SAIPS Home Exercise - Defects Detection

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In this document I'll review the approaches taken for solving the detection problem, results, conclusions and further ideas.

We have 3 pairs (inspected, reference) of images, two pairs containing some defects and one pair does not.

Each pair contains images which are highly similar, except of:

- small relative translation

- the defects that exist in one but (assumed) not in the other.

We are also given with 'labels': the (x, y) coordinates of the (center I assume?) of each defect.

We want to construct an algo which gets such pair of images as an input and return the binary images of the detected defects in the inspected image.

For me, this means 2 main things:

- correct alignment of the reference image, such that it's as matched as possible to the inspected one.

- design a flow which receives (inspected, aligned\_reference, labels) and return some 'model' that maps a pixel to defect-probability.

Step 1 - image alignment:

I have tried a number of methods

Displayed below are 6 images per each of the 3 cases:

1. the inspected image

2. the reference image

3. the shifted reference image

4. the diff between the inspected and the shifted reference images (err)

5. the probability of each pixel to be considered as defect according to the model (P\_defects)

6. the defects prediction binary image (prediction\_mask)