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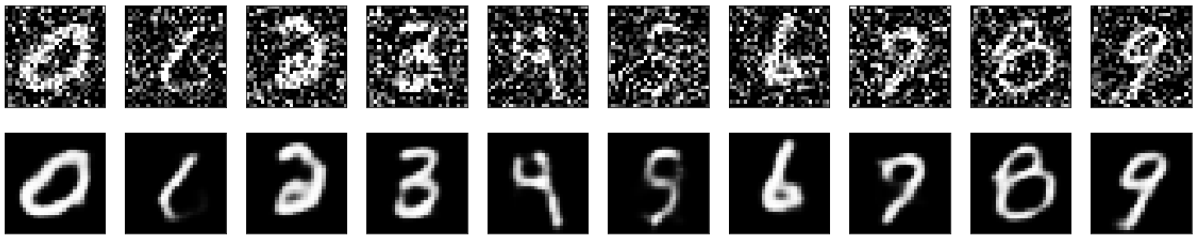
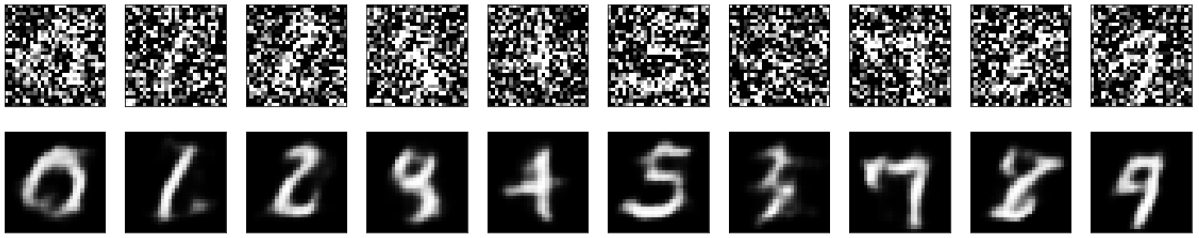
Exercice 2

Noise 0.5



Noise 0.7

Noise 0.9



Exercice 3

We can see that the model is quite good at denoising with an auto encoder. When noise is around 0.7 it is already hard for a human eye to find the number. But with noise at 0.9 it is nearly impossible to know which number is hidden behind noise. However the model is able to determine a number with every noise.

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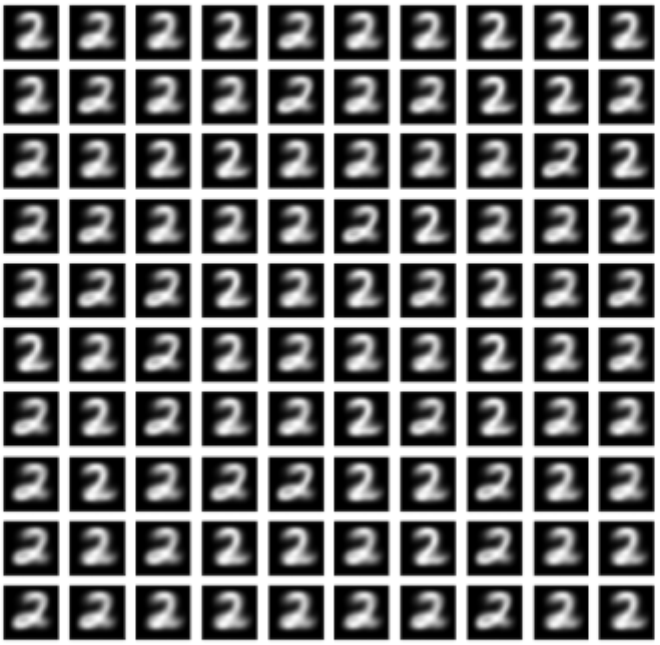
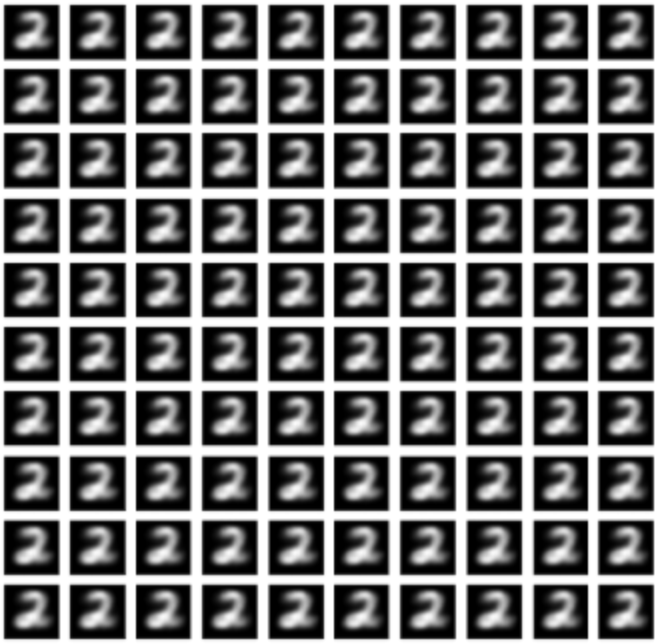
Exercice 4

