

3D PRINTING DEFECT DETECTION REPORT

Input data

· Input image:

Name: 3d_object_with_reference.png

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

· Input Gcode:

Name: 1_layer_grid.gcode

· Input reference object width:

18.74 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:**

250.77751104149266 pixels per 18.74 millimeters

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

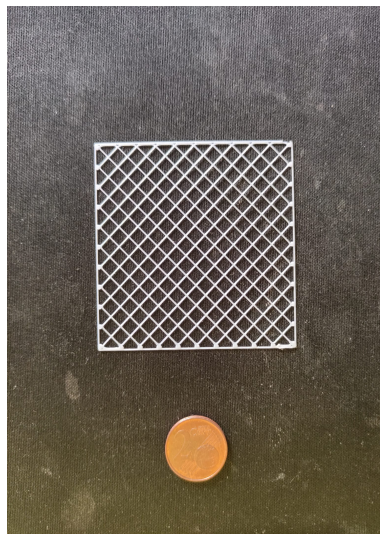
9.484E-1 %

- **Impresion total error:**

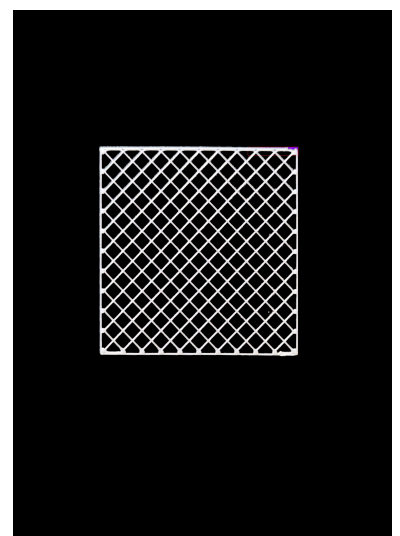
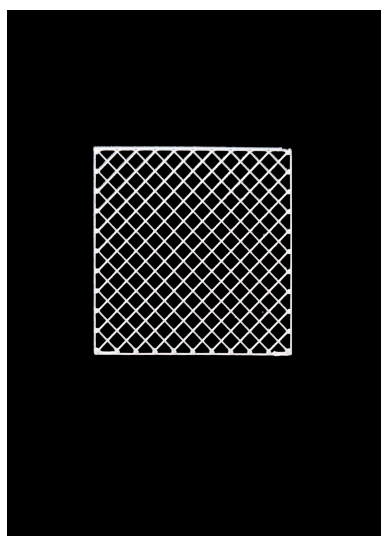
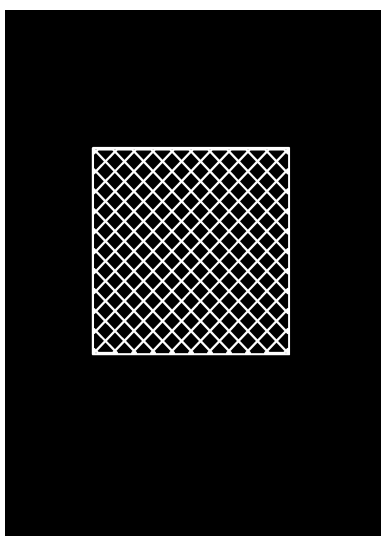
1.455E-3 %

- **Segmentation total error:**

5.019E-2 %



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 lenght:**

- Train images: 150
- Train labels: 150
- Test images: 50
- Test labels: 50

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

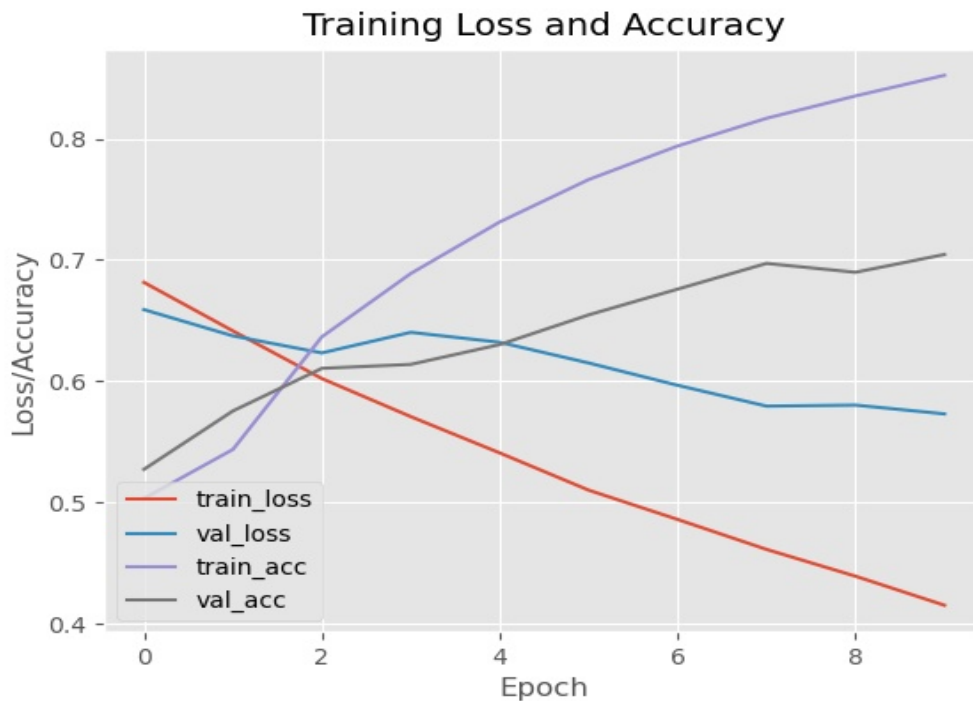
- Pair train images: 22350
- Pair test images: 2450

