Expirement2

The purpose of this experiment was to generate **precise binary masks** for **irregular blue dots** from a **custom dataset**. These masks capture the exact shape of the blue dots and are intended for use in training segmentation models like U-Net or for further shape analysis.

Dataset Description

- The dataset was **manually created** by cutting **pink paper into circular patches** and placing them on a plain background.
- **Blue dots** were created by **dropping blue watercolor** inside the pink circles, resulting in **irregular-shaped marks**.
- The resulting images were captured under consistent lighting and stored for processing.
- Each image was **manually annotated** using the **YOLOv11 polygon format**, labeling:
    - **Class 0**: Blue Dots (foreground – target for detection and masking)
    - **Class 1**: Pink Paper (background – ignored in mask generation)

Note: Only **Class 0 (blue dots)** are used to create the binary masks.

What This Code Does

- Parses YOLOv11 polygon-format .txt files.
- Extracts and converts **normalized coordinates** into **pixel-level polygons**.
- Fills the blue dot regions with white (255) on a black (0) background.
- Generates one binary .png mask per input image, saved in the masks/ directory.

□ **Workflow Summary**

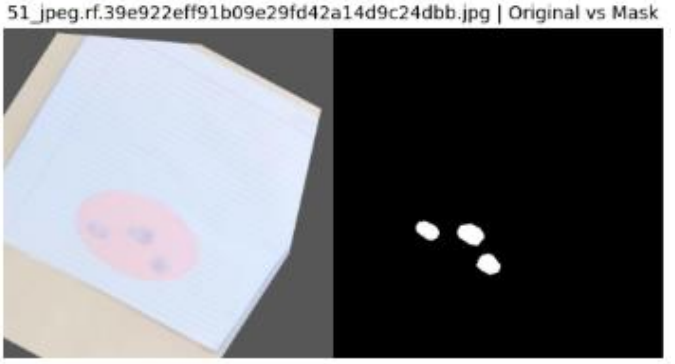
Step	Function	Description
1	parse_yolo_polygon_line()	Reads and extracts class + (x, y) polygon points from each annotation line
2	create_mask_from_annotations()	Fills only **blue dot (class 0)** polygons in white (255); ignores pink paper
3	convert_dataset_to_masks()	Converts all annotated images to masks
4	verify_mask_statistics() *(optional)*	Checks how many masks contain dots and how much area they cover
5	main()	Entry point to run the full conversion on the dataset

Why This Approach Works

- **Manual annotations** ensure precise labelling of irregular shapes.
- **Polygon-based filling** captures the **true outline** of each blue dot, unlike bounding boxes.
- **Black-and-white binary masks** are ideal for use in segmentation pipelines.

Outputs i.e., masked images of blue dots are stored in the folder named "maskedBlueDots"

51_jpeg.rf.39e922eff91b09e29fd42a14d9c24dbb.jpg | Original vs Mask



2025-07-04-at-2_41_49-PM-1-_jpeg.rf.048266447d0f8ed5bb0d3a60334e7fa5.j

52_jpeg.rf.377c37c6ae348e9590aafac4d10c655d.jpg | Original vs Mask

2025-07-04-at-2_41_49-PM-1-_jpeg.rf.470434fc69b2dbbef5d15784e77030e5.j