into 32 and fed simultaneously into the starting points of the 32 CA trails.

§3 Cellular Automata Based Neurite Networks

One can then evolve CA networks. There is too little space in this short report to go into the many details, but CA rules can be defined to repair and clean up “destroyed” trails, i.e. those for which collision circumstances make synapse formation impossible, in which case no CA rules are defined, so by default the background state (black, zero) becomes the next state, which can destroy the trail. Usually the network stabilizes after several hundred clock cycles, i.e. all signal sequences get absorbed at synapses. Once this happens, other CA rules make the CA network behave like a neural network. For example, there are three kinds of sheath cells, two for “axons” (excitatory and inhibitory) and one for “dendrites”. Signal strengths in axons keep the same value they had at emission (at CA neurons), but once the axon signal passes through an axon-to-dendrite (A→D) synapse (created in the CA net growth phase), it becomes a dendrite signal, which drops off in strength as it advances. Thus the dendrite signal strength depends on its distance from its (A→D) synapse. Since these distances are evolvable, they are equivalent to the weights of conventional neural networks. Signal values can be positive or negative. At an excitatory synapse, the sign of the axon signal value is transmitted unchanged to the dendrite. At an inhibitory synapse, the sign of the axon signal value transmitted to the dendrite is reversed. Excitatory and inhibitory axons generate excitatory (+ve A→D) and inhibitory (-ve A→D) synapses when dendrite CA trails collide with them. Axon-axon (A→A), and dendrite-dendrite (D→D) synapses are simply not formed. Two merging dendrite signals add their incoming signal strengths at the junction. CA rules can be defined which allow this. When a dendrite CA trail splits, special “gating” cells are formed at the split junction.