- **Model name:**

siamese_neural_network_model.keras

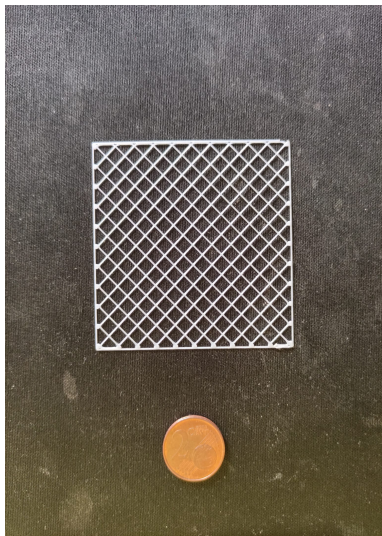
- **Model history:**

- Accuracy: $8.522E-1$ %
- Loss: $4.153E-1$
- Validation accuracy: $7.045E-1$ %
- Validation loss: $5.731E-1$

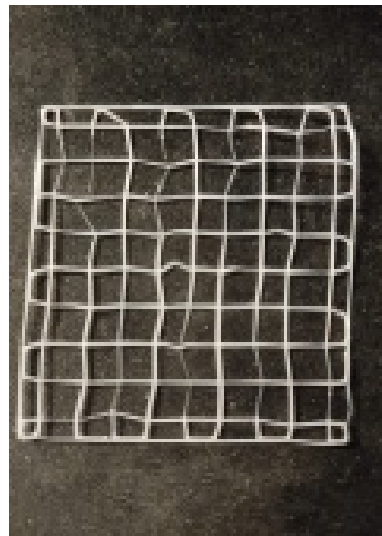


• **Defect classification:**

- Prediction probability: 7.523E-1 %
- Type of defect: Bad material adhesion



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



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

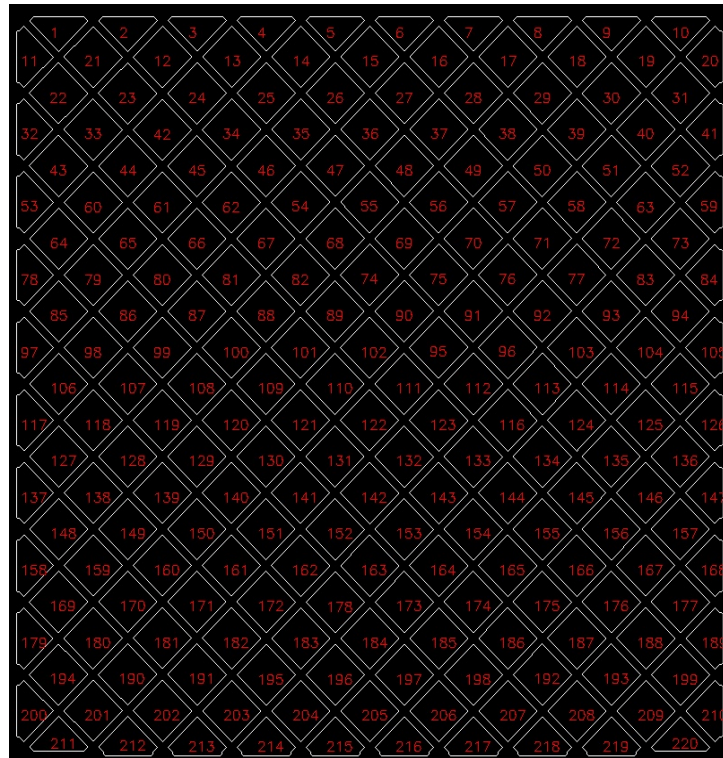
• **Recommendations:**

- 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 high.
- The layer prints too fast.
- The temperature or cooling setting is not correct.
- The printing platform:
 - Plastics adhere differently to each material.
 - Different surfaces can be used for extrusion materials.
 - BuildTak for PLA or a treated glass heated surface for ABS.
- Brims and Rafts:
 - Your piece may be small and not have enough contact surface.
 - You can try using 'BRIM' generating material perimeters around the basis of the original design.
 - Or use 'RAFT' to create a horizontal lattice between the base of the 3D printer and the part.

