

The present thesis describes two neuronal networks working both with pulse-coded neurons. The Closed Loop Antagonistic Network (CLAN) is a classifier that learns patterns and divides them into well defined classes without being monitored. Once a pattern has been set up the network will be able to decide on its own without any supervisor (teacher) if the set-up pattern is unknown or if a pattern class already exists for the new pattern. Thus explicit switching between recognition and learning procedures will no longer be needed, any unknown pattern will need to be shown only once, the usual training sequences will be dropped.

The room representation network RRN constitutes the second network to be looked at. Objects in an RRN are represented in a neuronal grid in a camera fixed coordinate system by activity clouds. Any movement of the system of coordinates will lead to a displacement of the cloud into the opposite direction. The displacement will only be effected by generating and cancelling activities. The mechanism shown will guarantee a solid representation of the objects. Special attention is given to the invariancy of dimensions of the representation.

Moreover a mechanism will be presented generating the activity cloud by looking at objects. For this it will be necessary to look at the objects from different sides. An excursion into the anatomy of the cerebellum showed parallelisms between structures and functional patterns of the cerebellum and the RRN.

In order to simulate the behaviour of neuronal networks a high computer performance will be necessary. Studies were made to find out to what extent it makes sense to parallelise the two networks presented and to implement them onto a parallel computer.