

Artificial Neural Networks and Deep Architectures, DD2437

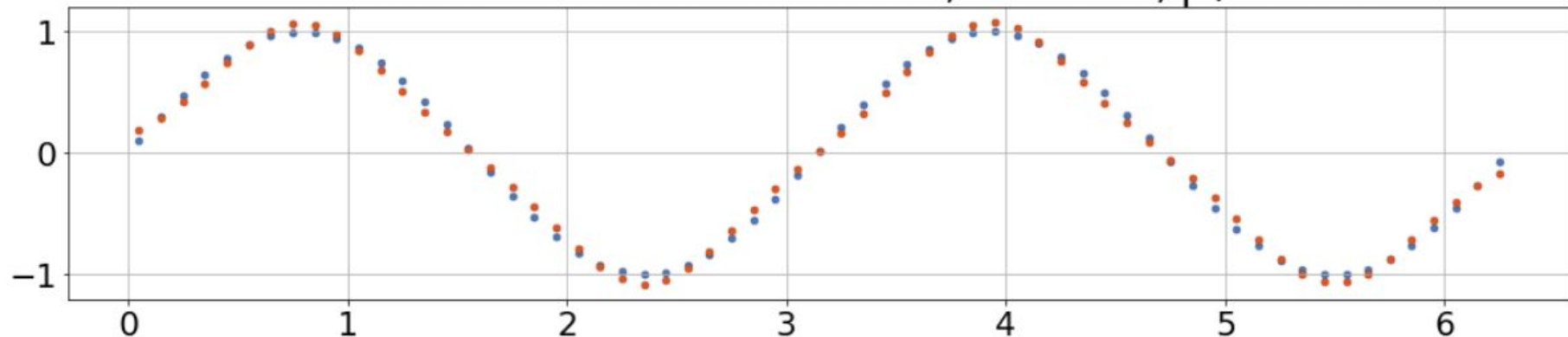
## Short report on lab assignment 2

Radial basis functions, competitive learning and  
self-organisation maps

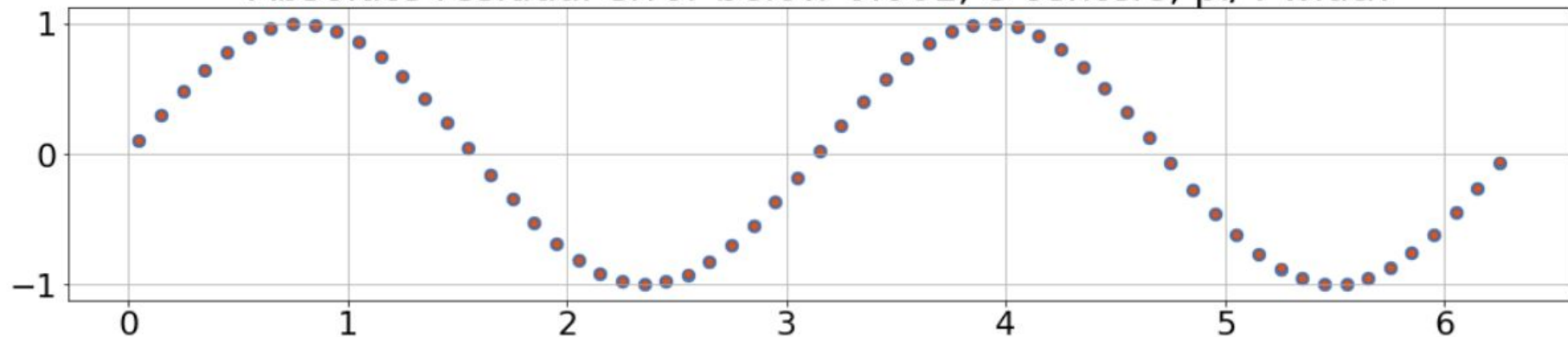
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February 7th, 2019

