

Exploiting synthetic images for real-world image recognition

Max Maton

Dataset creation



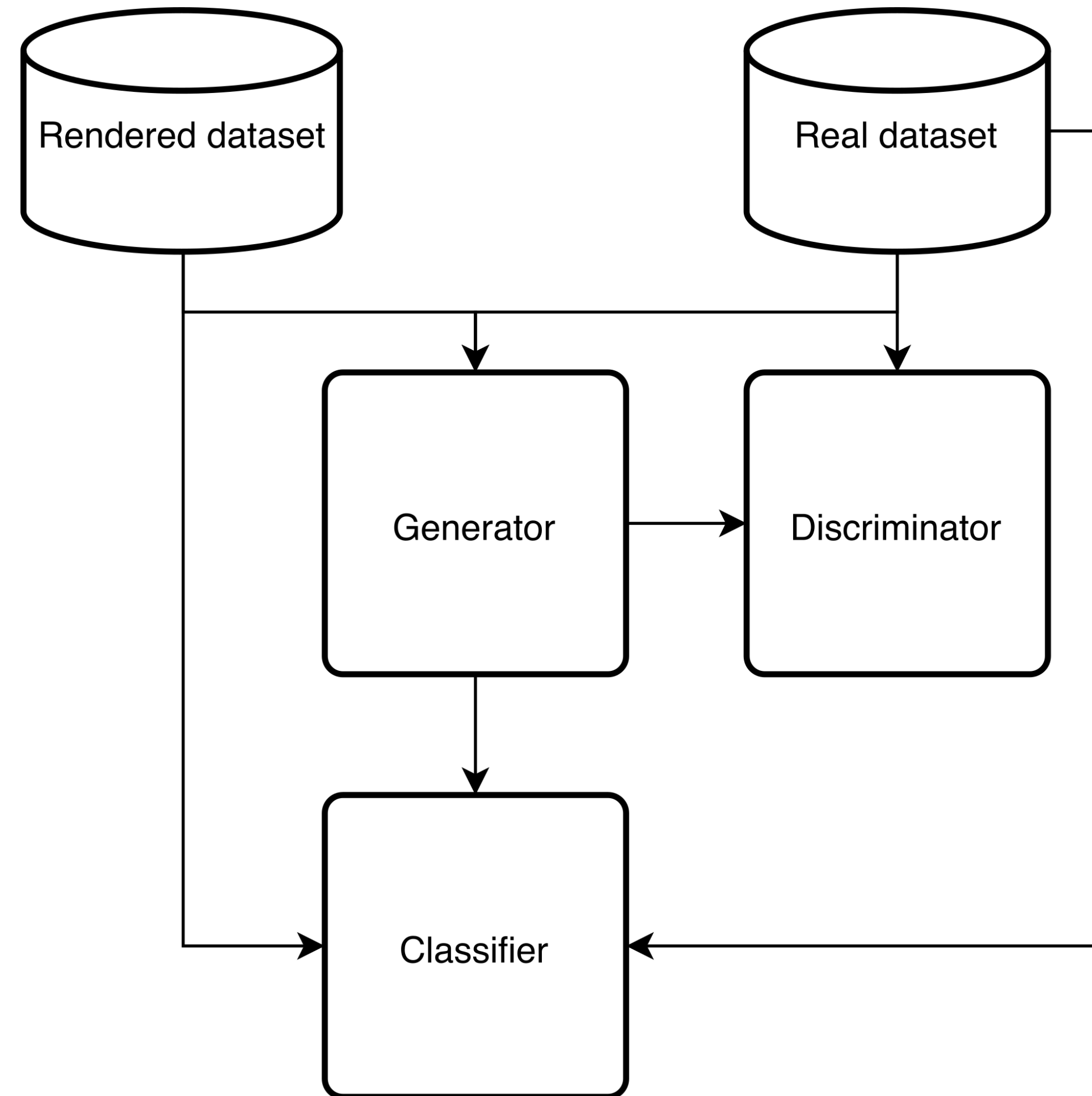
