OBJECT DETECTION

PROBLEM STATEMENT

Build a system that is able to segment the area containing an object in a given image automatically.

Framework

- Prepare the data
- Choose the method and tools
- Train the model
- Test the model

DATA




21 images: 18 for training and 3 for testing

PREPARE THE DATA

PREPARE THE DATA

Annotation file: via_region_data.Jason


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CHOOSE THE METHOD

Object detection API from tensorflow

- https://github.com/tensorflow/models/tree/master/research/object_detection
- Capable of localizing and identifying multiple objects in a single image
- Pre-trained models
  - Tensorflow detection model zoo
    - https://github.com/tensorflow/models/blob/master/research/object_detection/g3doc/detection_model_zoo.md
  - We choose: faster_rcnn_resnet50_fgvc
  - Fine tune this pre-trained model using our data

THE SELECTED PRE-TRAINED MODEL

Trained on iNaturalist database

- https://www.inaturalist.org
- https://github.com/visipedia/inat_comp
- Over 8,000 species, 450,000 images

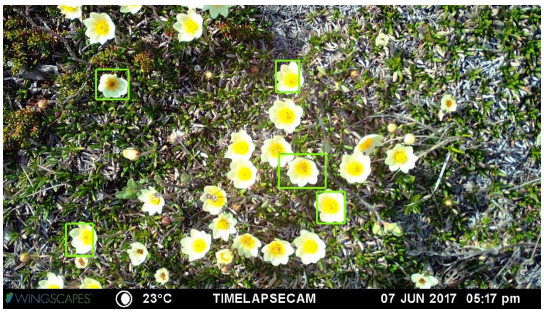


TRAINING

- Convert data format
  - https://github.com/rky0930/via
- Edit configuration file for the pre-trained model
- Fine tune the pre-trained model

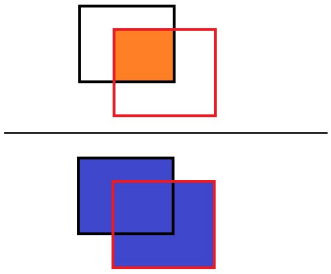
RESULTS

RESULTS (IMAGES FROM OTHER LOCATIONS)



EVALUATION METRICS

1. Intersection over Union (IoU)
   - $IoU = \frac{Predicion \cap Gournd\ Truth}{Predicion \cup Gournd\ Truth}$



2. True positive (TP): the IoU score of a prediction is **ABOVE** a pre-defined value.
3. False positive (FP): the IoU score of a prediction is **BELOW** a pre-defined value.
4. False negative (FN): there is no prediction associated with a gourd truth.
5. Precision: $\frac{TP}{TP+FP}$
6. Recall: $\frac{TP}{TP+F}$

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