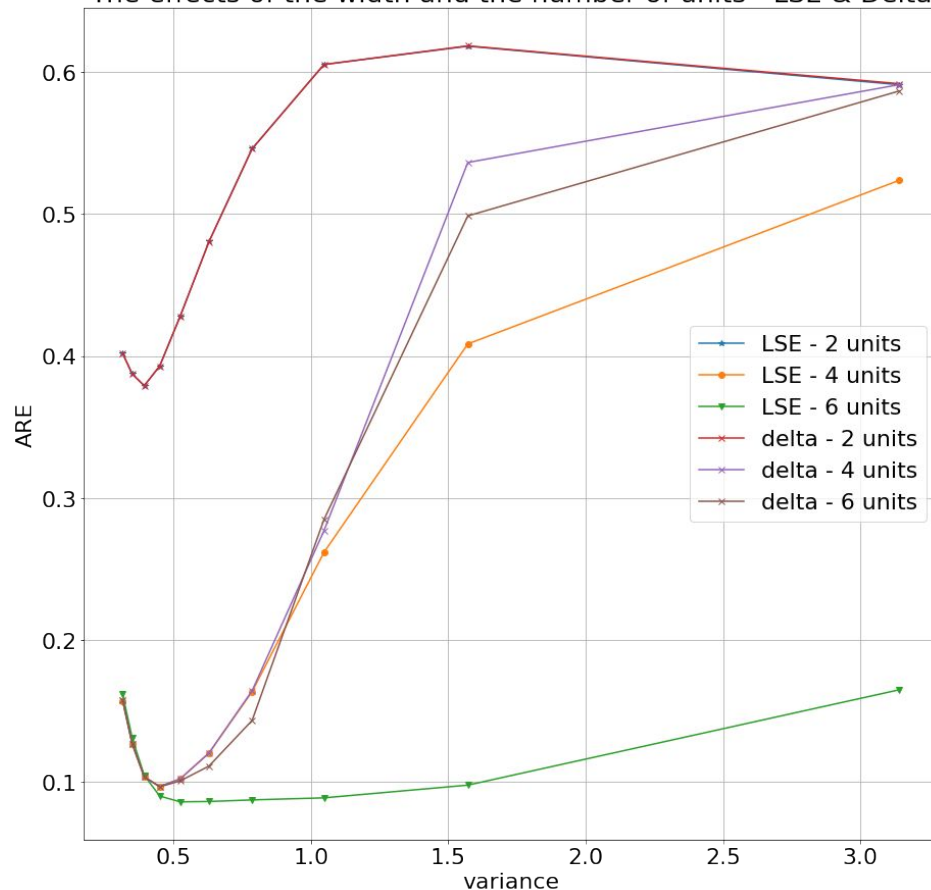
Absolute residual error below 0.01, 4 centers,  $\pi/8$  width



