

Machine Learning

Neural networks 1.2

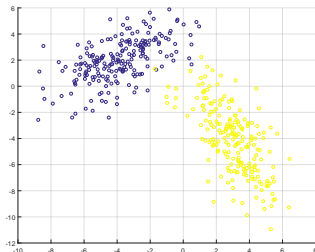
S. Nõmm

¹Department of Software Science, Tallinn University of Technology

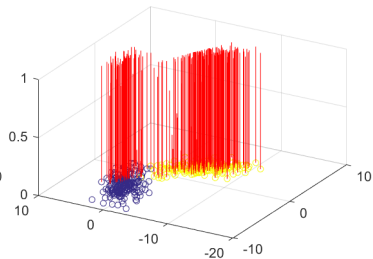
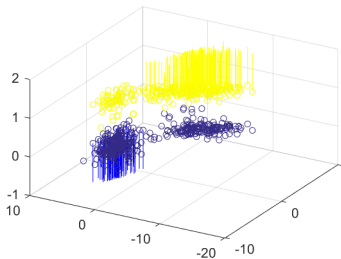
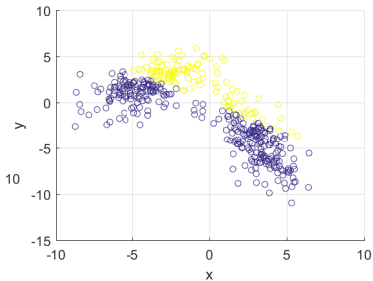
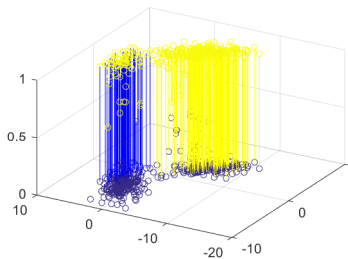
26.03.2020

Classification

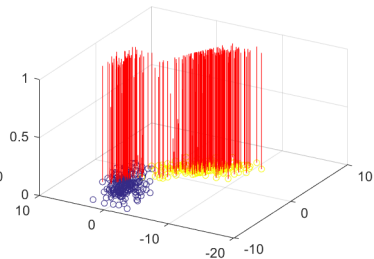
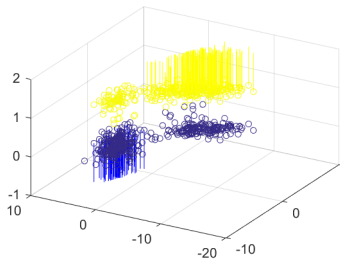
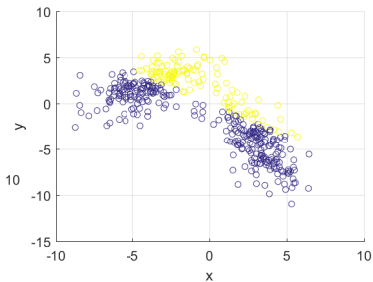
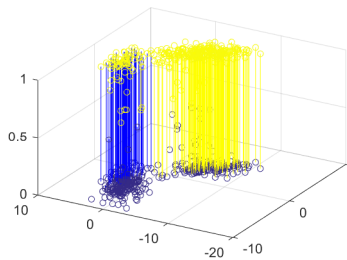
- The goal is to train neural network to classify elements based on their properties.
- Consider example of two sets where the properties of the elements are given by their coordinates.
- Attempt to build a classifier based on a single neuron with two inputs.
- Target (desired output) values are 0 and 1 depending on the class label.



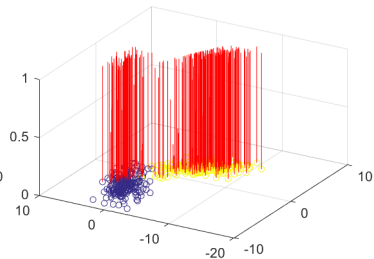
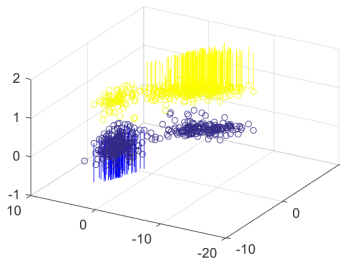
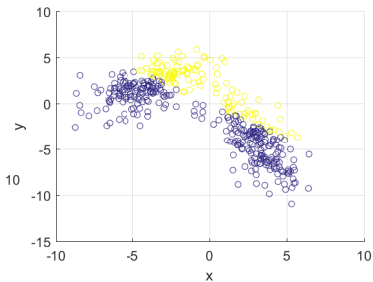
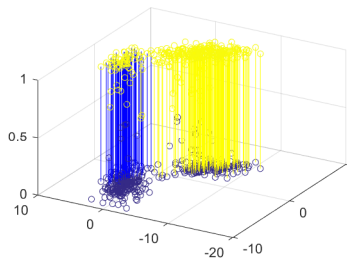
Initial guess, SSR = 247.45



