Deep fruit classification from aerial images

-Team 10

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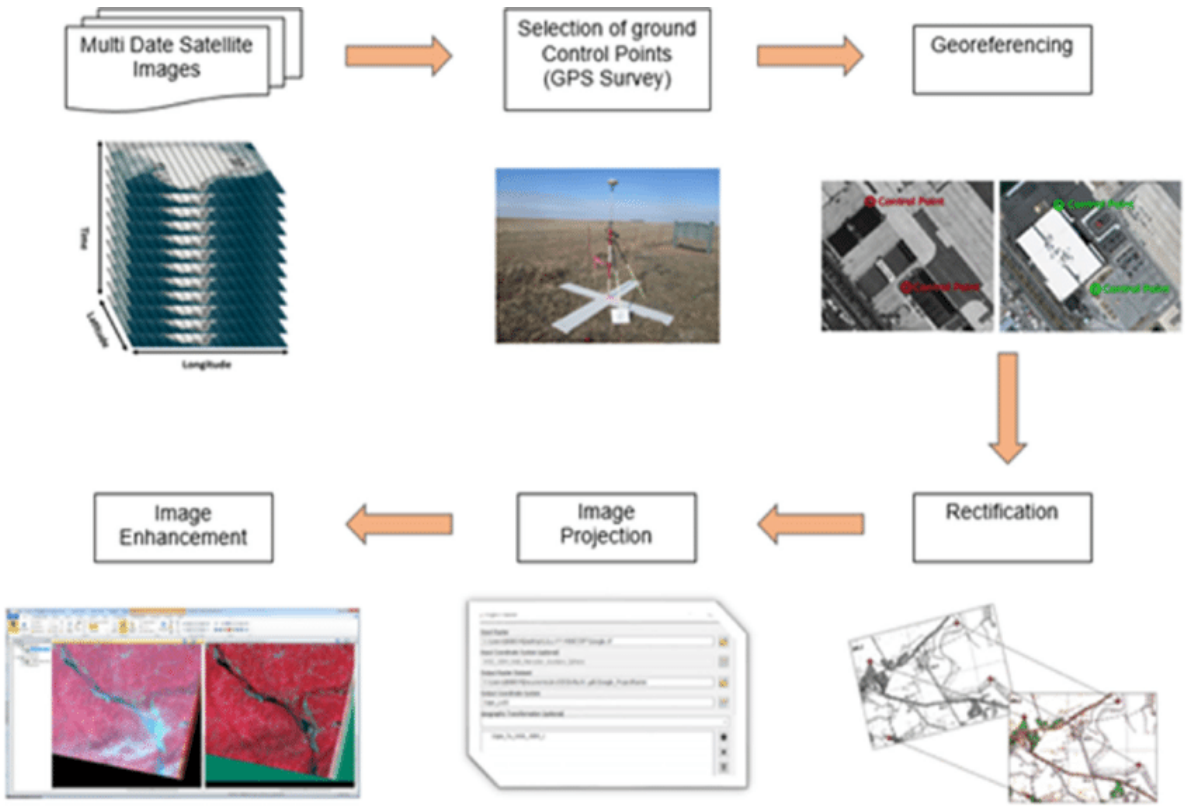
Data collection

Gather a dataset of aerial images containing various fruit trees or orchards. These images should capture the fruit trees from an aerial perspective, allowing for a clear view of the fruits. The dataset should include images of different fruit types, varying lighting conditions, and different stages of fruit growth.