Absolute residual error below 0.001, 6 centers,  $\pi/4$  width



The effects of the width and the number of units - LSE & Delta

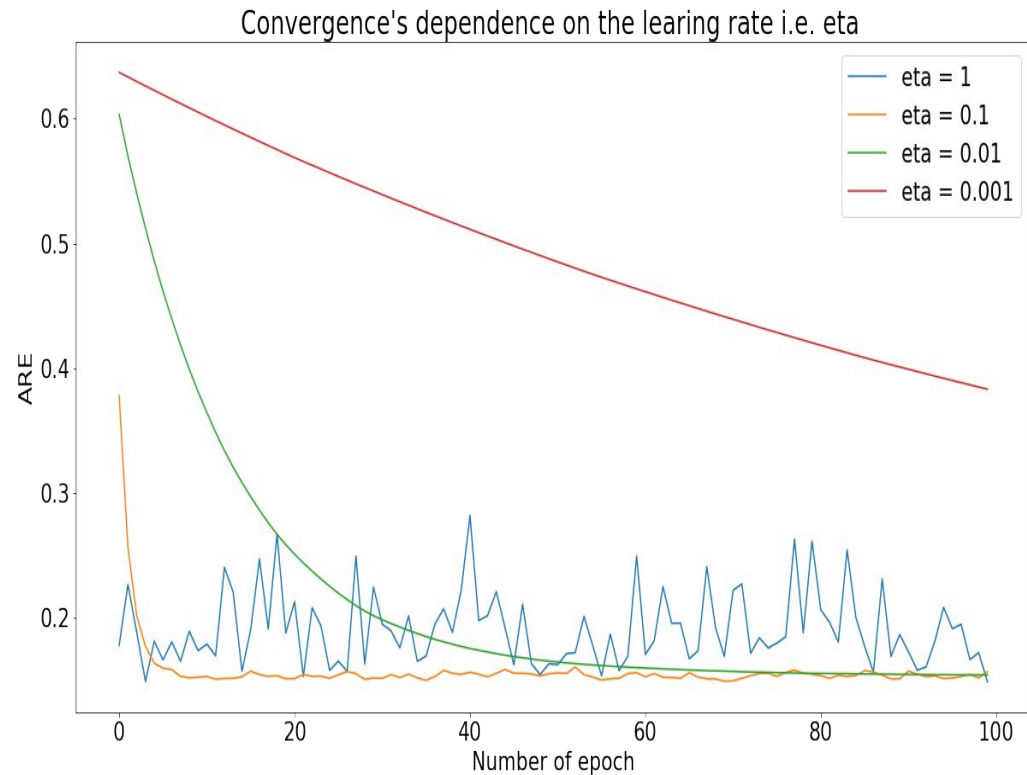
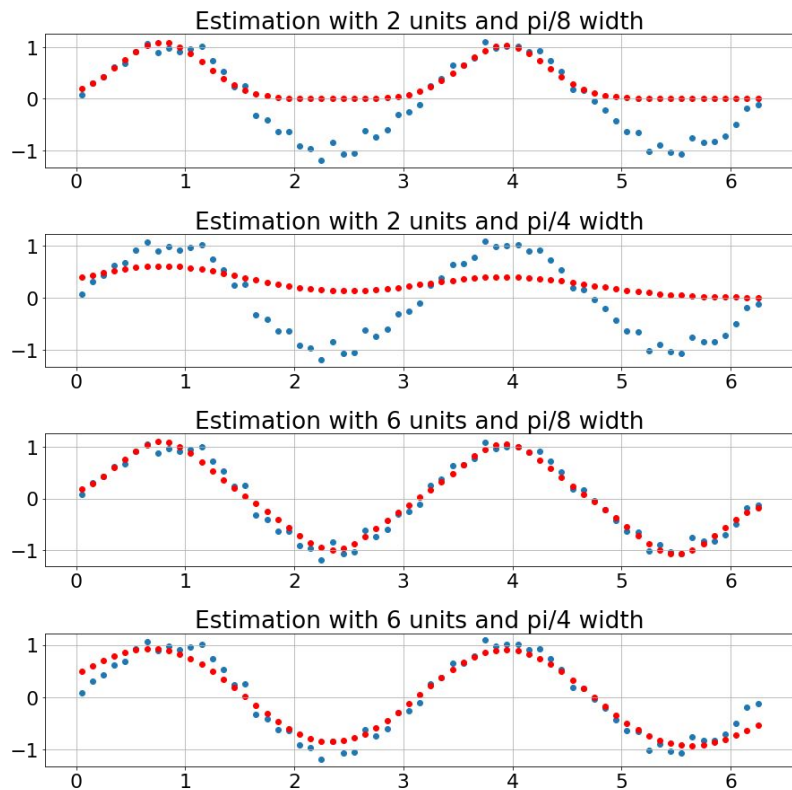


In general, LSE can achieve better performance.

One interesting thing here is when we use 2 units for LSE and online learning networks, they have almost the same results.

When the width is too small, all algorithm overfit.