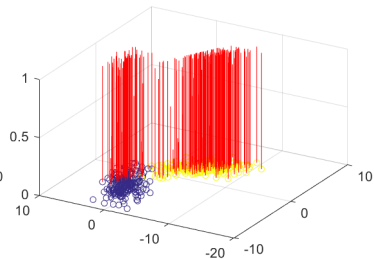
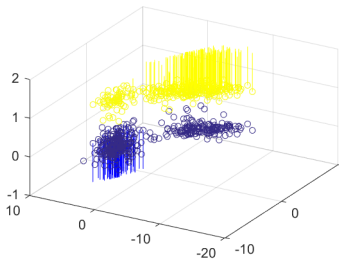
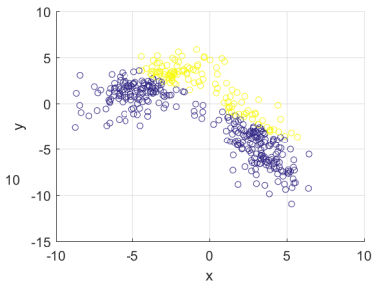
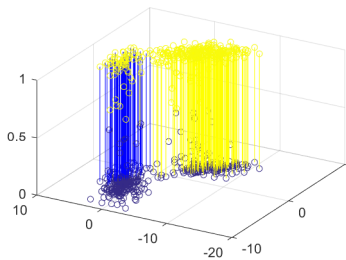
Epoch 2, SSR = 244.47



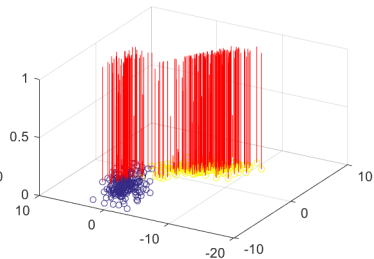
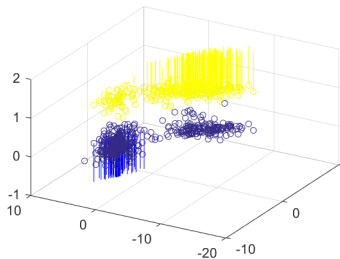
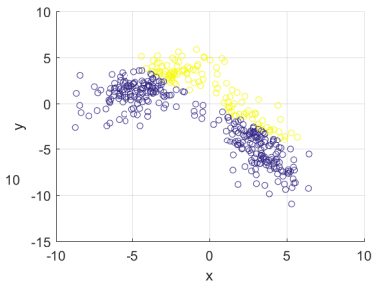
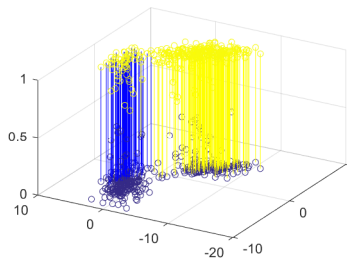
Epoch 4, SSR = 238.82



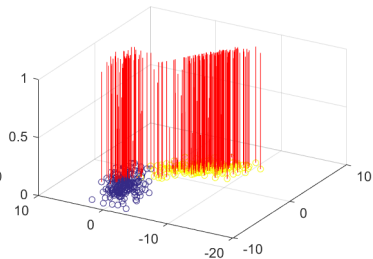
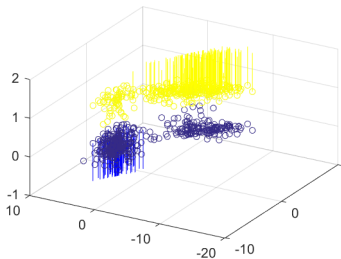
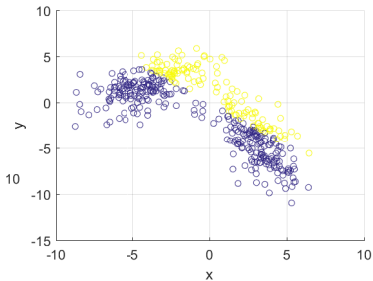
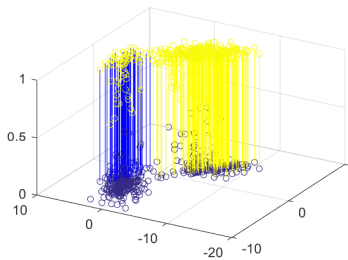
Epoch 6, SSR = 231.98



