

Algorithm and Flow Diagram for Defect Detection Model

Step 1: Load Required Libraries

- Import PyTorch, OpenCV, and other necessary libraries.
- Set up the device CPU for model inference.

Step 2: Load the Pre-trained Model

- Load the trained deep learning model using PyTorch.
- Set the model to evaluation mode .

Step 3: Load and Preprocess the Input Image

- Read the image using OpenCV (cv2.imread()).
- Resize and normalize the image to match the model's input size.
- Convert the image into a tensor and move it to the selected device.

Step 4: Perform Inference using the Model

- Pass the preprocessed image through the model.
- Get the bounding boxes, class labels for detected defects.

Step 5: Post-processing the Model Output

- Filter out predictions with low confidence scores.

Step 6: Draw Bounding Boxes on Detected Defects - Use OpenCV to draw rectangles around detected defects.

- Label each defect with its category and confidence score.

Step 7: Save and Display the Processed Image - Save the output image with bounding boxes.

- Display the image using cv2.imshow().

Flow Diagram for Defect Detection Model