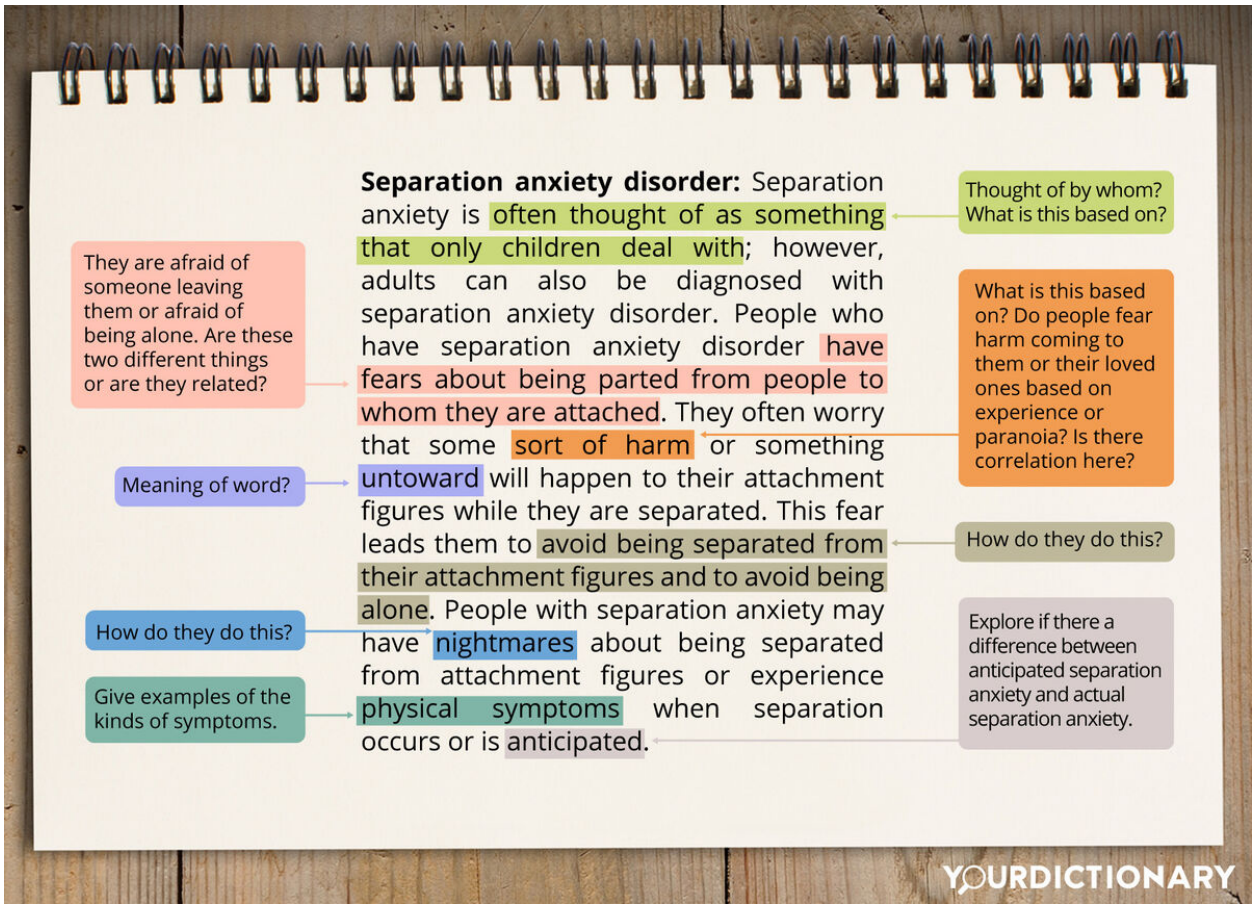
Preprocessing

Preprocess the aerial images to enhance their quality and remove any noise or irrelevant information. This may involve techniques such as image resizing, cropping, denoising, and normalization.