Internal areas

· Structural similarity index measure max score:

9.978E-1 %



· List of areas (mm2):

[1] 7.639	[17] 12.1488	[33] 12.3358	[49] 12.3358	[65] 12.1488	[81] 12.1488
[2] 7.6649	[18] 12.1488	[34] 12.3358	[50] 12.3358	[66] 12.1488	[82] 12.1488
[3] 7.478	[19] 12.1488	[35] 12.1488	[51] 12.3358	[67] 12.1488	[83] 12.1488
[4] 7.478	[20] 9.0426	[36] 12.1488	[52] 12.3358	[68] 12.3358	[84] 9.1749
[5] 7.478	[21] 12.215	[37] 12.1488	[53] 8.9304	[69] 12.3358	[85] 12.1488
[6] 7.478	[22] 12.2898	[38] 12.2955	[54] 12.3358	[70] 12.3358	[86] 12.1488
[7] 7.478	[23] 12.2955	[39] 12.3358	[55] 12.307	[71] 12.3358	[87] 12.1488
[8] 7.478	[24] 12.3358	[40] 12.3358	[56] 12.3358	[72] 12.2207	[88] 12.1488
[9] 7.478	[25] 12.1488	[41] 9.0426	[57] 12.3358	[73] 12.1488	[89] 12.1488
[10] 7.478	[26] 12.1488	[42] 12.1488	[58] 12.3358	[74] 12.3358	[90] 12.3358
[11] 8.8096	[27] 12.1488	[43] 12.3358	[59] 9.2295	[75] 12.3358	[91] 12.3358
[12] 12.3358	[28] 12.1488	[44] 12.1488	[60] 12.1488	[76] 12.3358	[92] 12.3358
[13] 12.1488	[29] 12.2265	[45] 12.1488	[61] 12.1488	[77] 12.2898	[93] 12.1488
[14] 12.1488	[30] 12.3358	[46] 12.3358	[62] 12.1488	[78] 8.8815	[94] 12.1488
[15] 12.1488	[31] 12.1488	[47] 12.1488	[63] 12.1488	[79] 12.1488	[95] 12.3358
[16] 12.1488	[32] 8.7435	[48] 12.2322	[64] 12.1488	[80] 12.1488	[96] 12.4997

[97] 8.8815 [134] 12.3358 [171] 12.1488 [208] 12.1488
[98] 12.1488 [135] 12.1488 [172] 12.3358 [209] 12.1488
[99] 12.1488 [136] 12.1488 [173] 12.2092 [210] 9.0426
[100] 12.1488 [137] 8.8815 [174] 12.3358 [211] 7.639
[101] 12.1488 [138] 12.1488 [175] 12.3358 [212] 9.2295
[102] 12.1488 [139] 12.1488 [176] 12.3358 [213] 9.0426
[103] 12.1488 [140] 12.1488 [177] 12.3358 [214] 9.0426
[104] 12.1488 [141] 12.1488 [178] 12.1488 [215] 9.0426
[105] 9.1749 [142] 12.3358 [179] 8.7435 [216] 9.0426
[106] 12.1488 [143] 12.3358 [180] 12.3358 [217] 9.0426
[107] 12.1488 [144] 12.3358 [181] 12.1488 [218] 9.0426
[108] 12.1488 [145] 12.307 [182] 12.3358 [219] 9.0426
[109] 12.1488 [146] 12.1488 [183] 12.1488 [220] 7.478
[110] 12.1488 [147] 9.1749 [184] 12.1488
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[120] 12.1488 [157] 12.1488 [194] 12.2898
[121] 12.1488 [158] 8.9304 [195] 12.1488
[122] 12.1488 [159] 12.1488 [196] 12.1488
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[127] 12.1488 [164] 12.3358 [201] 12.215
[128] 12.1488 [165] 12.3358 [202] 12.3358
[129] 12.1488 [166] 12.3358 [203] 12.1488
[130] 12.1488 [167] 12.1488 [204] 12.1488
[131] 12.1488 [168] 9.2295 [205] 12.1488
[132] 12.3358 [169] 12.3358 [206] 12.1488
[133] 12.3358 [170] 12.1488 [207] 12.1488