

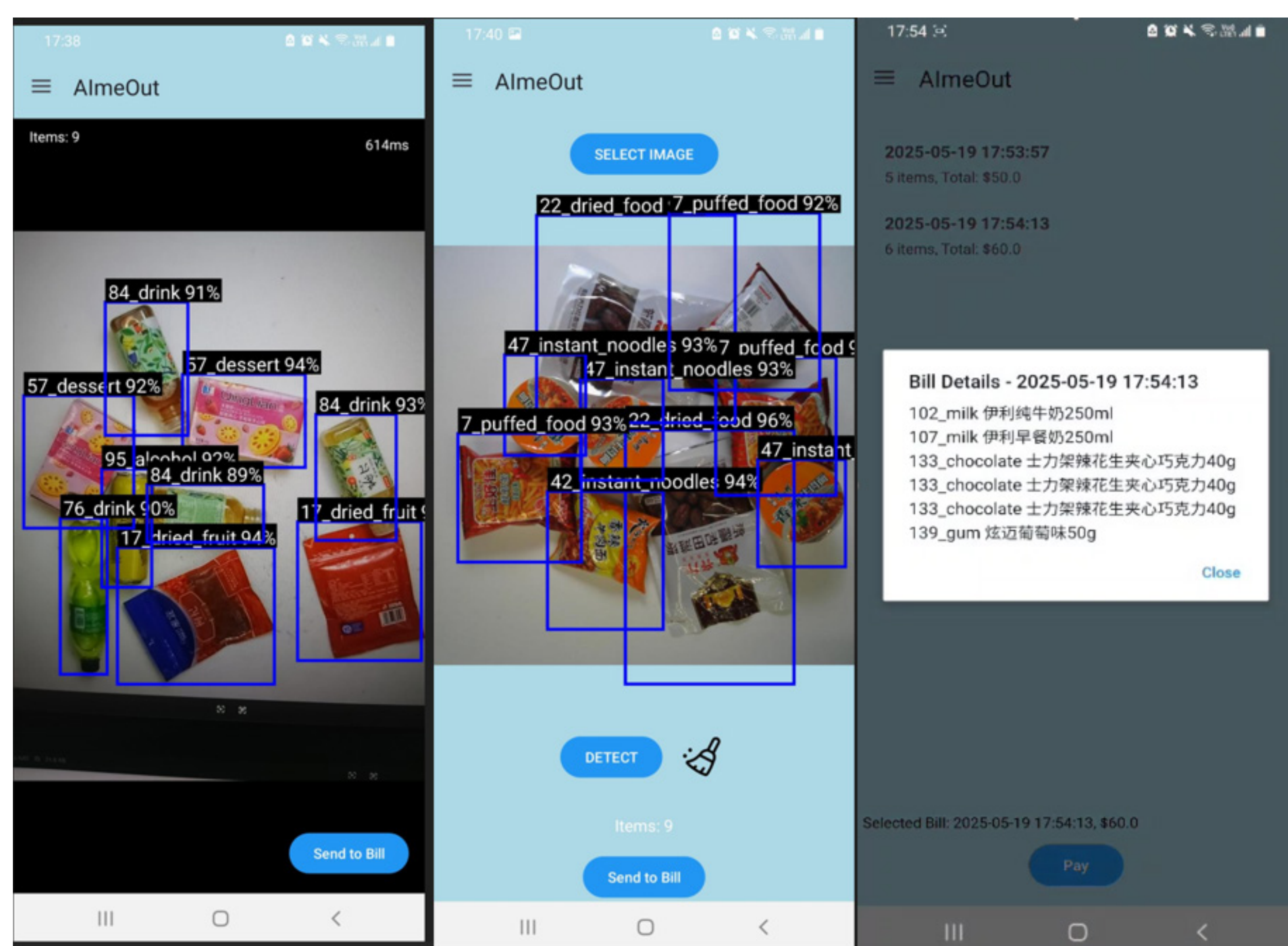
“AlmeOut”: Enhanced Self-service Checkout System

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1. Introduction

- Traditional self-service checkout systems rely on barcode scanning, which is time-consuming, error-prone, and inefficient for non-barcoded items, which often requiring staff assistance.
- Make use of AI and mobile application to enhance the check out experience and improve convenience
- New consumer habit
- Replace counters
- Amazon Go (Budget & Reasonable version)



Camera Scan
Real-time

Image Scan

Bill & Pay

2. How It Tracks

- Mechanism: Compares new detections to previous detections using iou and class name. Matched boxes keep the same id, ensuring moving objects are not treated as new.
- Stability: Requires detectionThreshold (5) frames for confirmation, reducing false positives from shaky hands or brief detections.
- State Management: detectionCountMap tracks persistence; previousDetections stores last frame's boxes.

