ERROR CATEGORIZATION

Detection of Objects = model trained to 0.98 mAP and is easily passing
confidence threshold of 0.50 in controlled environment.
However confidence of detection of balls if any external object in environment drops.

Initially had troubles when all 3 balls placed in same bowl but retraining with ,ore data has solved this.

Background will be a concern would suggest not to change much if doing keep a plain background.Have already trained with multiple backgrounds to overcome and retraining is suggested if necessary

Color classification
Balls
Faced issues with webcam colors and illumination conditions
Have trained yolo classification model to best suit all lighting conditions but if changing or adding other ball colors would require re-training

Bowls
Not many issues
Tweaking of H values in HSV range for red and yellow if any issue faced

Prompts
Any manipulation can be done in Api content part to finetune outputs

Any prompts must compulsorily include the ball colors as the llm desnt know balls in environment or the same can be included in content part of API call

Swap corresponding interchange or opposite prompts need a mentioning of balls or bowls in prompts. I.e swap balls into opposite color balls or swap balls positions

Also memory for swapping ball positions is included

Transitive prompts wont work
Eg move Red blue yellow balls in circular pattern.zigzag patterns as the outputs for any prompt is action ball X goes to Y and we dont have connection between sequence like swap logic we can write n logics fo n patterns

When conditions like ground or anywhere or initial position is mentioned current logic will move the ball to initial positions balls .test logs are logged below.
https://drive.google.com/file/d/1d0Nk-UZ8tBrcNNsII9gXRmB1yCebn07Q/view?usp=sharing

CODES

Webcam index vary device to device for now i have included to check range of 0-3

The initial image path (path0) and updated image path and detection model and classification model should be properly setup.