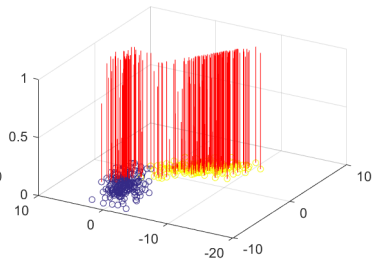
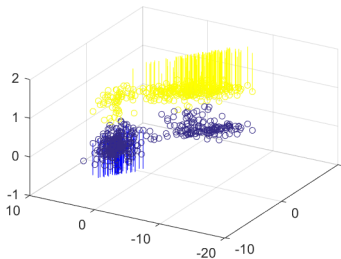
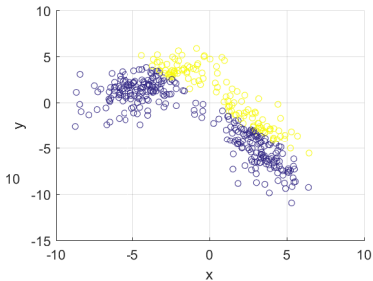
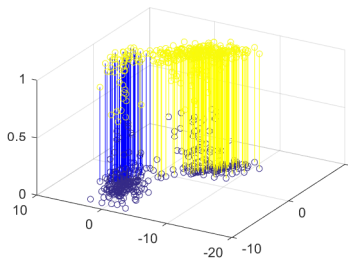
Epoch 8, SSR = 221.03



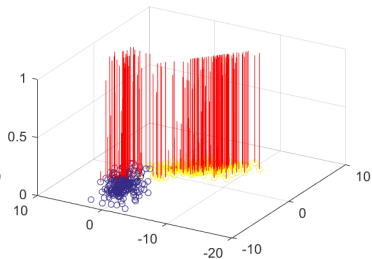
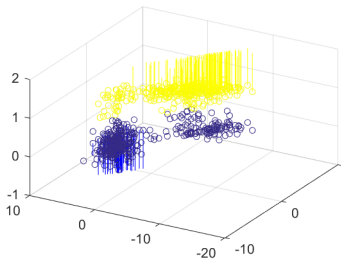
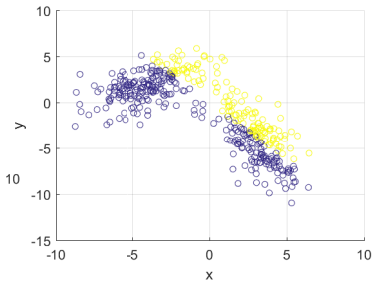
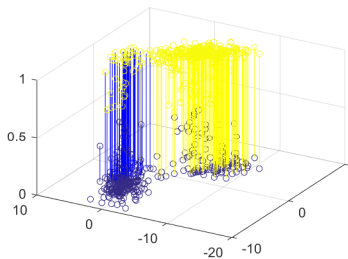
Epoch 10, SSR = 205.61



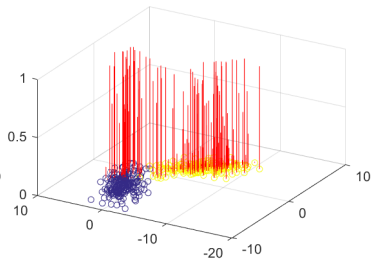
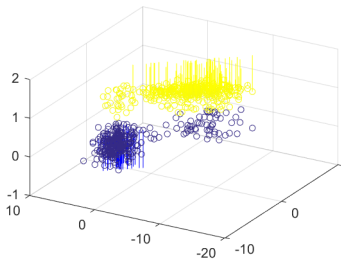
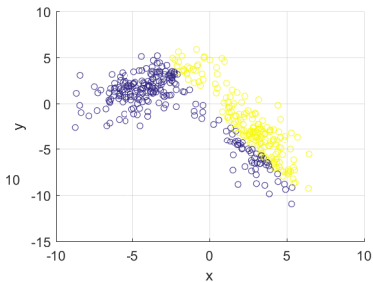
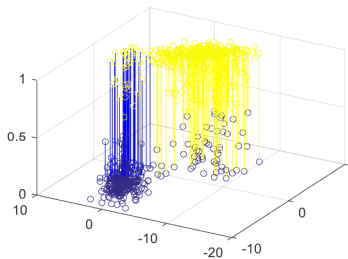
Epoch 12, SSR = 183.14