Rendered data



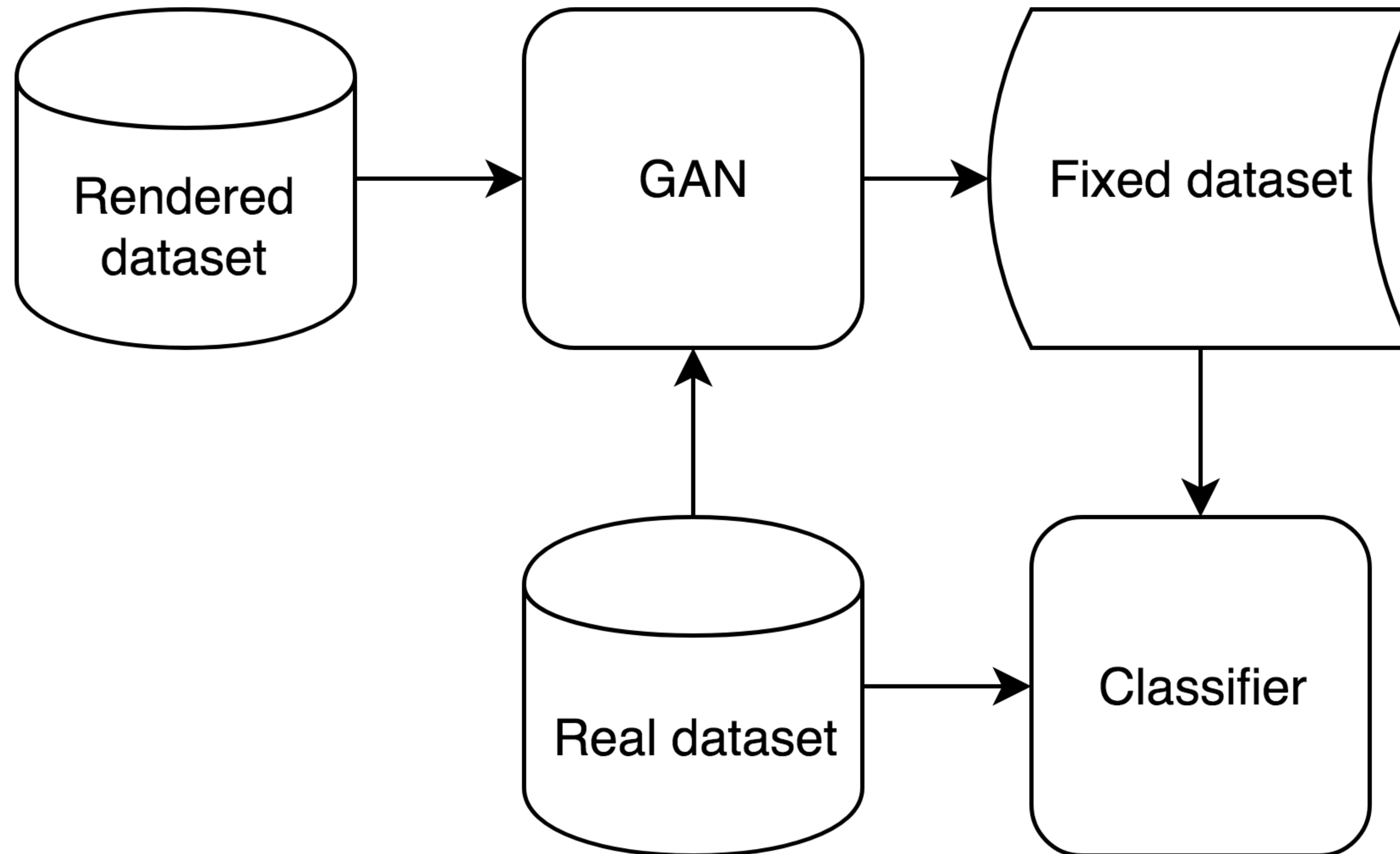
Distribution gap



What are GANs?



Are GANs able to fix this?