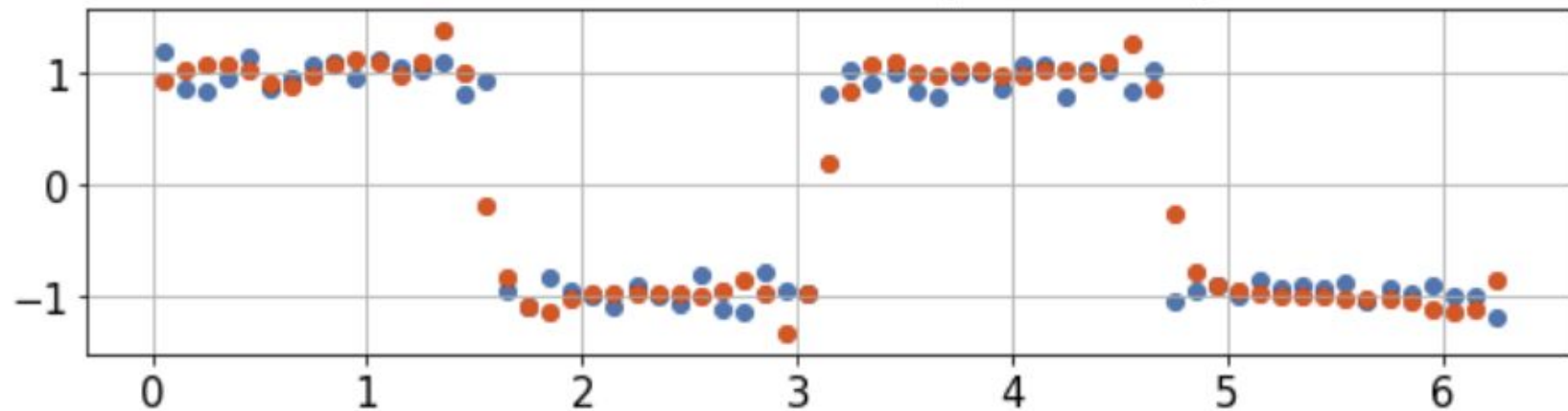
As width becomes bigger and bigger, ARE increases accordingly.



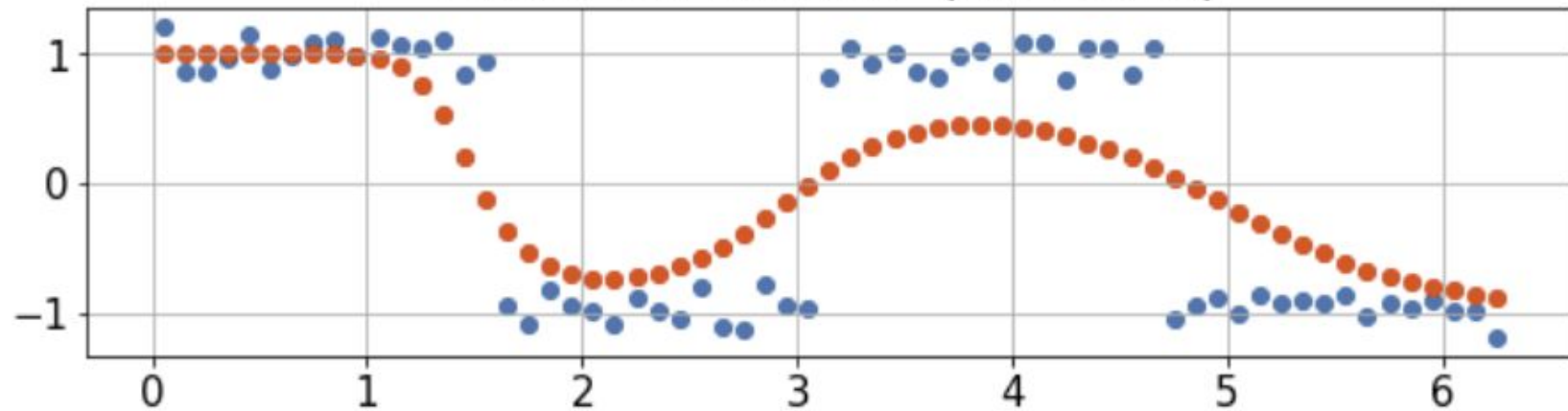
Effect of the number of Gaussian units for RBF (nodes) and their width

When  $\eta = 1$ , it is too large to achieve convergence. As  $\eta$  decrease, it takes more epochs to achieve convergence.

