

Chapter 8

Conclusion

The mimetic EHW, regarded as an on-line EHW, was demonstrated. The software version of GA was migrated to the FPGA prototyping boards consisting of a custom microprocessor and a fitness evaluator. It can be shown that the hardware tailored to the problem could be 36 times faster than a conventional computer. The significant speedup, resulted from the use of fitness evaluators in parallel, validates the contribution on accelerating the fitness evaluation.

Although the FPGA is a reconfigurable device, in practice the configuration bits cannot be changed by the FPGA itself. The configuration bits are normally compiled from hardware description languages, then the configuration bits were downloaded from a host computer to the FPGA via a cable link. The use of FPGA is limited due to the following reasons.

- The FPGA manufacturers do not provide the interpretation of the configuration bits in order to protect the customers design from reverse engineering. As a result, the behavior of the configuration bits cannot be simulated.
- An illegal configuration causes a permanent damage on the FPGA. This restricts the evaluation of a random configuration in the actual circuit (intrinsic hardware evolution).

Accordingly, it is relatively impossible to evolve the FPGA configuration bits since the configuration bits cannot be evaluated whether in the software simulator or the actual hardware. An FPGA dynamically reconfiguring itself would be a great challenge of the future research.