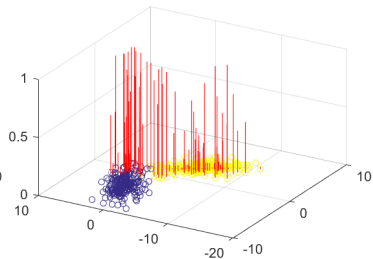
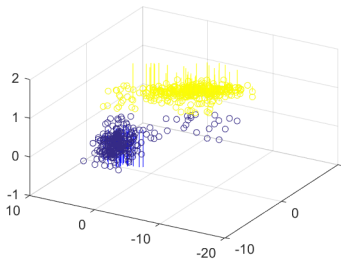
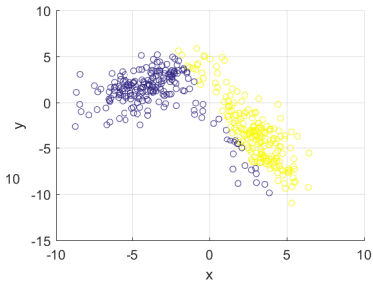
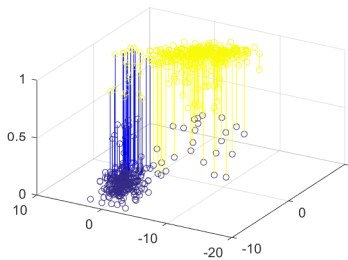
Epoch 14, SSR = 147.53



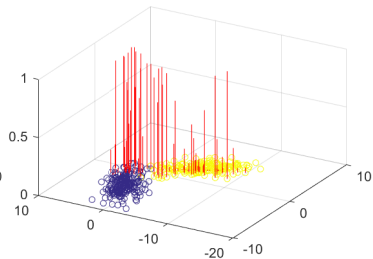
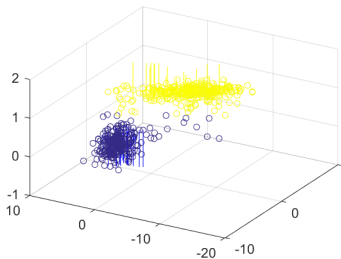
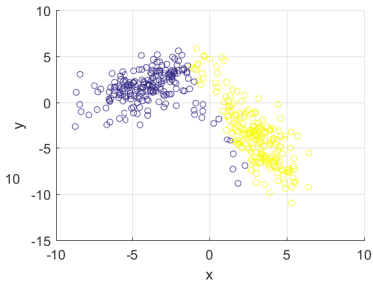
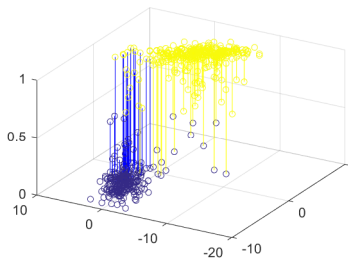
Epoch 16, SSR = 75.57



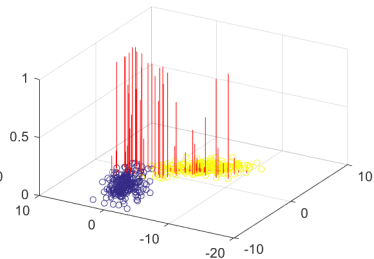
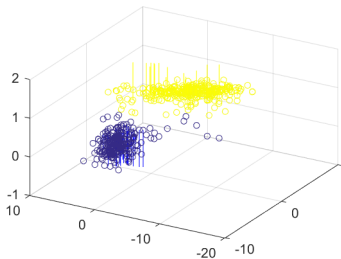
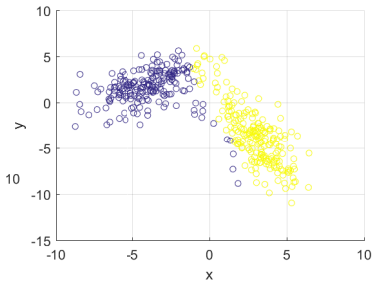
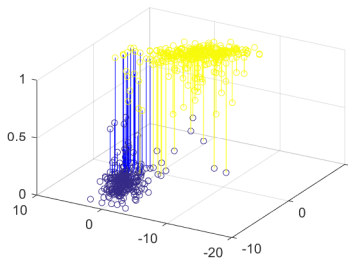
Epoch 18, SSR = 37.85