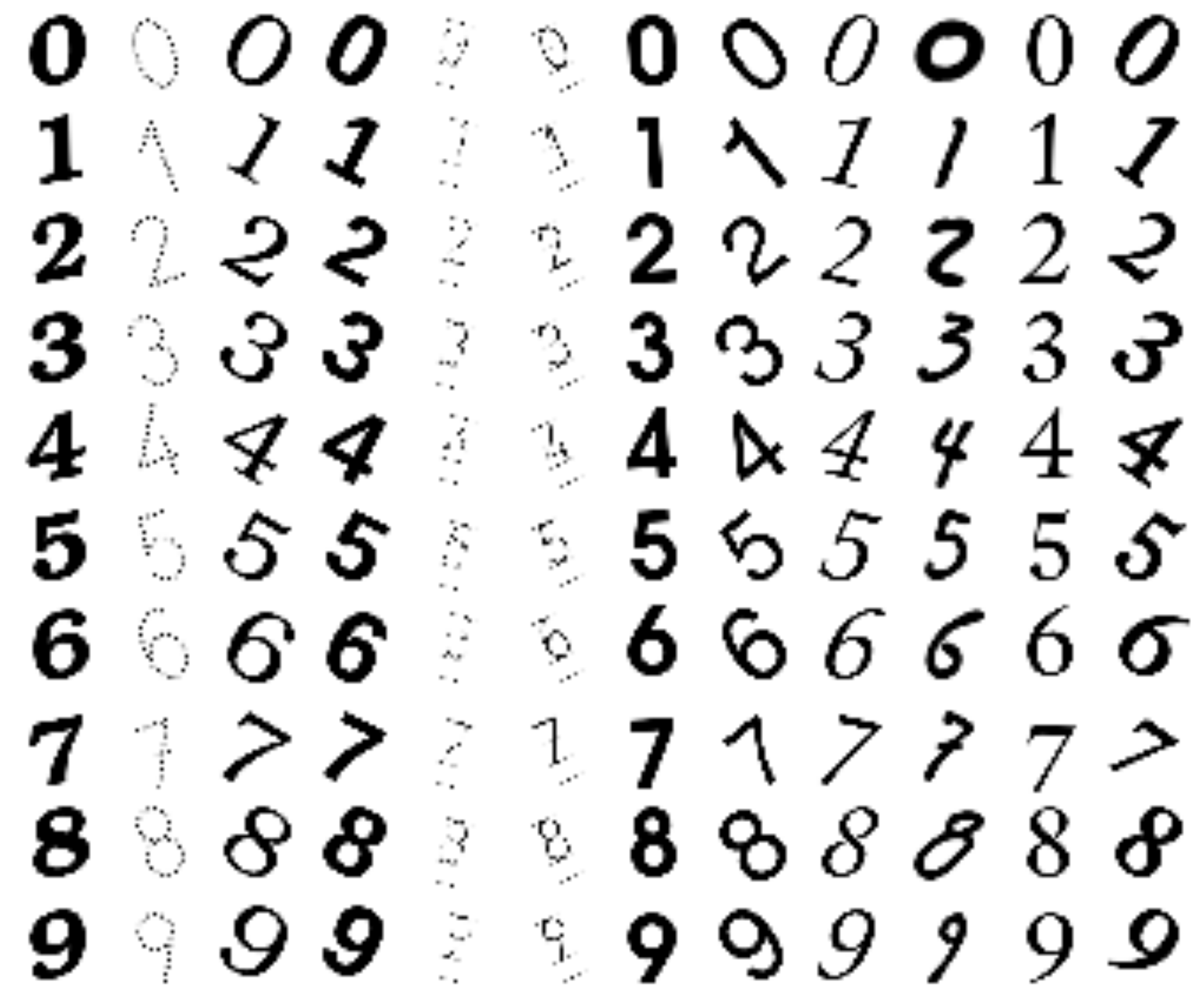


Using MNIST as testcase

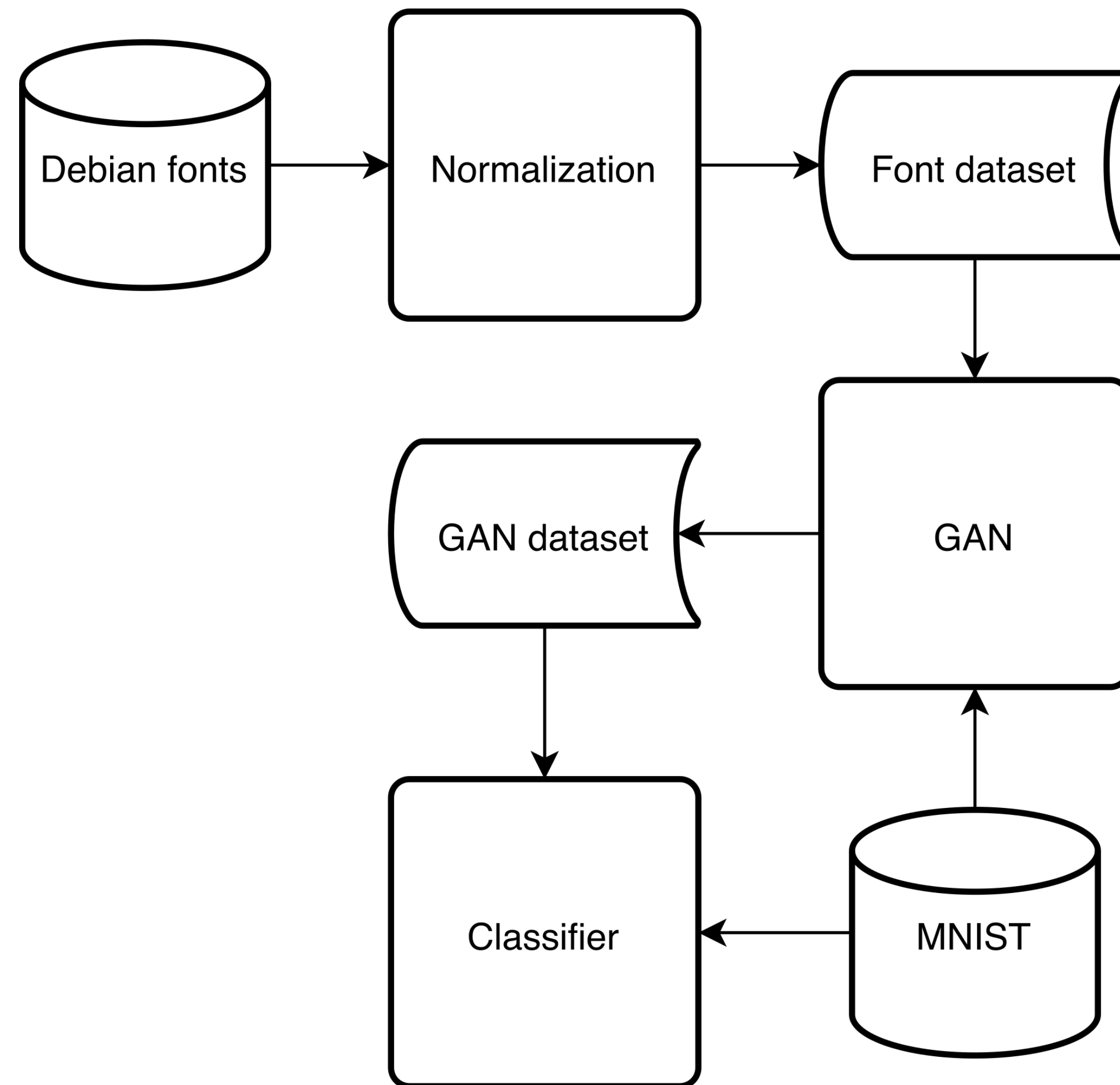
Real



Rendered



Using MNIST as testcase



Output

55 images


| | | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|---|---|
| in | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| out | 2 | 8 | 2 | 8 | 9 | 9 | 5 | 9 | 7 | 5 |

Output

385 images

| | | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|---|---|
| in | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| out | 9 | 3 | 3 | 7 | 9 | 2 | 2 | 2 | 3 | 9 |

