

# 3D PRINTING DEFECT DETECTION REPORT

## Input data

### · Input image:

Name: wrong\_z\_offset\_honeycomb\_box.jpg

Size: (2048, 1537, 3) (height, width, channels) pixels.

### · Input Gcode:

Name: wrong\_z\_offset\_honeycomb\_box.gcode

### · Input reference object width:

23.21 millimeters

### · Input metadata:

Name: test.txt

Data:

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed eu dictum eros.

Aenean ut justo eleifend, euismod turpis quis, dignissim odio.

Phasellus iaculis odio vitae nibh placerat tincidunt.

Ut fermentum turpis velit, quis vehicula mi dictum a.

Phasellus consectetur massa urna, sit amet blandit libero pulvinar quis.

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Vivamus massa massa, faucibus venenatis condimentum id, finibus viverra ipsum.

Integer purus orci, lacinia faucibus porta eu, tincidunt imperdiet magna.

Donec tortor libero, maximus in accumsan nec, finibus at urna.

Suspendisse tempus dui vitae mauris viverra tincidunt vel eu lectus.

Etiam elementum sed massa malesuada vulputate.

Sed viverra dolor et justo finibus, in eleifend diam egestas.

Sed dui mauris, elementum id ipsum vitae, fringilla lobortis odio.

Nam laoreet finibus mauris vel eleifend.

Pellentesque leo urna, iaculis sit amet nisl ac, fringilla dapibus nulla.

Fusce finibus semper tellus at aliquam.

Fusce lobortis turpis at tellus commodo blandit.

Praesent hendrerit vulputate tincidunt.

Vestibulum nulla nunc, elementum nec ligula in, egestas bibendum elit.

Pellentesque facilisis nisl ac nisi elementum tempor.

Nunc vehicula id justo eu porttitor.

Pellentesque commodo turpis quis finibus placerat.

In id convallis sapien, quis fringilla leo.

Donec dictum luctus leo, sit amet tincidunt nunc scelerisque vitae.

In egestas eros mollis lobortis malesuada.

Pellentesque massa nibh, accumsan ac ante eu, tincidunt facilisis augue.

Etiam in nisl a erat cursus molestie.

## Impresion defects

- **Pixels per metric:**

390.5 pixels per 23.21 millimeters

- **Structural similarity index measure max score:**

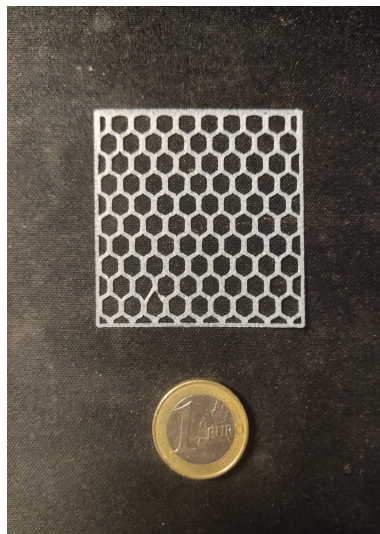
9.009E-1 %

- **Impresion total error:**

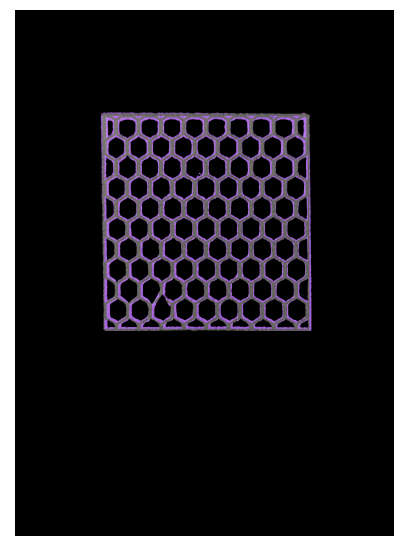
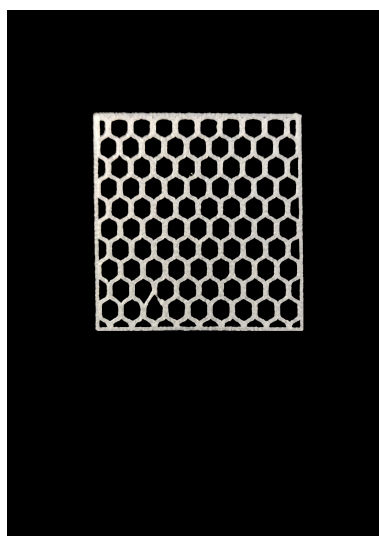
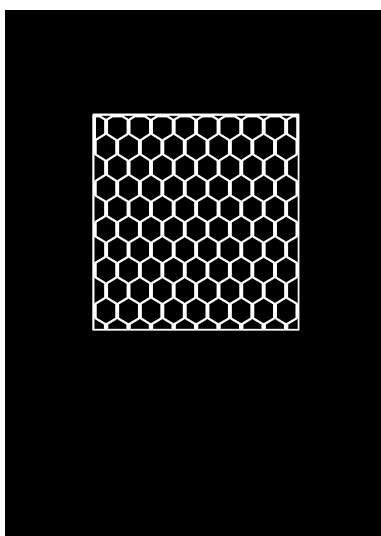
9.912E-2 %