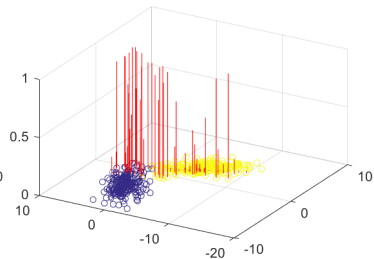
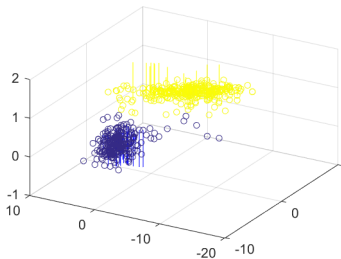
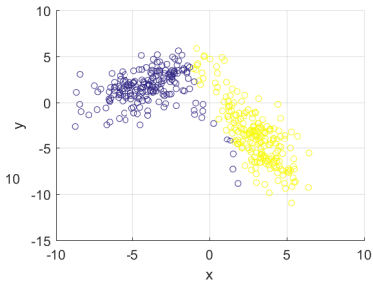
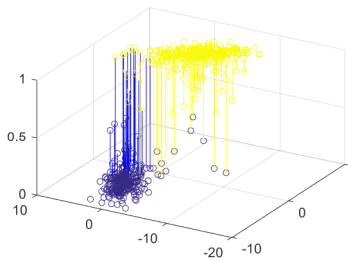
Epoch 20, SSR = 27.86



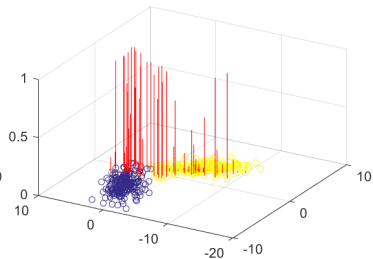
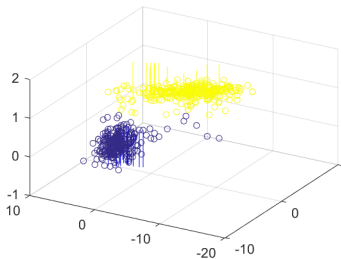
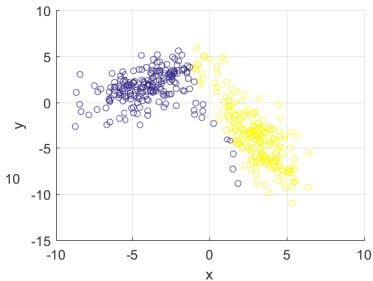
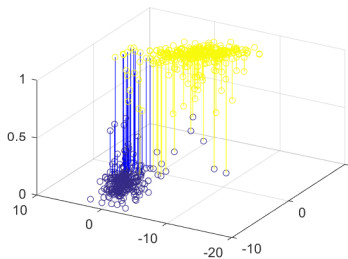
Epoch 22, SSR = 26.39



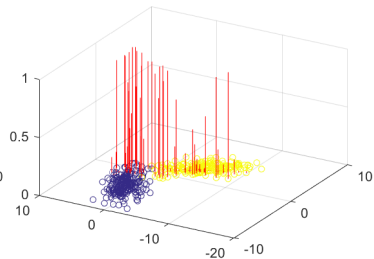
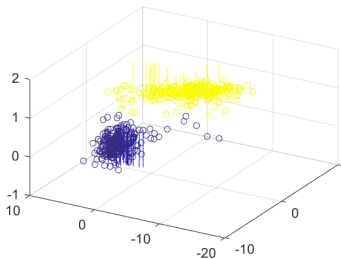
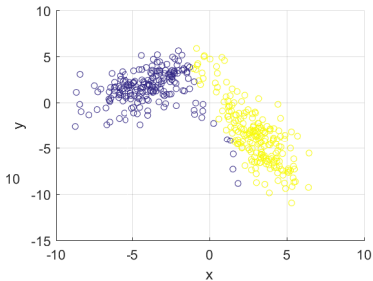
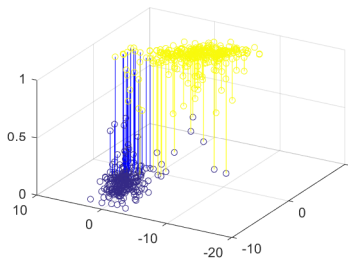
Epoch 24, SSR = 26.25