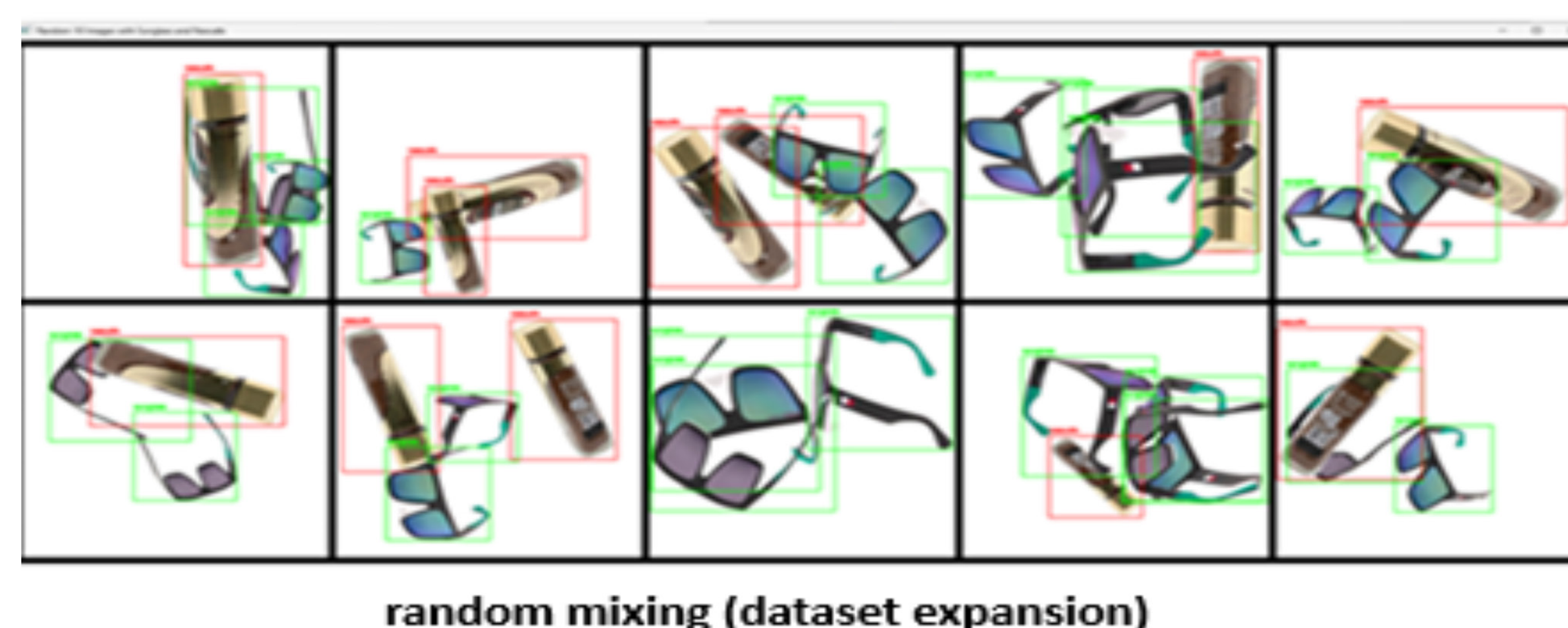
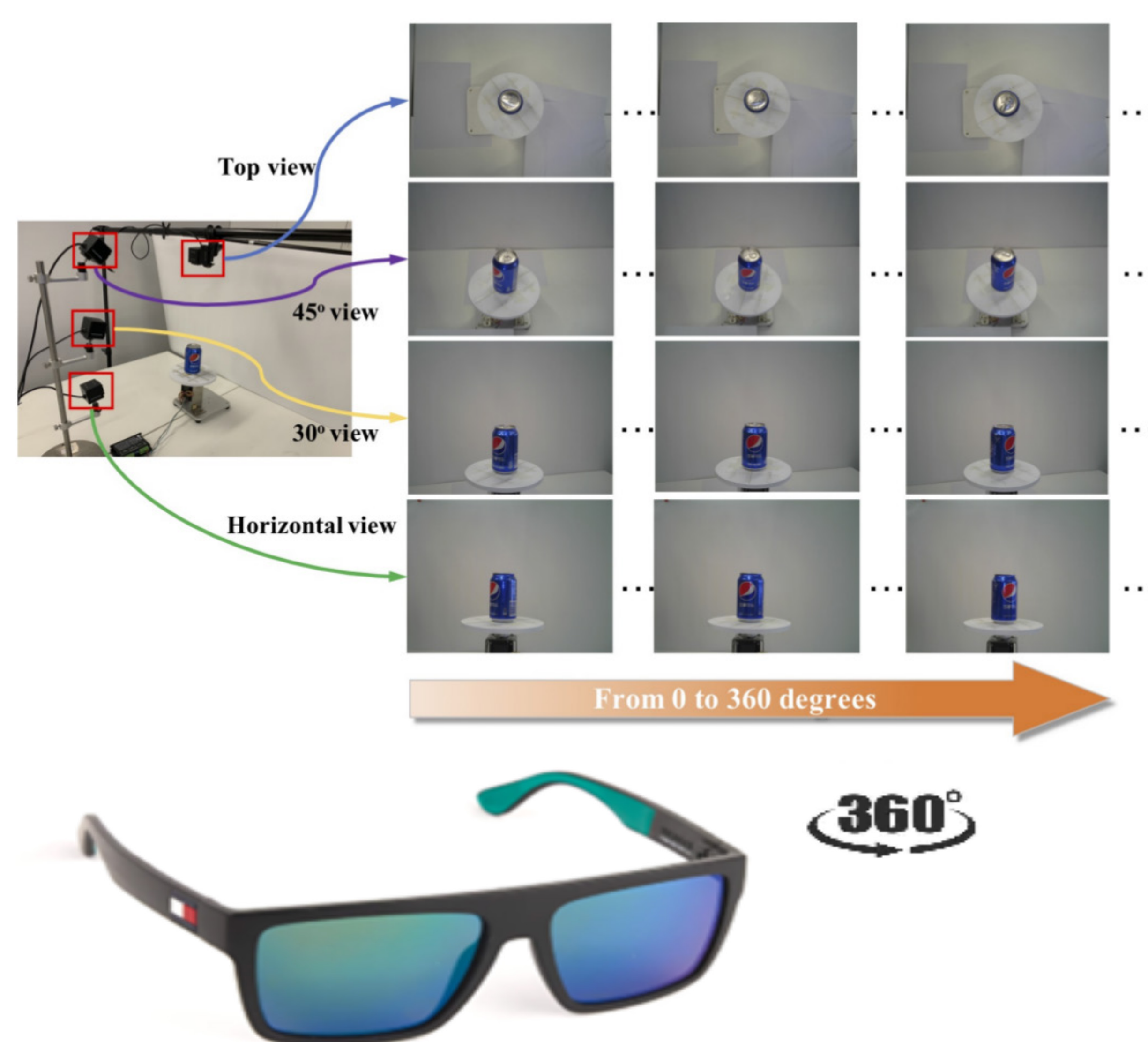
3. Methodology

- Using Yolov8 run 10 epochs for training 200 items, total ~84000 images, takes 2 hours to train, maintain good accuracy without overfitting, mAP50: 0.973, mAP50-95: 0.843.

(The average of the mean average precision calculated at varying IoU thresholds, ranging from 0.50 and 0.50 to 0.95)

4. Results

- Custom scripts allow efficiently preprocess datasets, including tasks such as image conversion and resizing. The application supports a comprehensive workflow utilizing 360-degree turntables to record item videos, resulting in a well-prepared dataset. This process enhances dataset creation by automating the mixing of items, contributing to dataset expansion.
- Takes maximum 5min for a 15s single item video, complete frame cutting, augment mixing and redirect.
- 200 items dataset: Training cost Maximum 2 hours.
- Real time Scanning in the APP, average 620ms



random mixing (dataset expansion)

5. Conclusion

- This system brings up a new consumer habit, with high accuracy scanning, consumer no longer struggles in the counter and time saving, providing a chainless experience.