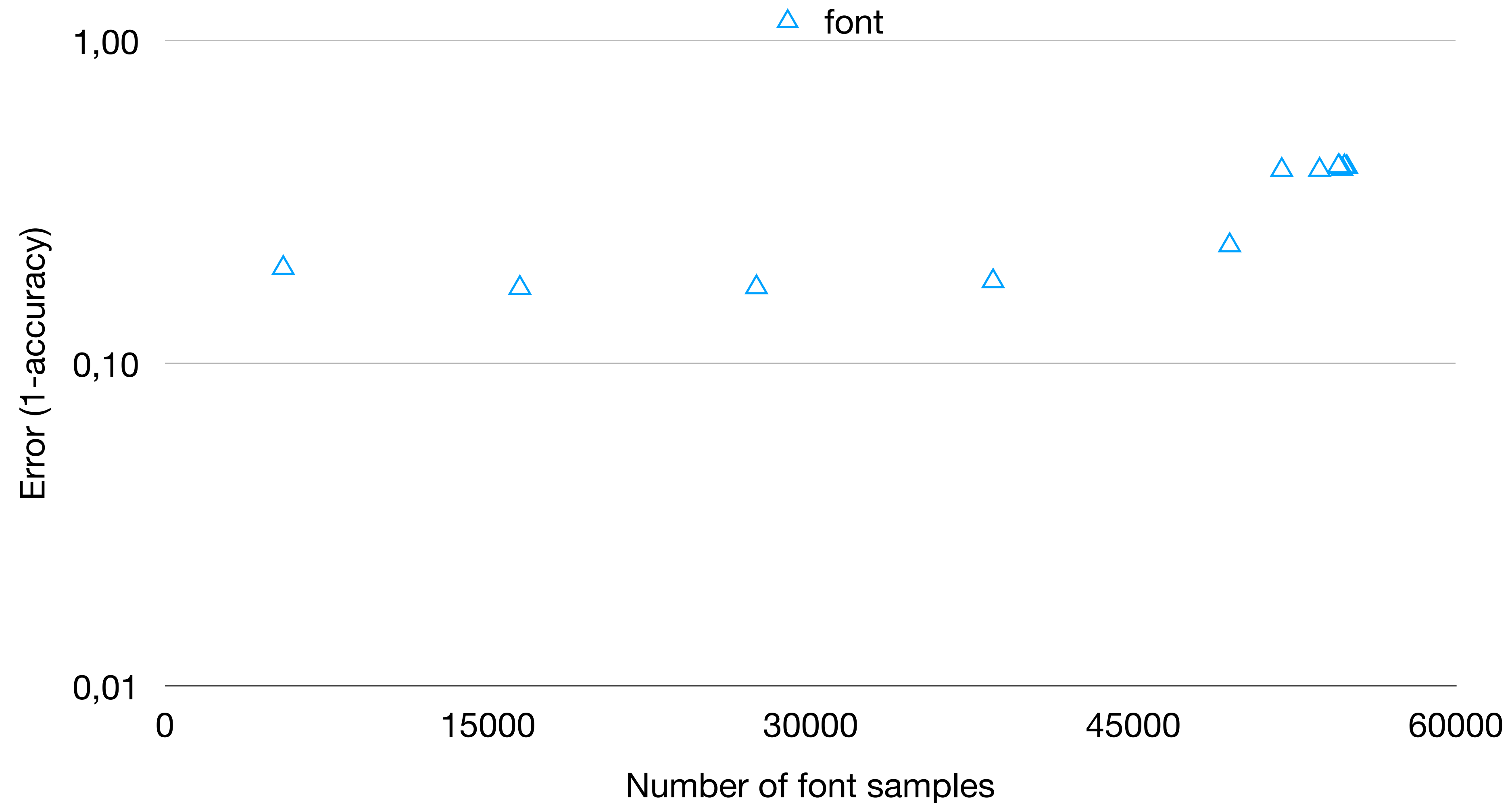
Output 5,500 images

| | | | | | | | | | | |
|-----|-------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|
| in | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| out |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