Predictions with size 5958



Predictions with size 1000



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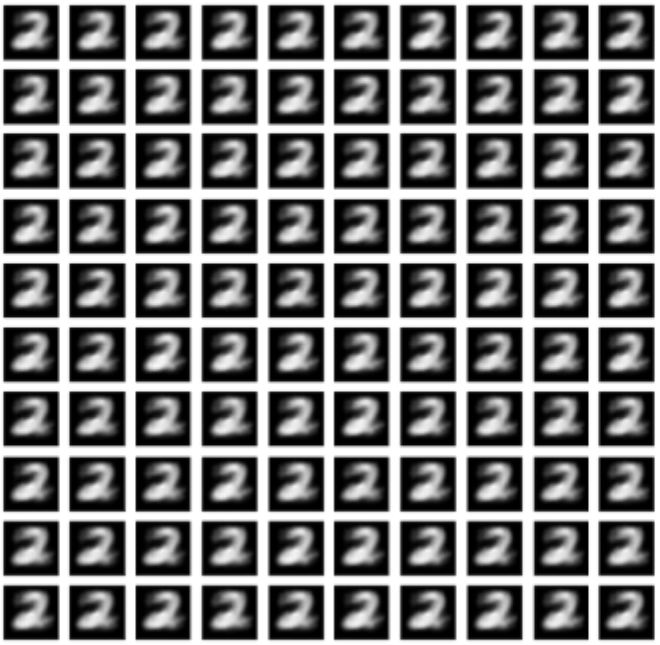
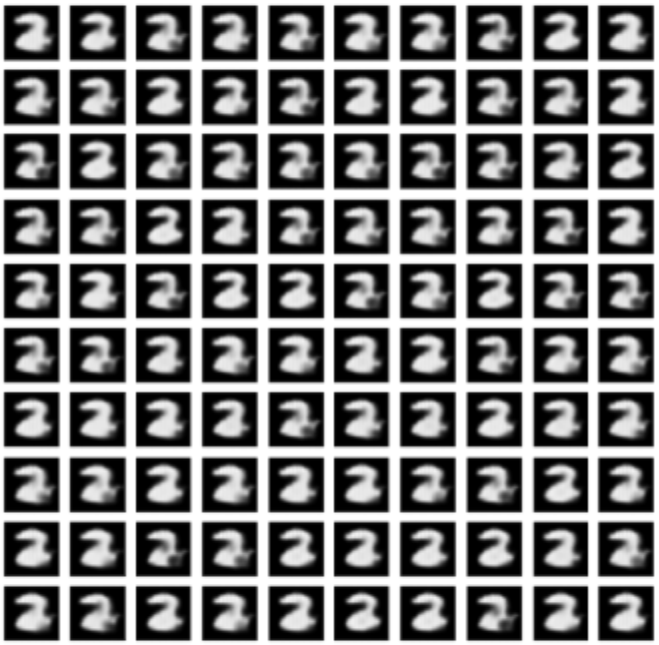
Predictions with size 100



Predictions with size 10



With more samples the generated “2” are more blurry but are better recognisable as “2”. For example with 10 samples it looks barely as a “2”.
We can measure the diversity by calculating the average difference between the generated elements.