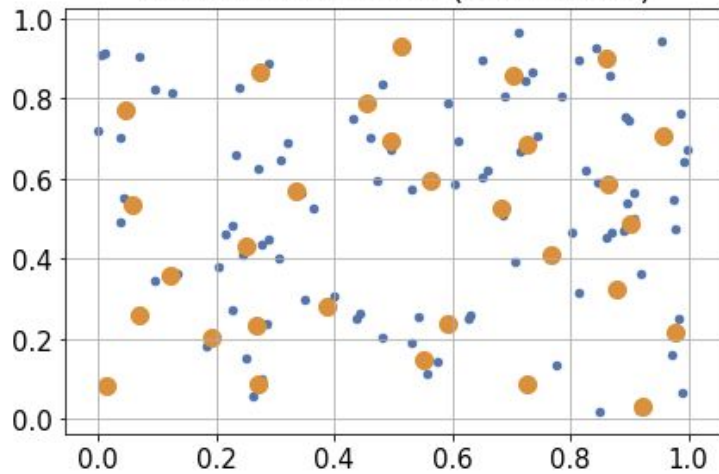
Estimation with RBF (ARE=0.16)



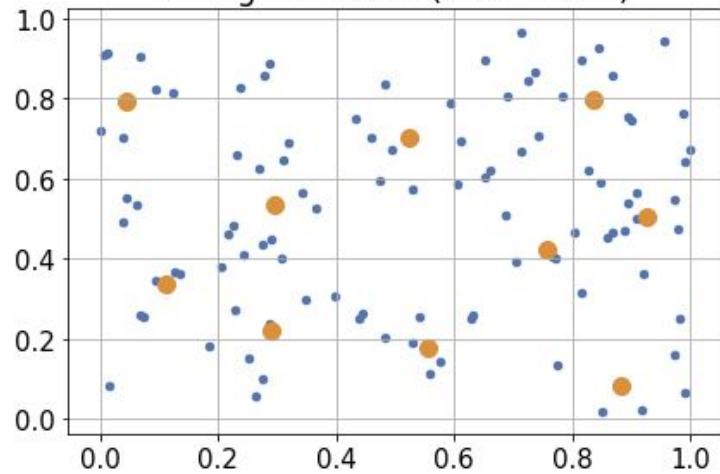
Estimation with MLP (ARE=0.44)



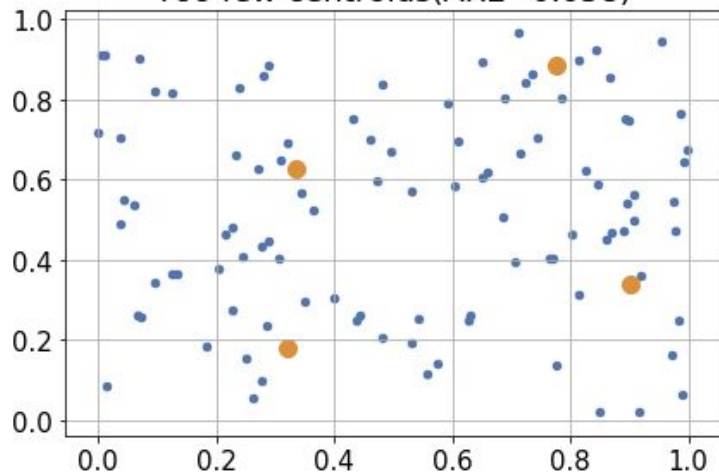
Too much centroids (ARE=0.019)



Enough centroids (ARE=0.049)

