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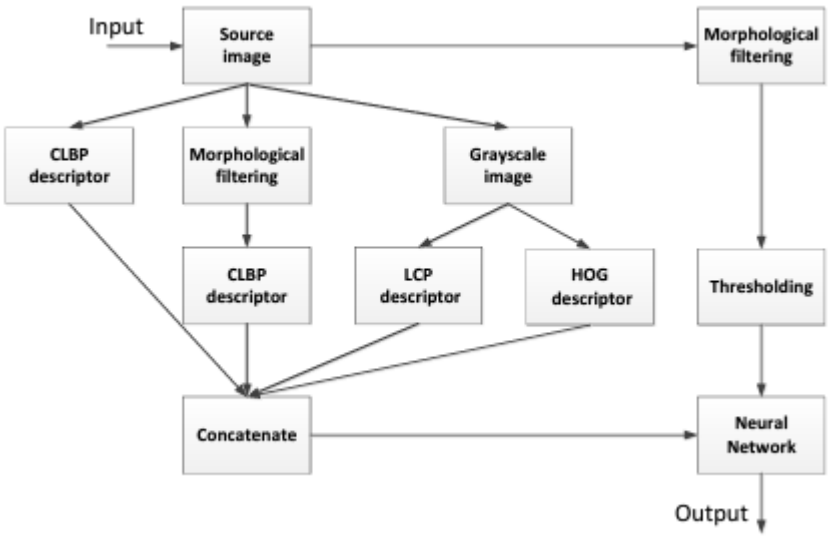
Defect Detection

Traditional image processing-based surface defect detection of industrial products needs to design a method for extracting image features according to the texture features of the image, which does not require a large number of labeled data to train the model. Solution automatic defect detection problem is widely used in practice. This problem occurs when searching for defects in the road surface, the textile industry, as well as virtual restoration of archival photo images. The decision of the range of tasks to speed up work in the direction of the data, and in some cases completely resolve. For defects occurring in the pictures are different kinds of stains, scratches, cracks and other foreign objects. Their appearance can be due to aging, physical impact, improper storage, or operation. Recovery of such defects in the present, in most cases carried out through manual processing, making it challenging to restore archived facsimiles.

Defect Detection Method:

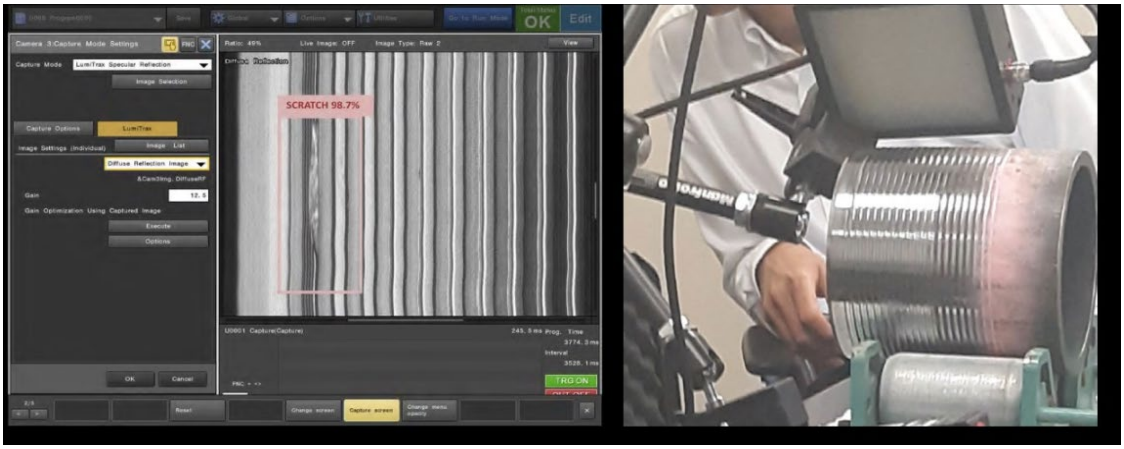


Example:

Manufacturing process:

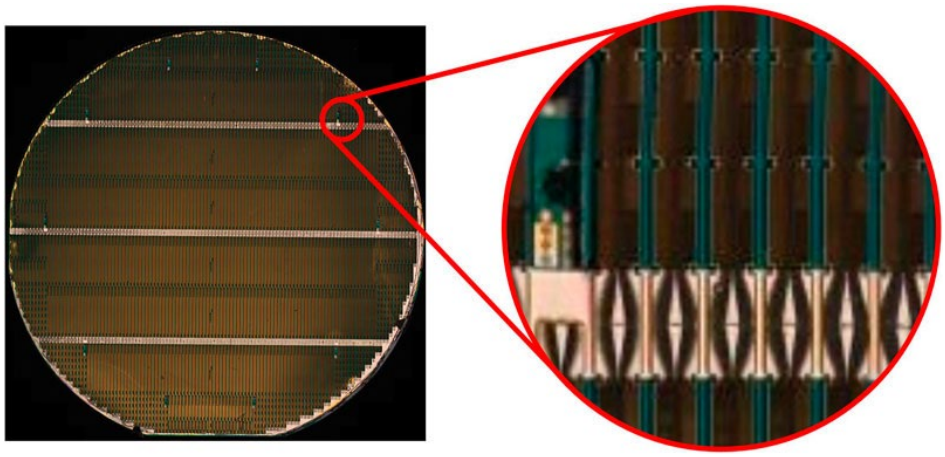
Instead of the typical human inspector checklist, machine learning algorithms can check 25 or more items at once. To understand the real value of this

process, we first need a deeper understanding of classic manufacturing processes. What most don't know is that 98% of electronic assembly lines are manual assembly lines.



High Resolution Defect Detection:

Following a specific protocol, the manufacturer's personnel inspect the fabrication quality of the received processed wafer after taking high resolution photos of the wafer surface. A Sensofar microscope with a 5x magnification objective is used for this. The Sensofar microscope captures roughly 400 images for imaging a complete 2-inch wafer, which are afterwards patched together using specialized software.



Inspection of photomasks

The revolutionary photomask inspection system that inspects the reticle before each photolithographic process to almost completely remove repeated flaws. A new photomask inspection system called QC Optics,

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Inspects the reticle before each photolithographic operation, therefore eliminating repeated flaws. When choosing a high performance, high detection rate inspection tool, this instrument offers IC producers a cost-effective and dependable alternative that supports sub-0.15-micron design standards. Phase shift, "Tri-tone," and optical proximity correction (OPC) masks are just a few examples of the advanced reticles that can be used with QC Optics, The newest member of QC Optics' FLS (Fast Laser Scanning) product family. The tool does not mandate that the user be familiar with the reticle pattern, chromium reflectivity, pellicle thickness, or any other additional information The tool may inspect less important layers in less time per reticle by employing lower sensitivity and less severe defect criteria.

Applications:

- Reticle Stockers
- Wafer Steppers
- Cleaning Stations
- Automatic Handling Systems
- Stand-alone unit with manual loading

Options:

- Nesting Sensor - to check whether the reticle is properly nested.
- Reticle Present Sensor - verifies if a reticle is placed on the stage.
- Bright-Field Detection - to inspect holes in the pellicle.

Benefits:

- Cost-Effectiveness
- Easy Operation
- High Speed
- Low Maintenance

References with Example:

I. https://www.semiconductoronline.com/doc/photomask-inspection-system-0001

II. https://www.drschenk.com/products/customized-solutions/photomask-inspection.html
III. https://www.photo-sciences.com/photomask-inspection/