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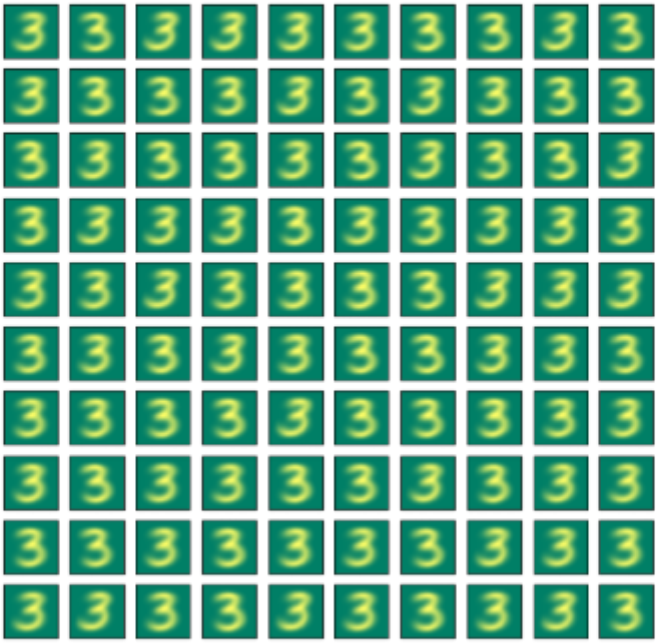
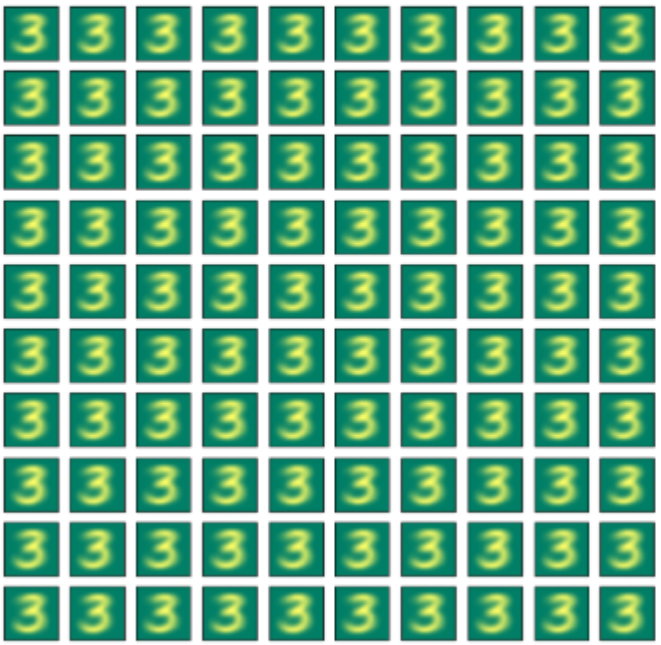
Predictions with size 6131



