CLAIMS

1. An electronic circuit for utilizing an oscillating neural network for feature recognition, the electronic circuit comprising:

a network of coupled voltage-controlled oscillators, wherein each of the voltage-controlled oscillators is adapted for receiving an edge input signal which is phase-shifted by a fraction of a period length of the voltage-controlled oscillators according to a signal strength of an analog input signal allotted to a respective one of the voltage-controlled oscillators, and

an active output circuit comprising:

input terminals connected to selected ones of the voltage-controlled oscillators,

an adder portion for adding input signals present at the input terminals, and

a non-linear amplifier, an input line of the non-linear amplifier being connected to an output line of the adder portion.

2. The electronic circuit according to claim 1, further comprising a plurality of active output circuits, wherein the input terminal of each of the plurality of active output circuits is connected to groups of the voltage-controlled oscillators, wherein each group represents a different predefined pattern of the received input signals.

3. The electronic circuit according to claim 2, wherein the selected voltage-controlled oscillators, when phase-shifted activated, represent a predefined pattern of the received input signals.

4. The electronic circuit according to claim 1, wherein the electronic circuit is adapted to process signals of one color channel.

5. The electronic circuit according to claim 1, wherein the electronic circuits represents a plurality of the electronic circuits connected in series, wherein each of the electronic circuits represents a predefined filter.

6. The electronic circuit according to claim 1, wherein each of the input terminals are connected to an input of a linear amplifier via a separate resistor respectively.

7. The electronic circuit according to claim 1, wherein the non-linear amplifier is a differential amplifier with a diode in a feedback loop thereof.

8. The electronic circuit according to claim 1, wherein each of the voltage-controlled oscillators in the network is connected to each other by a resistor/capacitor coupling circuit.

9. The electronic circuit according to claim 1, wherein the fraction of the period is half a period of an oscillating frequency of the voltage-controlled oscillators.

10. The electronic circuit according to claim 9, wherein the fraction of the period is larger than 120 degrees.

11. The electronic circuit according to claim 10, wherein the fraction of the period is 180 degrees.

12. The electronic circuit according to claim 1, wherein the active output circuit is integrated into a semiconductor unit.

13. The electronic circuit according to claim 1, wherein the electronic circuit is integrated into one semiconductor unit.

14. The electronic circuit according to claim 1, wherein a phase-shifting of an output of the non-linear amplifier of the active output circuit is aligned with a majority of received bit input signals to the active output circuit.

15. The electronic circuit according to claim 1, wherein the edge input signal changes from logical “0” to logical “1” depending on a shifting time derived from the signal strength of the analog input signal.

16. The electronic circuit according to claim 1, wherein each of the voltage-controlled oscillators oscillate with a same frequency.

17. A neural network device comprising:

a plurality of electronic circuits, each of the electronic circuits including:

a network of coupled voltage-controlled oscillators, wherein each of the voltage-controlled oscillators is adapted for receiving an edge input signal which is phase-shifted by a fraction of a period length of the voltage-controlled oscillators according to a signal strength of an analog input signal allotted to a respective one of voltage-controlled oscillators, and

an active output circuit comprising

input terminals connected to selected ones of the voltage-controlled oscillators,

an adder portion for adding input signals present at the input terminals, and

a non-linear amplifier, an input line of the non-linear amplifier being connected to an output line of the adder portion.

18. The neural network device according to claim 17, further comprising a plurality of active output circuits, wherein the input terminal of each of the plurality of active output circuits is connected to groups of voltage-controlled oscillators, wherein each group represents a different predefined pattern of the received input signals.

19. The neural network device according to claim 18, wherein the selected voltage-controlled oscillators, when phase-shifted activated, represent a predefined pattern of the received input signals.

20. The neural network device according to claim 18, wherein the electronic circuit is adapted to process signals of one color channel.