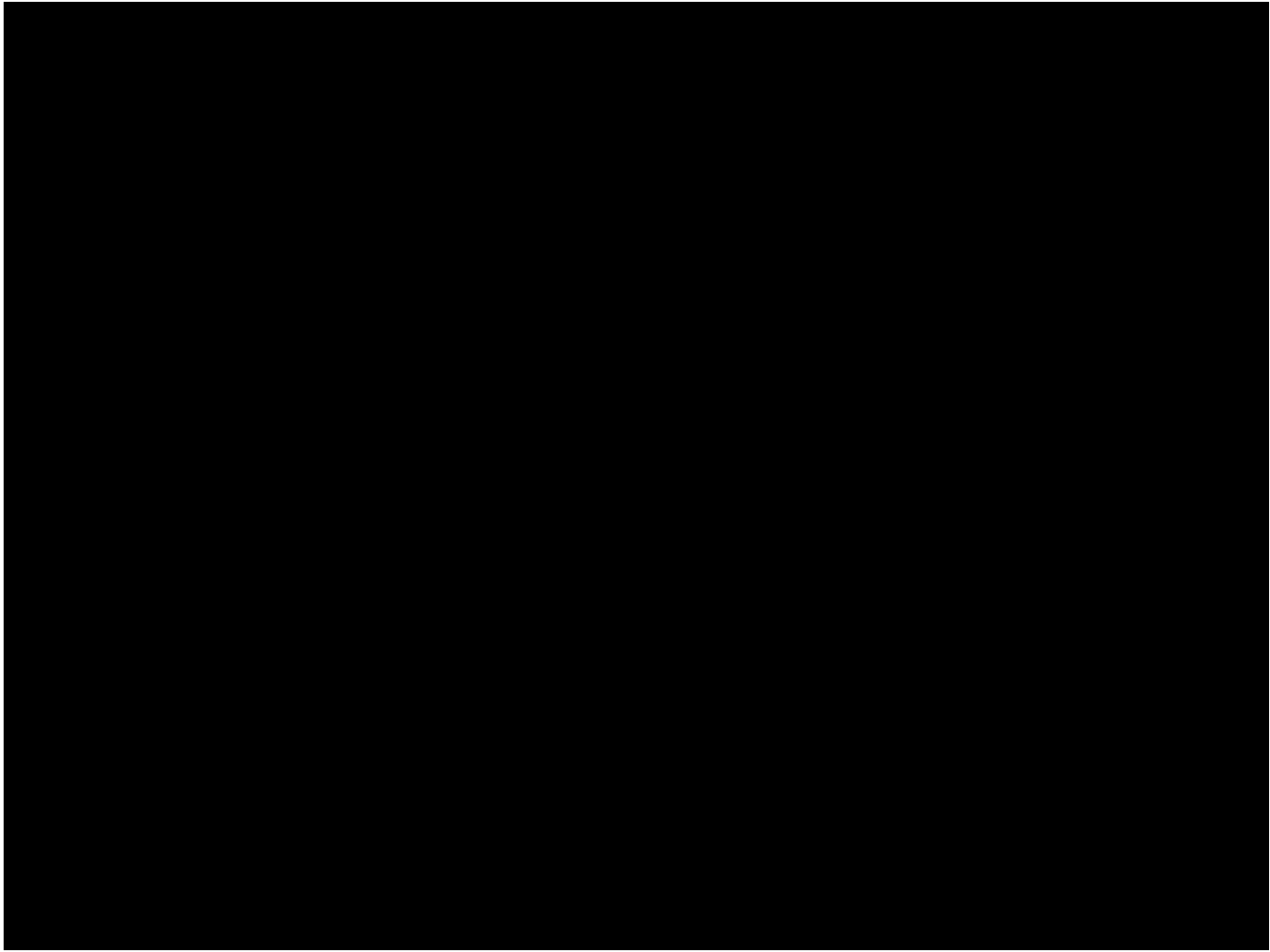


Too few centroids (ARE=0.058)