Predictions with size 1000



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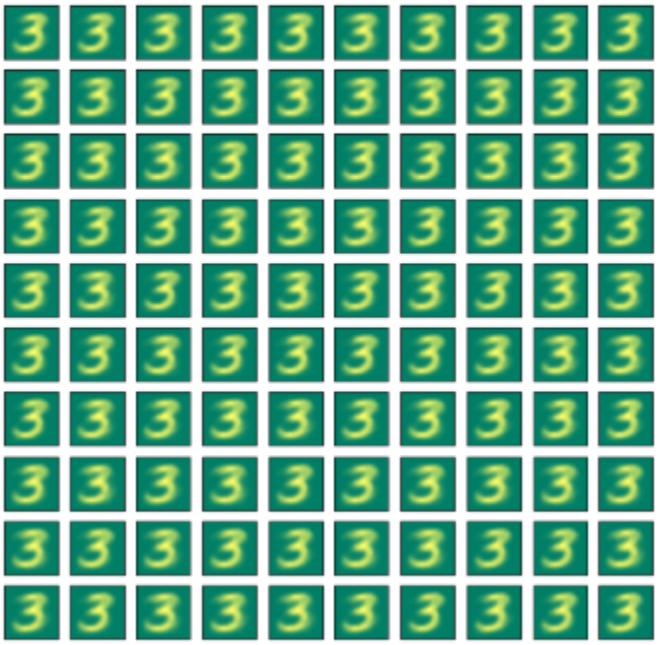
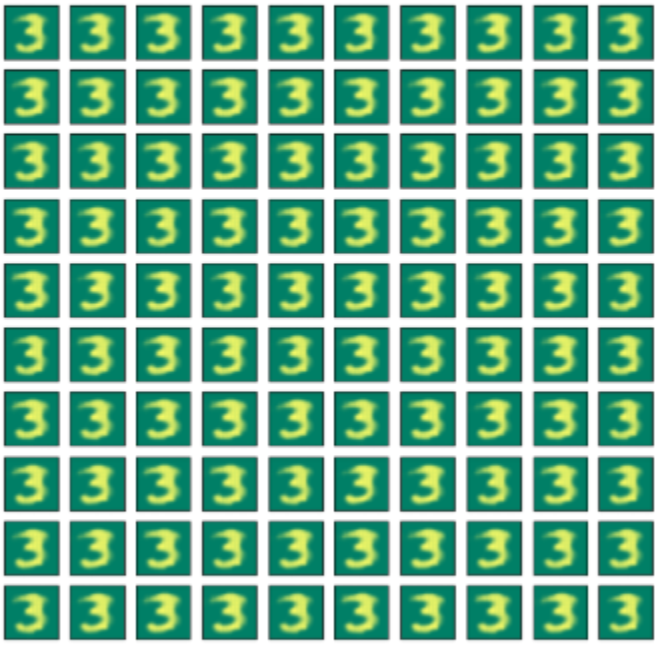
Predictions with size 100



Predictions with size 10



The same things can be said for the number 3, and again the classifier succeeds in classifying all the samples correctly.
The diversity seems with the naked eye less prominent with the full dataset

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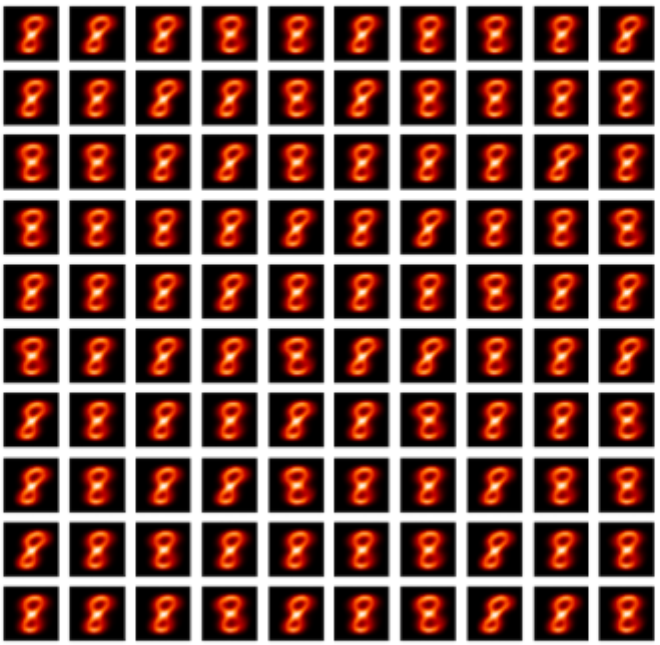
Predictions with size 5851