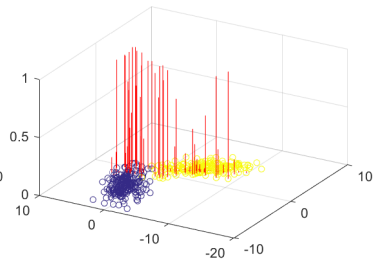
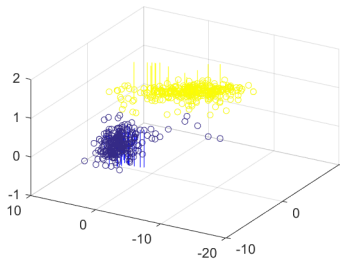
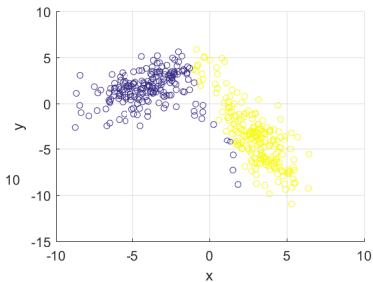
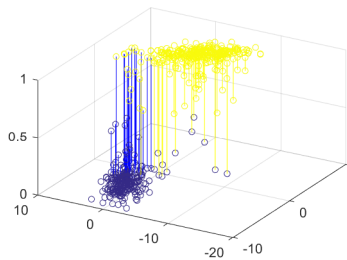
Epoch 26, Training should stop here!



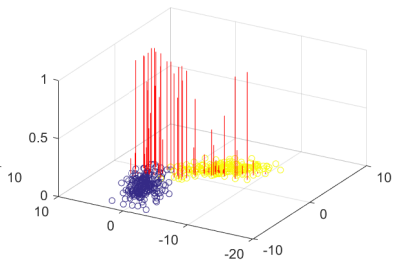
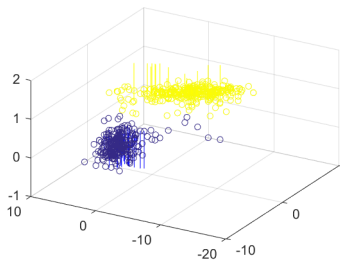
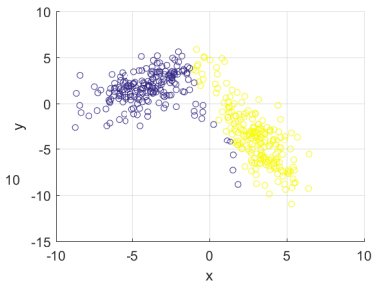
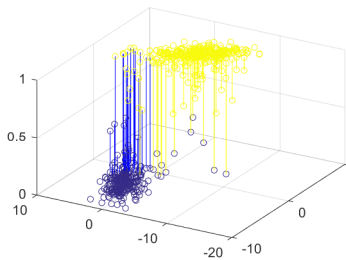
Epoch 28



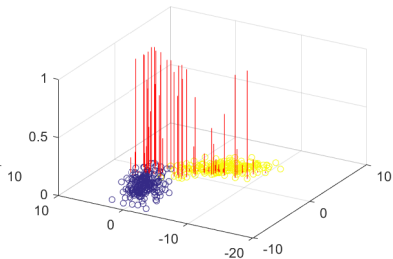
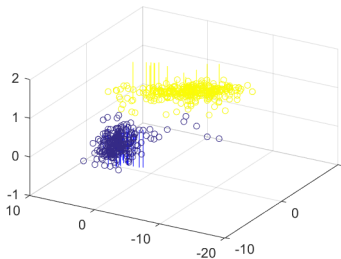
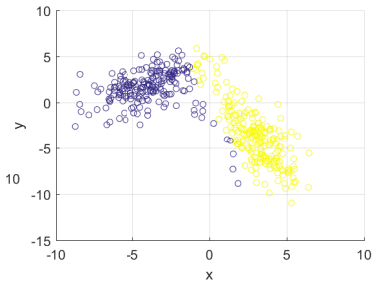
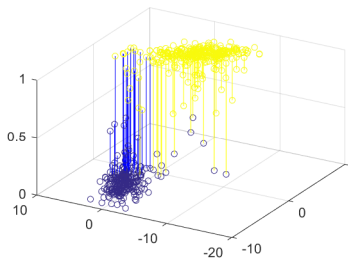
Epoch 30



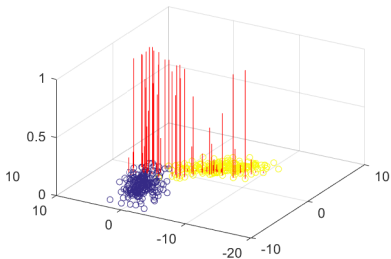
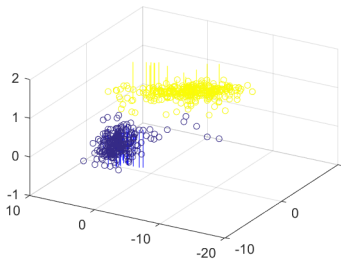
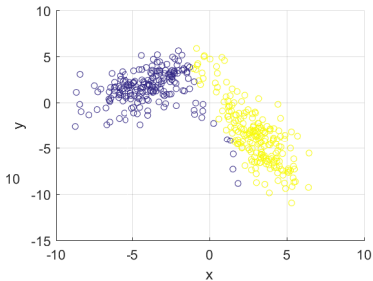
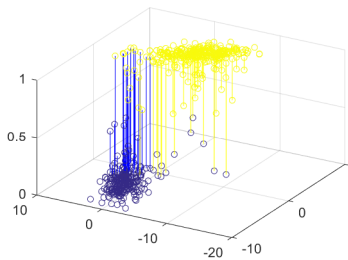
Epoch 32