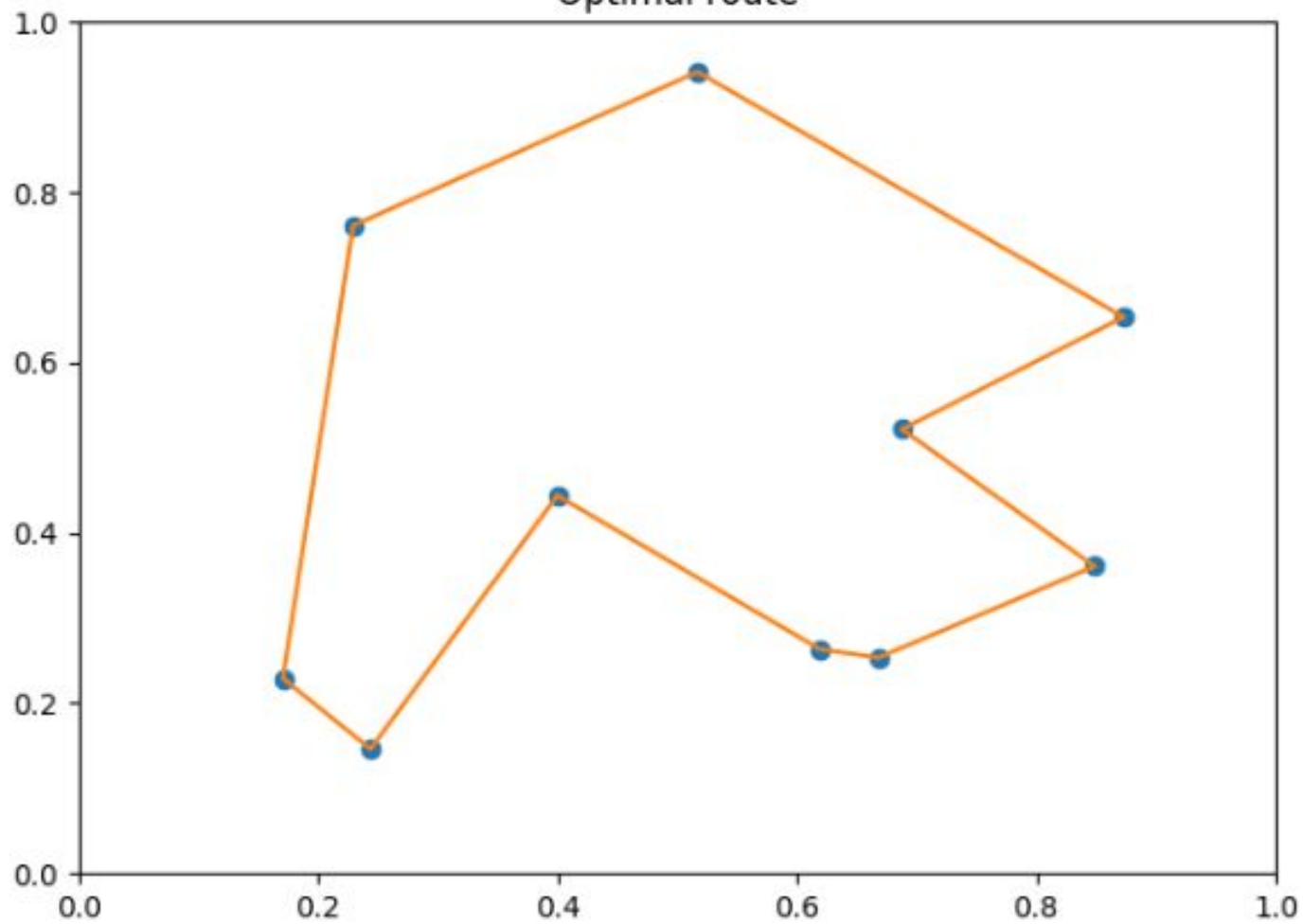
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['camel' " 'giraffe' " 'pig' " 'antelop' " 'horse' " 'kangaroo' " 'ape' "  
" 'rabbit' " 'elephant' " 'walrus' " 'bear' " 'hyena' " 'dog' " 'rat' "  
" 'bat' " 'skunk' " 'cat' " 'lion' " 'crocodile' " 'seaturtle' " 'frog' "  
" 'duck' " 'pelican' " 'ostrich' " 'penguin' " 'spider' " 'moskito' "  
" 'housefly' " 'butterfly' " 'beetle' " 'grasshopper' " 'dragonfly']
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Transformation from the  $32 \times 84$  dimensional input to a 1x100-dimensional space





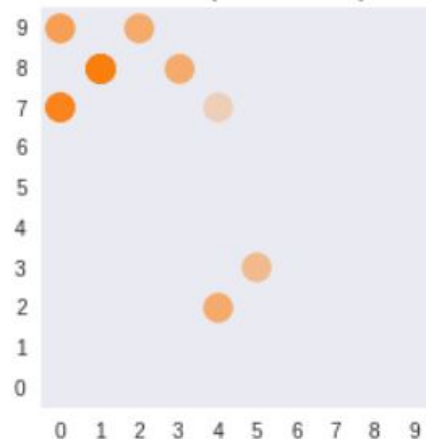
Optimal route



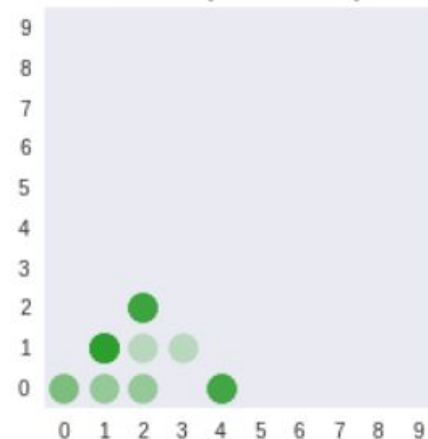
No party(members: 1)