Predictions with size 1000

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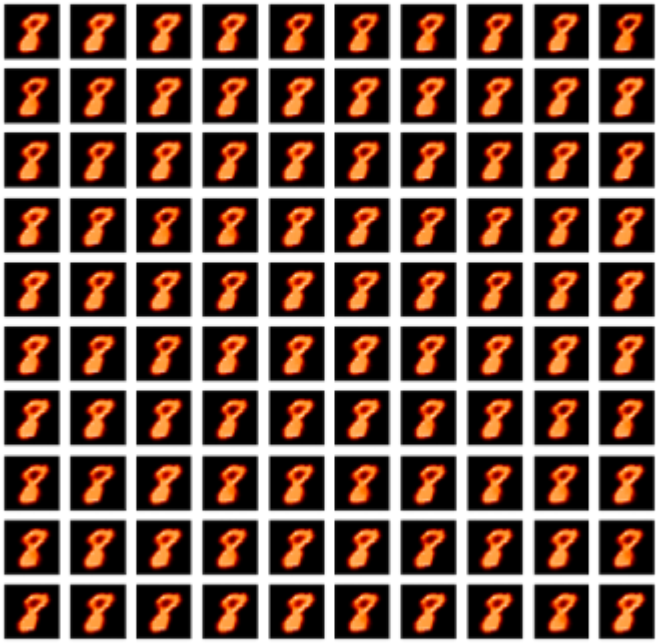
Predictions with size 100

Predictions with size 10



On the other hand the diversity seems better with the full dataset on the eights

Exercice 5

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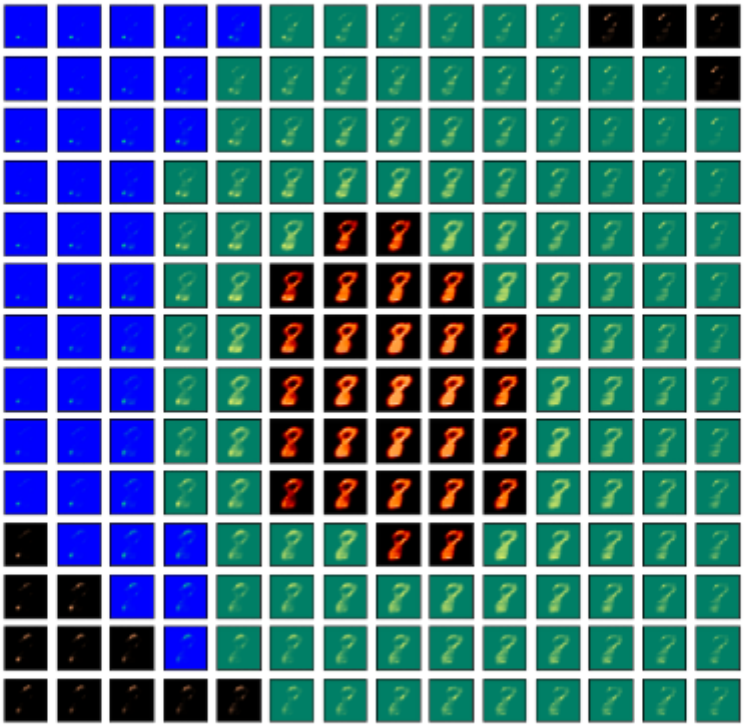
With a more variable latent vector, Even with the full dataset the eights are significantly mismatched with “9” (the more inclined on the left the more the classifier interprets them as “9”, and with some with “3”.



With “8” and only 10 samples + a diverse latent vector, the majority of eights are interpreted as “3”, some as “5” and some as “2”, only a minority is correctly classified.