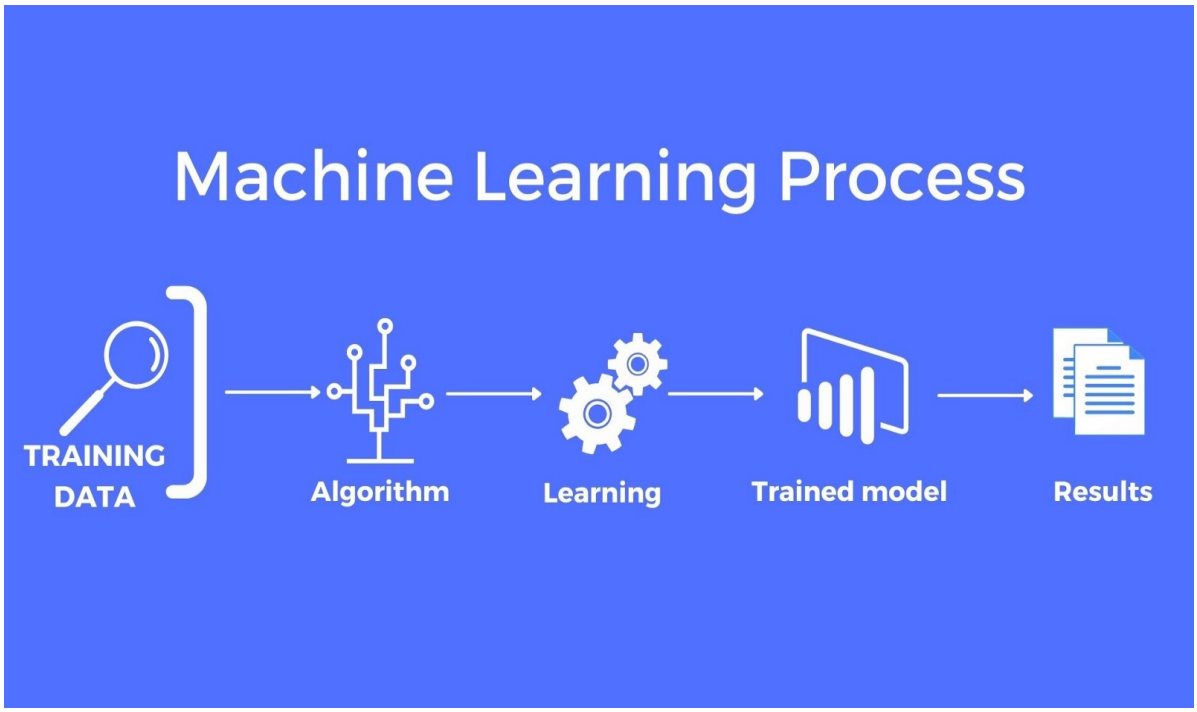
Annotation

Annotate the images with bounding boxes or pixel-level segmentation masks to indicate the location and extent of each fruit in the image. This manual annotation step is crucial for training a supervised machine learning model.



Model training

Use a deep learning architecture, such as convolutional neural networks (CNNs), to train a fruit classification model. The model should take an input image and predict the fruit type or class for each fruit instance present in the image. You can employ popular CNN architectures like ResNet, Inception, or EfficientNet as a starting point.



Data augmentation

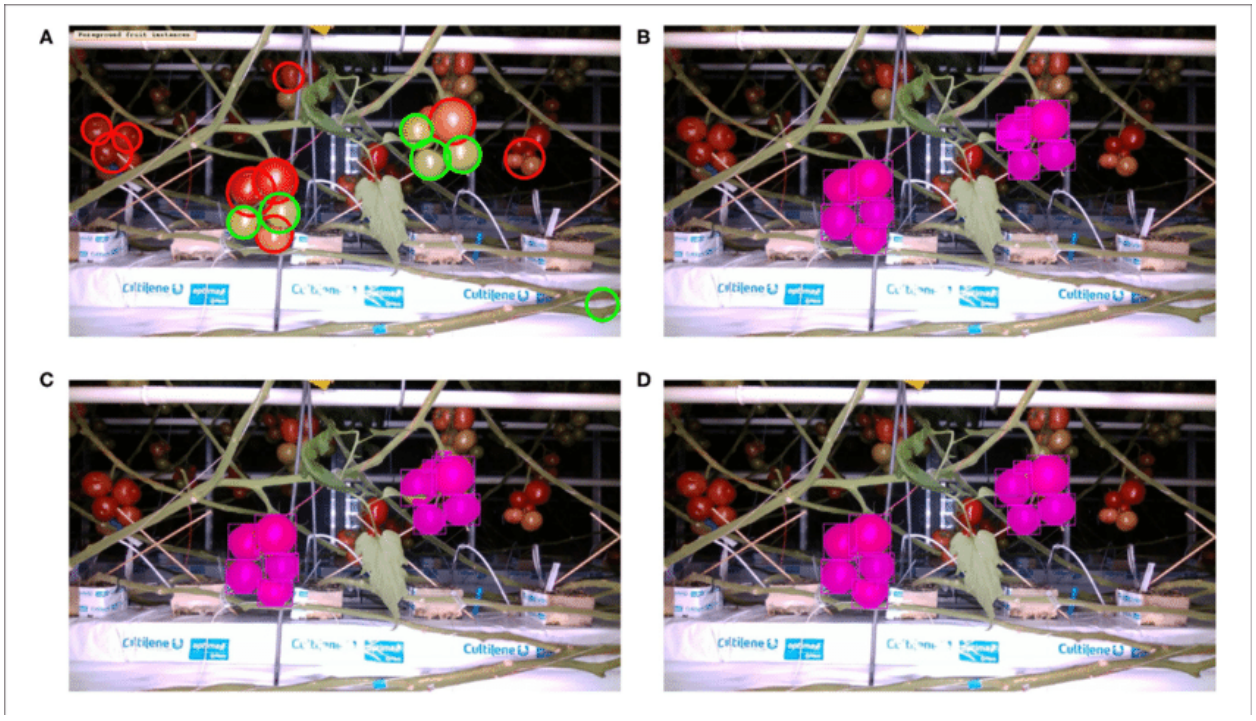
Apply data augmentation techniques to artificially increase the size and diversity of the training dataset. Common augmentation techniques include rotation, flipping, scaling, and adding noise to the images. This helps the model generalize better and reduces overfitting.

Model evaluation

Split the dataset into training and testing subsets. Evaluate the trained model on the testing set to measure its performance metrics such as accuracy, precision, recall, and F1 score. Adjust the model hyperparameters or architecture if necessary.

Inference

Once the model is trained and evaluated, it can be used for fruit classification on new aerial images. The model takes an input image, processes it, and produces predictions for each fruit instance in the image, indicating the fruit type.



Post-processing

Optionally, you can perform post-processing steps to refine the predictions, such as non-maximum suppression to eliminate duplicate or overlapping predictions, or filtering based on size or shape characteristics.