- **Segmentation total error:**

0.000E+3 %



Original image, size: (2048, 1537, 3) (height, width, channels) pixels.



[Left] Perfect model, size: (2048, 1537, 3) (height, width, channels) pixels.

[Middle] Masked 3d printed object, size: (2048, 1537, 3) (height, width, channels) pixels.

[Right] Masked 3d printed object with defects, size (2048, 1537, 3) (height, width, channels) pixels.

# Classification

- **Train and test images and labels length:**

- Train images: Using pretrained model
- Train labels: Using pretrained model
- Test images: 50
- Test labels: 50

- **Train and test pair images length:**

- Pair train images: Using pretrained model
- Pair test images: Using pretrained model

- **Model name:**

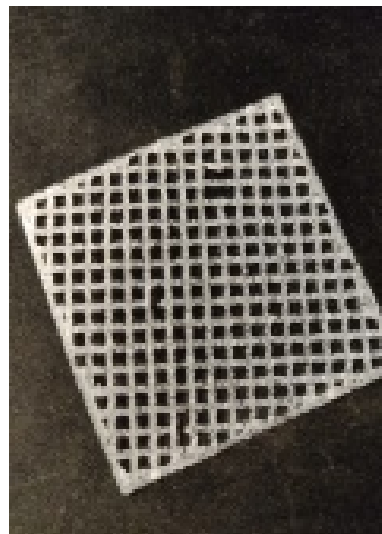
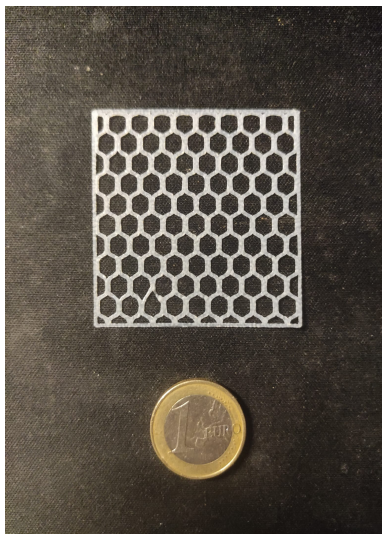
siamese\_neural\_network\_model.keras

- **Model history:**

Using pretrained model

- **Defect classification:**

- Prediction probability: 7.500E-1 %
- Type of defect: Low Z-offset



[Left] Original image, size: (2048, 1537, 3) (height, width, channels) pixels.

[Right] Test image, size: (159, 120, 3) (height, width, channels) pixels.

- **Recomendations:**

- The print platform is not level.
- The Z-offset between the print platform and the extruder has not been correctly adjusted and it's too low.
- The diameter of the extruder may be affecting the Z-offset:  
Extruders with larger diameters may require a larger Z-offset

due to the greater extrusion of material, while smaller ones may require a smaller value.

- Different types of materials influence the Z-offset calibration:

Variable diameters of materials can affect the volume of extrusion of the molten material.

