TRIED TPC01 Exam Prep Carl Robinson - 17th Dec 2017

Part 2: Configuration and Results of Optimal SOM

Optimal Configuration

Using the **hx_hy_pg_pd** coding only, the training set size, number of iterations and temperature thresholds for stage 1 and 2 were adjusted a number of times to find the optimal configuration in terms of training set classification performance.

The optimal configuration found was to be:

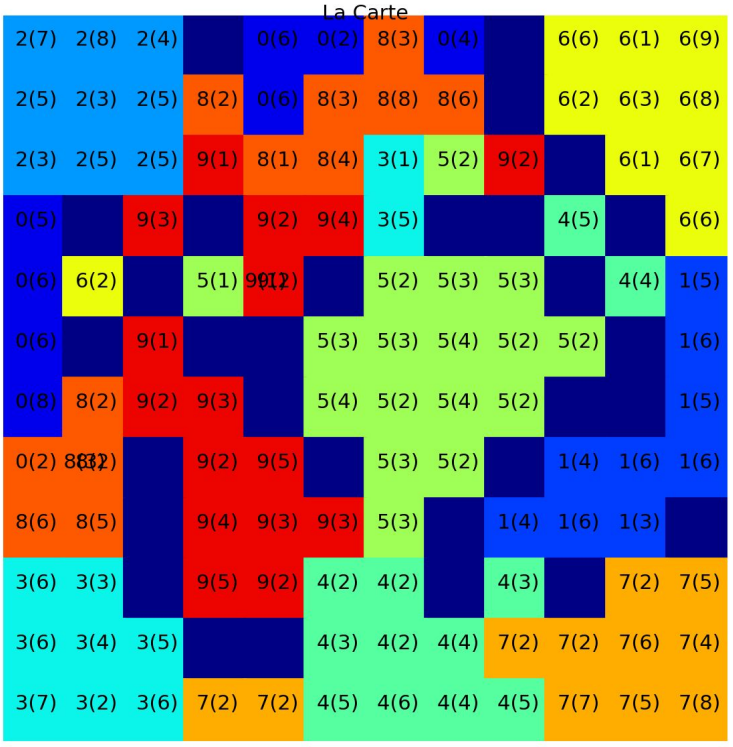
- **450** of 480 digits used for training, the remaining 80 used for test;
- Stage 1 parameters: iterations (**50**); temperature range [**20.0 to 10.00**];
- Stage 2 parameters: iterations (**100**); temperature range [**10.00 to 0.10**];

Best Train and Test performance with optimal configuration

Iteration	Training Set Performance	Test Set Performance
1	99.11	96.67
2	98.67	93.33
3	98.89	1.00
4	98.89	1.00
5	99.33	96.67

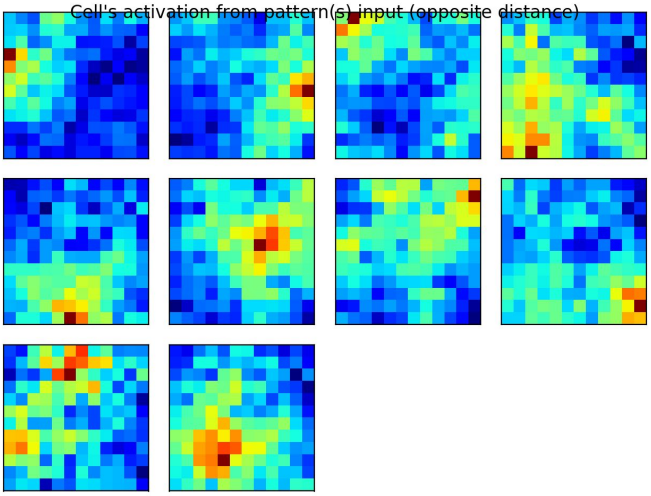
To account for the effect of the random initialisation of weights, the training was run multiple times to find the global optimum. The best performance on the training set was **99.33%**.

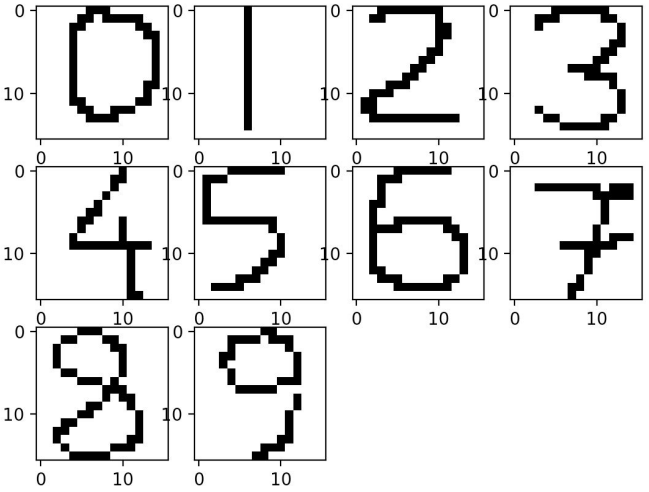
Majority vote referent classifications for best performance of optimal configuration



- The map referents are shown with class assignments, and the number of assigned observations in ().
- There is a clear clustering of similarly classified referents
- There is a clear separation of each clustering with a decision boundary made up of unclassified referents.

Neuron Activations for first 10 digits (left), and their plots (right)





- Similar digits (e.g. 5 and 6) have similar neuron activations.
- The high activation levels for a particular digit are found for neurons that are classified as that digit in the referent map.