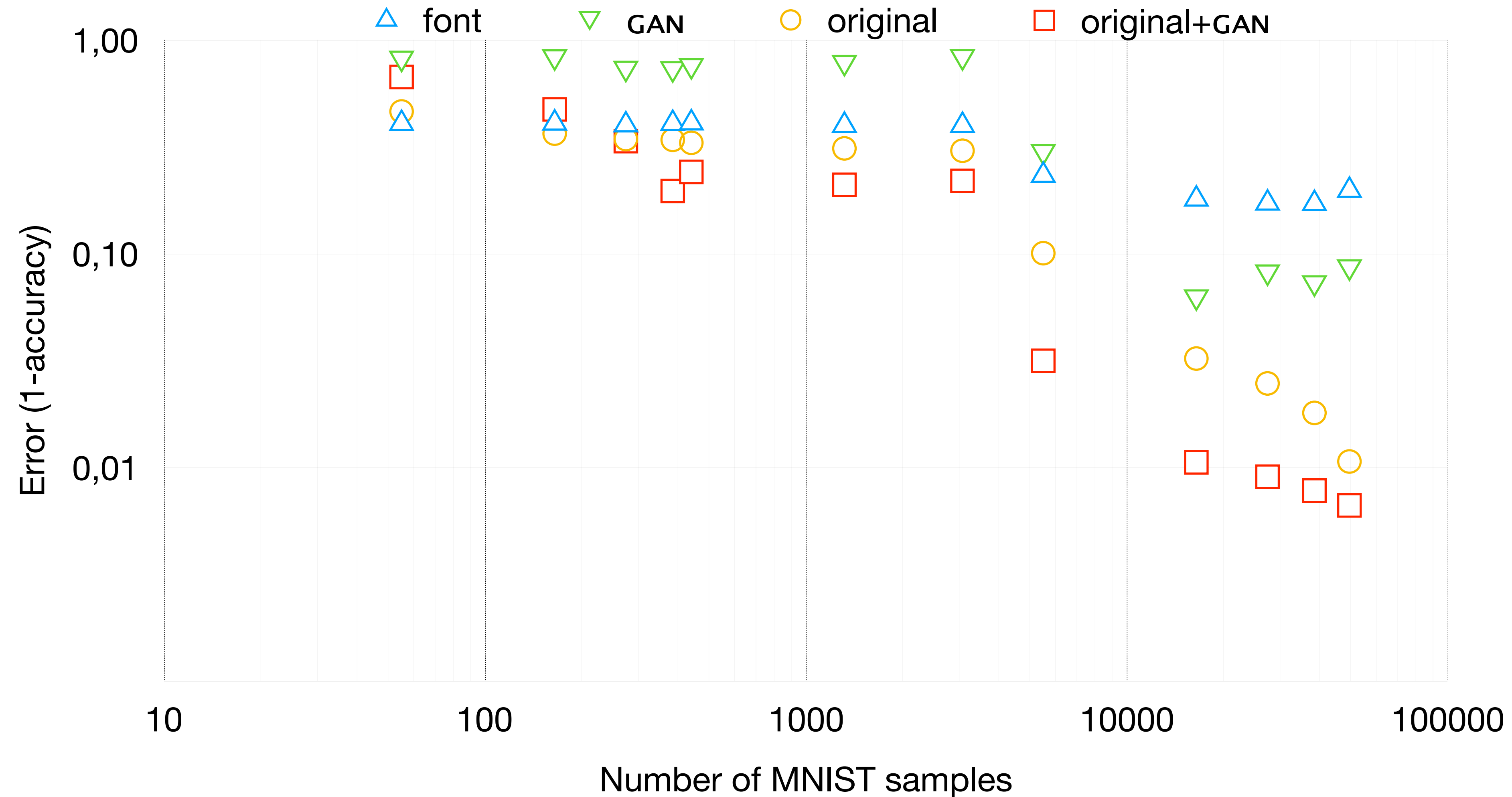
Output 38 , 500 images

| | | | | | | | | | | |
|-----|---|---|---|---|---|---|---|---|---|---|
| in | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| out | 0 | 1 | 2 | 3 | 4 | 5 | 5 | 7 | 8 | 9 |