- Hardware problems:

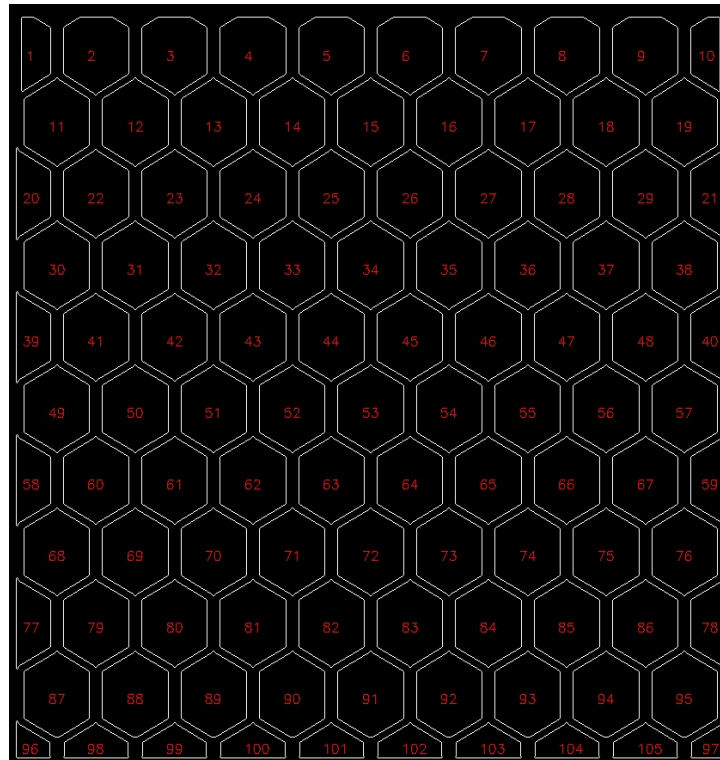
It may have mechanical problems that affect the accuracy of the Z-offset.

Check for loose, misaligned or aged components that may affect to the printing precision of the printer.

## Internal areas

### · Structural similarity index measure max score:

9.598E-1 %



### · List of areas (mm2):

[1] 9.1225	[17] 21.8368	[33] 21.9568	[49] 21.7826	[65] 22.0574	[81] 22.0574
[2] 20.966	[18] 22.1155	[34] 22.2355	[50] 22.0574	[66] 21.7826	[82] 21.7826
[3] 20.966	[19] 21.8368	[35] 21.9568	[51] 21.7826	[67] 21.7826	[83] 21.7826
[4] 21.1943	[20] 11.6499	[36] 21.9568	[52] 21.7826	[68] 21.7826	[84] 22.0574
[5] 20.966	[21] 11.6499	[37] 22.2355	[53] 22.0574	[69] 22.0574	[85] 21.7826
[6] 20.966	[22] 21.8368	[38] 21.9568	[54] 21.7826	[70] 21.7826	[86] 21.7826
[7] 21.1943	[23] 21.8368	[39] 11.6151	[55] 21.7826	[71] 21.7826	[87] 21.7594
[8] 20.966	[24] 22.1155	[40] 11.6151	[56] 22.0574	[72] 22.0574	[88] 22.0342
[9] 20.966	[25] 21.8368	[41] 21.7826	[57] 21.7826	[73] 21.7826	[89] 21.7594
[10] 9.1225	[26] 21.8368	[42] 21.7826	[58] 11.6151	[74] 21.7826	[90] 21.7594
[11] 21.8368	[27] 22.1155	[43] 22.0574	[59] 11.6151	[75] 22.0574	[91] 22.0342
[12] 22.1155	[28] 21.8368	[44] 21.7826	[60] 21.7826	[76] 21.7826	[92] 21.7594
[13] 21.8368	[29] 21.8368	[45] 21.7826	[61] 21.7826	[77] 11.6151	[93] 21.7594
[14] 21.8368	[30] 21.9568	[46] 22.0574	[62] 22.0574	[78] 11.6151	[94] 22.0342
[15] 22.1155	[31] 22.2355	[47] 21.7826	[63] 21.7826	[79] 21.7826	[95] 21.7594
[16] 21.8368	[32] 21.9568	[48] 21.7826	[64] 21.7826	[80] 21.7826	[96] 4.2749

[97] 4.2749  
[98] 7.9769  
[99] 7.9769  
[100] 8.0775  
[101] 7.9769  
[102] 7.9769  
[103] 8.0775  
[104] 7.9769  
[105] 7.9769