**ANPR Capture to Conversion and Saving to DB**

**Overview**

The ANPR process involves capturing video frames, detecting number plates, extracting characters from the number plates, and finally saving the processed data and images to a database. Below are the detailed steps involved in this process:

**1. Setup and Initialization**

**1.1. Install Dependencies**

Ensure you have the required libraries installed:

* OpenCV (cv2)
* YOLO (from ultralytics)
* PIL (for image processing)
* MySQL connector (db\_mysql)

**1.2. Load Models**

Load the YOLO models for number plate detection and character recognition:

number\_plate\_model = YOLO('customYOLO.pt')

character\_model = YOLO('best\_char\_1630.pt')

**2. Coordinate Selection for Cropping**

**2.1. Select Region of Interest (ROI)**

1. **Open Video**: Open the video file using OpenCV.
2. **Draw Rectangle**: Use mouse events to draw a rectangle around the area of interest (number plates).
3. **Save Coordinates**: Save the coordinates of the rectangle to crop the frames.

**3. Frame Extraction and Processing**

**3.1. Extract Frames**

1. **Open Video**: Use OpenCV to read the video file.
2. **Read Frames**: Read frames in a loop and crop them based on the selected coordinates.
3. **Resize Frames**: Resize frames for display purposes.

**3.2. Number Plate Detection**

1. **Detect Number Plates**: Use the YOLO model to detect number plates in the cropped frame.
2. **Draw Bounding Boxes**: Draw bounding boxes around detected number plates.

**4. Character Detection and Extraction**

**4.1. Detect Characters**

1. **Extract Number Plate Image**: Crop the detected number plate region from the frame.
2. **Detect Characters**: Use the YOLO model to detect characters in the number plate image.

**4.2. Format and Clean Text**

1. **Sort Characters**: Sort characters based on their positions and confidence scores.
2. **Combine Characters**: Combine characters into the final number plate text.

**5. Save and Store Results**

**5.1. Save Images**

1. **Save Number Plate Image**: Save the number plate image with detected characters.
2. **Resize Image**: Optionally, resize the saved images using PIL.

**5.2. Save to Database**

1. **Insert Data**: Save the final number plate text and image paths to the MySQL database.

**Summary**

The ANPR process involves capturing video frames, detecting number plates, extracting characters, and saving the results. Ensure to:

* Load the appropriate models.
* Crop and process frames.
* Detect and extract characters.
* Save results and store them in the database.