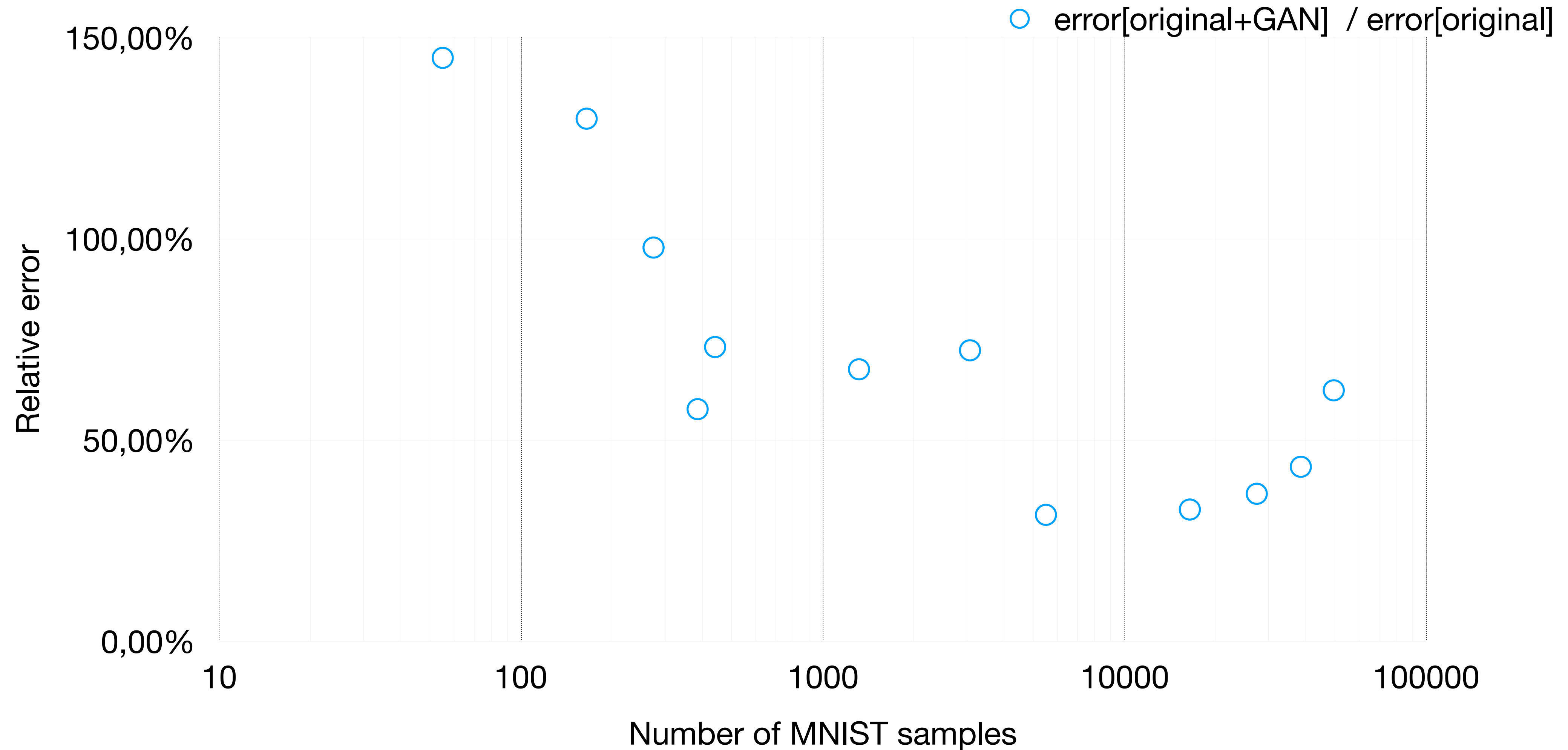
Does the gap exist here?



