LabelMe Project Changes and Updates

This document provides a detailed comparison of all changes made in the codebase from the beginning of the project to the current stage. The changes are related to integrating FastReID and YOLO for person detection and ReID, as well as enhancing the LabelMe app to handle video annotation and labeling with unique IDs for detected persons.

# Summary of Changes

1. 1. Integrated YOLOv8 for person detection and FastReID for person ReID in the LabelMe app.
2. 2. Added functionality to track persons across frames using FastReID and YOLO.
3. 3. Integrated DeepSORT for tracking, providing consistent IDs for detected persons.
4. 4. Updated the label list dialog box to display the correct IDs and labels.
5. 5. Added feature extraction from FastReID and integrated it with YOLO's bounding box outputs.
6. 6. Introduced the save feature for saving ReID annotations in a JSON format.
7. 7. Implemented the `match\_ids` function to match detected persons across frames based on ReID features.
8. 8. Added error handling for missing or invalid outputs from YOLO or FastReID.
9. 9. Integrated the ReID feature extraction and bounding box annotations with video frames for easier manual corrections.
10. 10. Refined the interaction between the `Polygon Labels`, `Label List`, and other dialog boxes for a smoother workflow.
11. 11. Resolved issues with displaying incorrect number of persons and duplicate labels in the UI.
12. 12. Added methods to ensure accurate person tracking and annotation throughout video frames.

# Explanations

The project evolved by integrating advanced models such as YOLOv8 and FastReID for person detection and ReID, respectively. YOLOv8 was employed to detect persons in the video frames, while FastReID extracted features for identifying and matching these persons across frames. We also introduced the concept of tracking persons over time using DeepSORT and matching their features based on cosine similarity to maintain consistent IDs. The labels with IDs were then added to the UI for easy visualization and tracking.