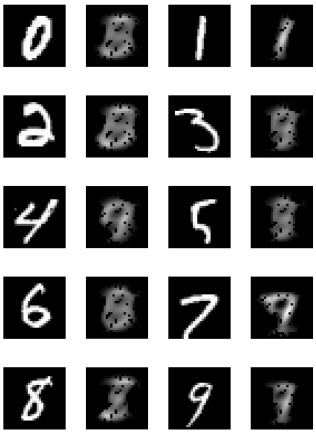
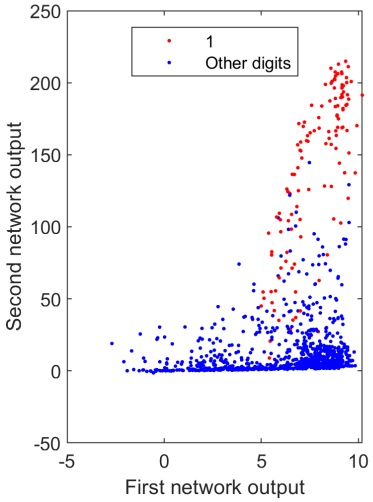
Fully connected autoencoder

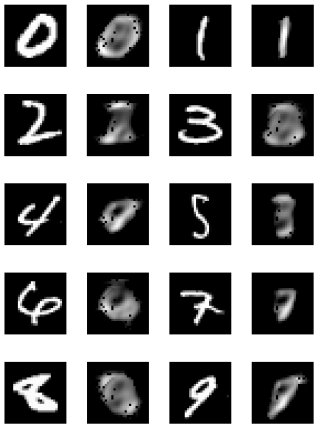
David Tonderski (davton)



(a) Montage for the first network.



(b) Scatter plot of the encoded values.



(c) Montage for the second network.

Figure 1: Montage for the two networks and scatter plot for the first.

As shown in figure 1a, the first encoder only convincingly reproduces the digit 1. This is also visible in figure 1b. The second encoder seems to reproduce the digits 1, 2, and 7, as shown in figure 1c. Examining scatter plots of the values encoded in the second network shows the approximate regions for each of the reproduced digits: ones are in the region $x_1 \in [15, 40], x_2 \in [-5, 10], x_3 \in [0, 100], x_4 \in [20, 350]$, twos are in $x_1 \in [3, 15], x_2 \in [3, 15], x_3 \in [0, 4], x_4 \in [0, 10]$, while sevens are in $x_1 \in [20, 30], x_2 \in [10, 40], x_3 \in [80, 140], x_4 \in [20, 50]$. This is visualised in table 1. Fives and threes often resemble each other, while the other digits are usually visually similar to zeros. This was also seen in the scatter plots, as all the other digits where scrambled together.

Table 1: Shows generated images for chosen x_1, x_2, x_3, x_4.

Digit	x_1	x_2	x_3	x_4	Generated digit
1	25	3	50	175	
2	9	9	2	5	
7	25	25	110	35