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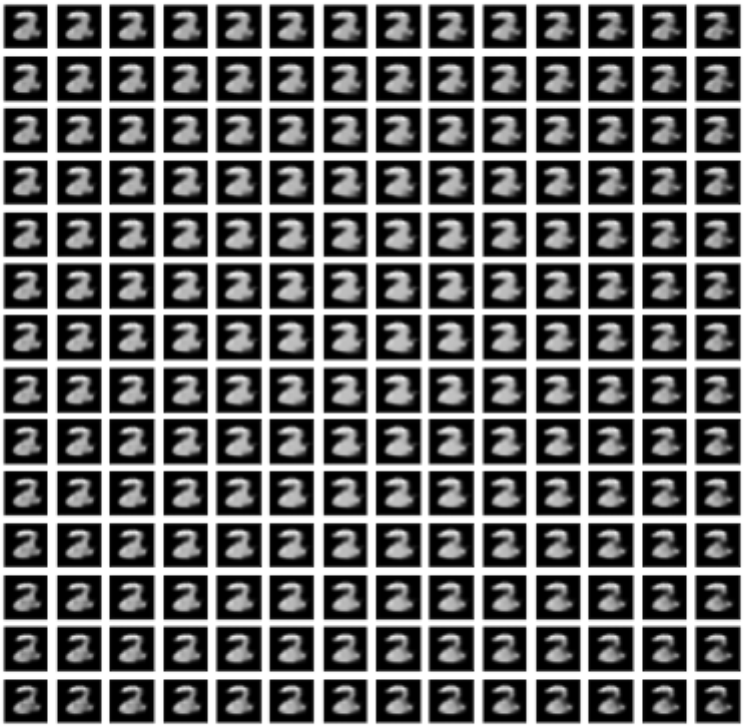
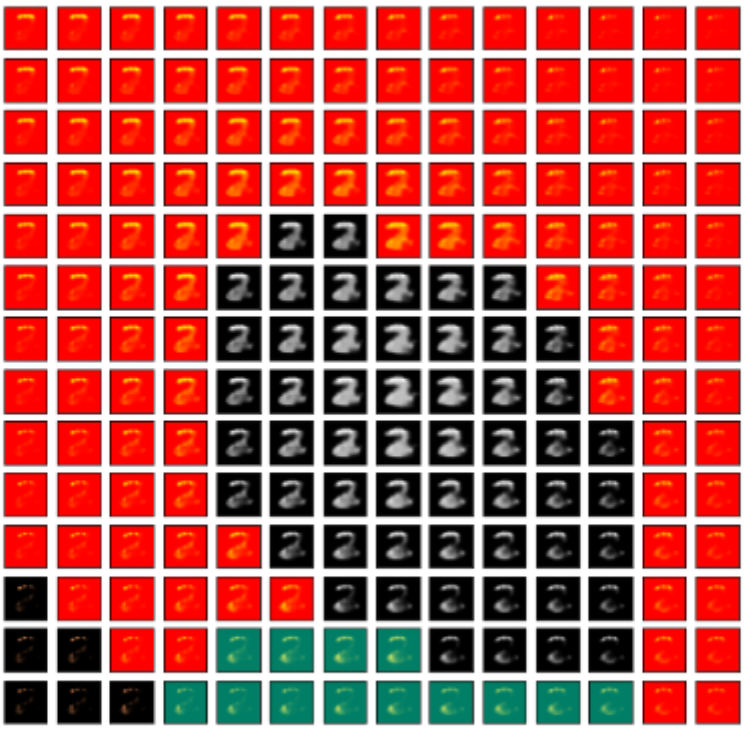


The “2” is detected pretty well even with 10 sample on a middling diverse latent vector, all are recognised



The performance deteriorates clearly with the combination of 10 samples, and most variable vectors, interestingly enough the majority of “2” are classified as “3”.