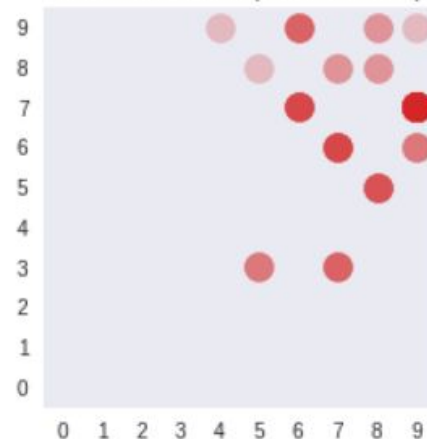
Moderate(members: 55)



Liberals(members: 48)



Social Democratic(members: 144)



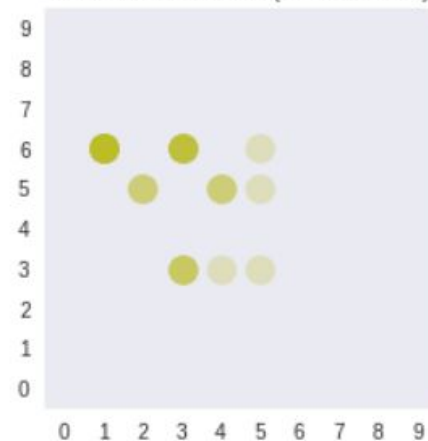
Left Party(members: 29)



Green Party(members: 17)



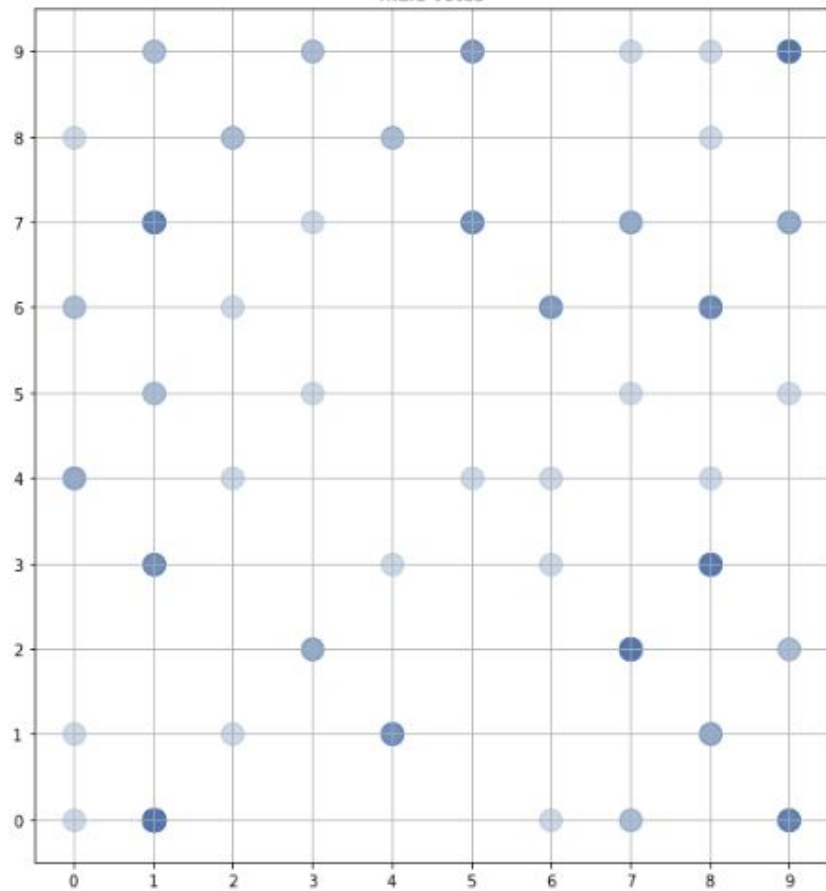
Christian Democrats(members: 33)



Center Party(members: 22)



male votes



female votes