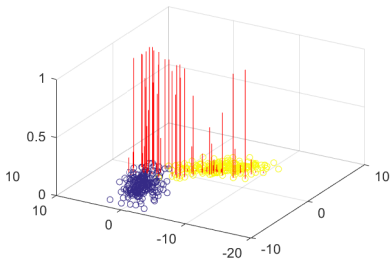
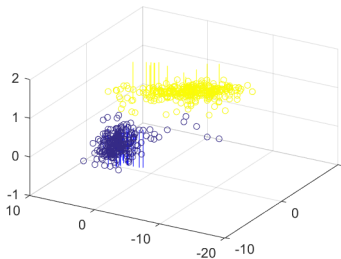
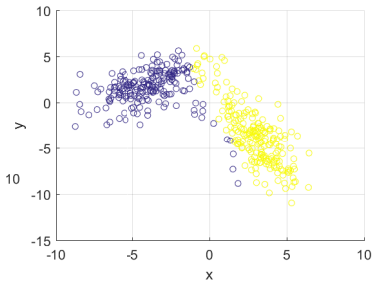
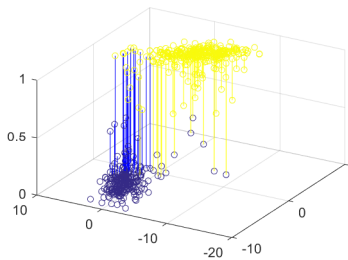
Epoch 34



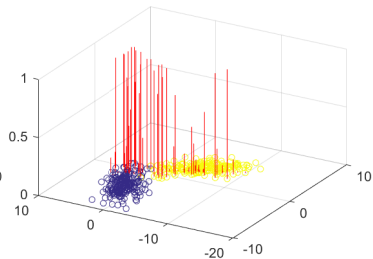
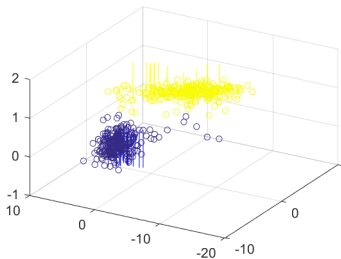
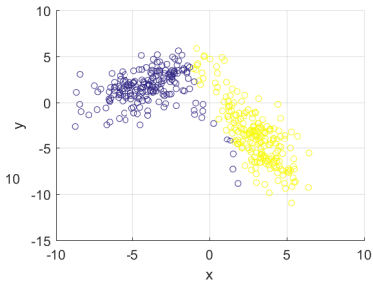
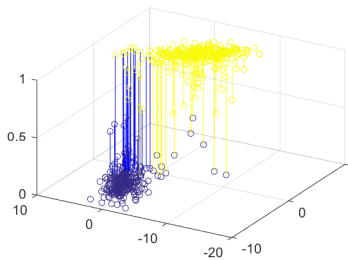
Epoch 36



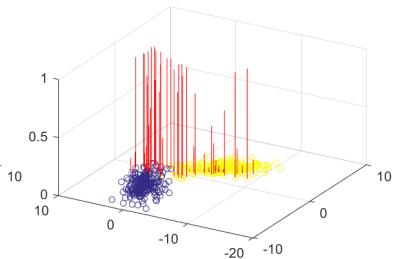
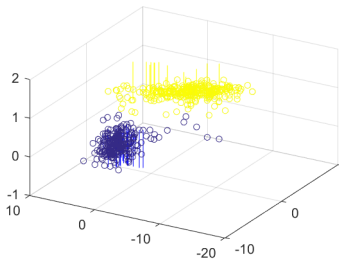
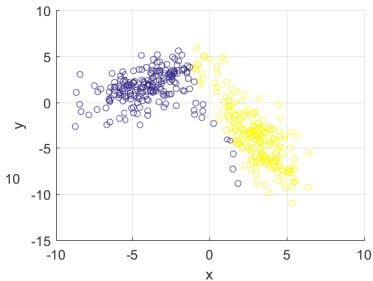
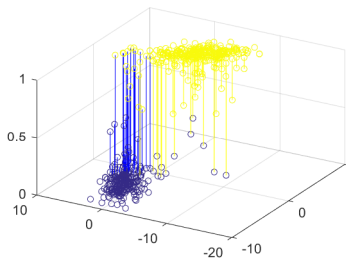
Epoch 38