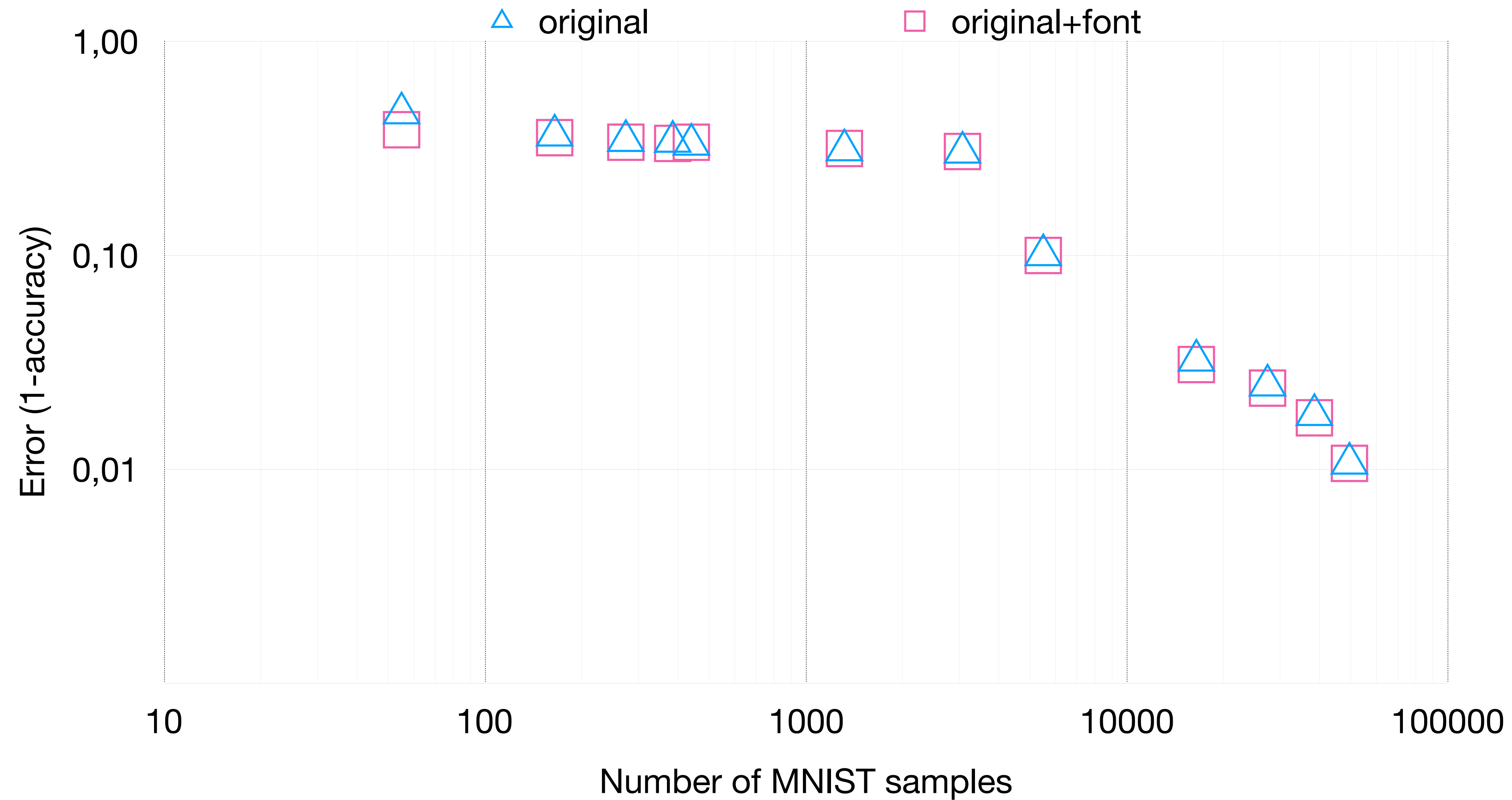
Does the GAN help?



How much better is it?



Isn't original+font enough?



Open questions

- Hyperparameter finetuning
- GAN loses labels while still working



Conclusion

- This works great on MNIST
- Even with very little real training data
- GANs are very useful for inflating datasets

Questions?

<https://aiir.maxmaton.nl>