

## **Work Done Till Now – Jasmine Bud Detection Project**

### **Image Collection**

Captured around 200+ jasmine flower images under natural outdoor lighting conditions with variations in angle, background, and illumination. Images covered all maturity categories such as pre-bud, small bud, medium-small bud, medium bud, big bud, and full bloom.

### **Class Definition and Annotation**

Manually annotated all images using a YOLO-compatible tool. Bounding boxes and class labels were assigned for each flower. Observed natural class imbalance across categories.

### **Dataset Cleaning**

Removed blurred or unclear images. Ensured only useful samples were retained for model training.

### **Dataset Augmentation**

Applied augmentations such as flips, rotations, brightness variations, and exposure adjustments to improve dataset variety and reduce overfitting.

### **Dataset Splitting**

Divided images into Train, Validation, and Test sets using YOLO's standard structure (approx. 85/7/8 split).

### **Initial YOLOv8 Training (RGB Images)**

Trained YOLOv8 model on the RGB dataset. Achieved maximum per-class accuracy (precision/recall-based) of around 53% for certain bud categories without overlapping instances. Other classes showed lower confidence due to dataset imbalance and lighting variations.

### **HSV Conversion**

Converted the entire dataset from RGB to HSV color space. HSV is preferred in such flower/plant datasets because the Hue component captures color information better and remains stable under different lighting conditions. Other formats such as YCrCb or LAB were not chosen at this stage because HSV provides the most intuitive separation between color and brightness for green-background agricultural images.

### **Upcoming / Pending Work**

Training the YOLO model on the HSV-converted dataset and comparing results with RGB accuracy. Dashboard development (Phase 2) and real-time monitoring (Phase 3) are yet to begin.