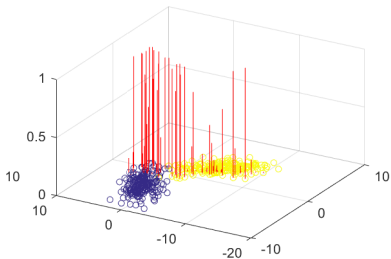
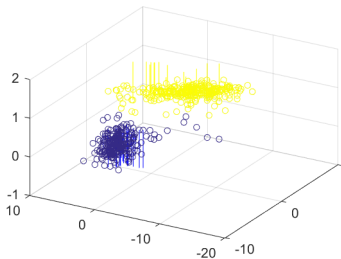
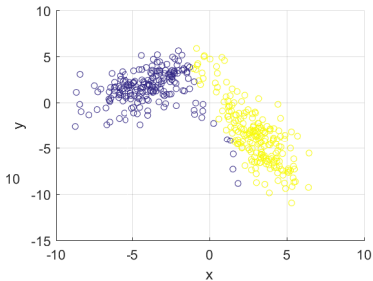
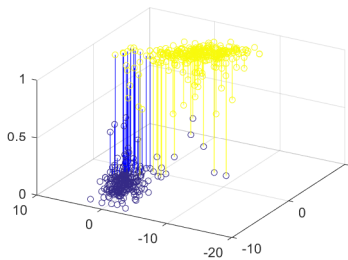
Epoch 40



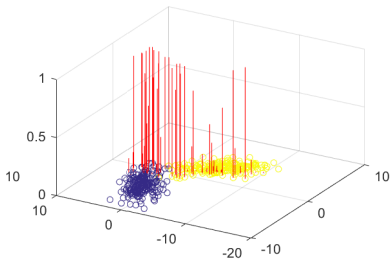
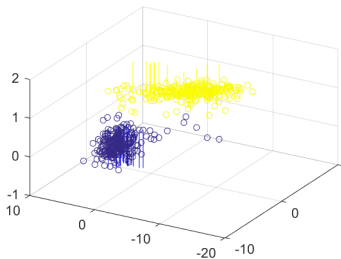
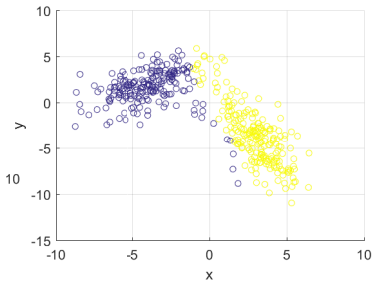
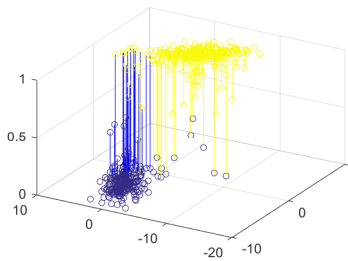
Epoch 45



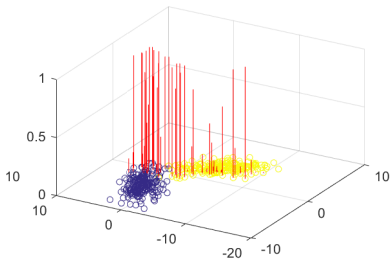
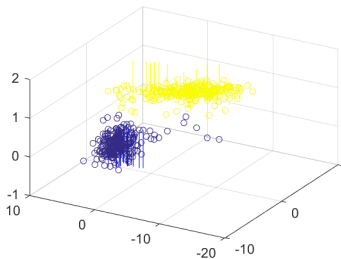
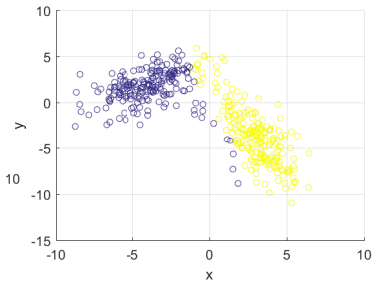
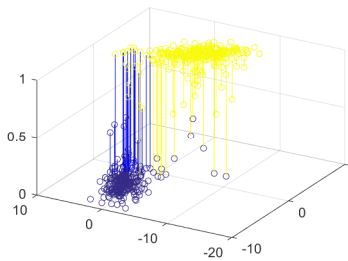
Epoch 50



Epoch 55



Epoch 60



Epoch 65

