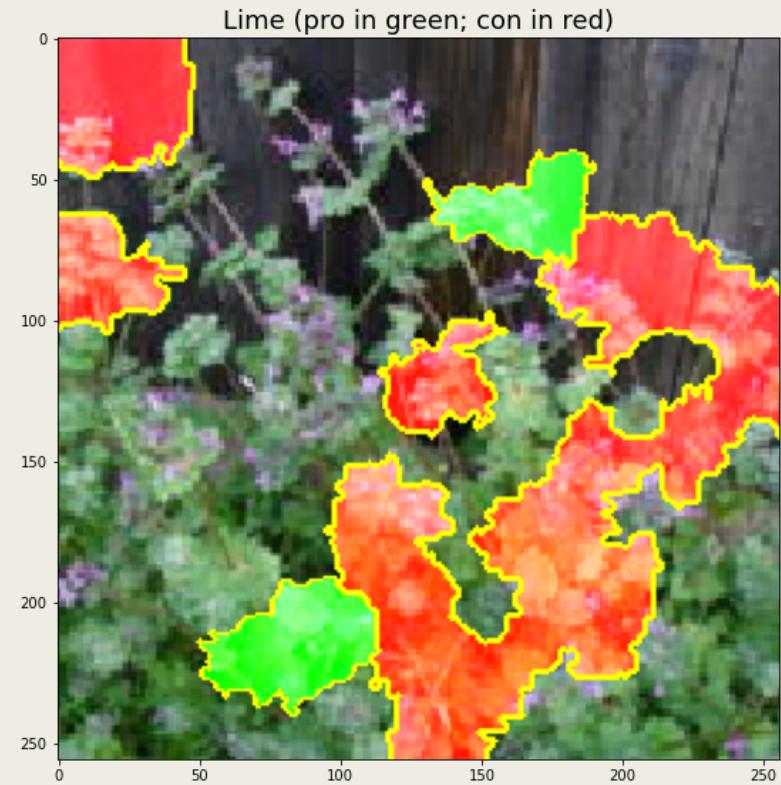
# Results – Pretrained Model



# Results – Pretrained Model



# Results – Pretrained Model



# Conclusions

- Final model not performing well
  - *48% accuracy*
  - *50% precision*
  - *Not focusing on plant to classify image*
- Pretrained model slightly better performance
  - *50% accuracy*
  - *52% precision*
  - *Not focusing on plant to classify image*

# Next Steps

- Try other pretrained models
- Continue adjusting model parameters
- Find new data sources
- Try image segmentation or other techniques

# THANK YOU!

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