

## DNA 자가조립기반 분자 패턴학습 시스템

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DNA has received much attention as a high-density memory device[1-2]. In synthetic DNA molecules, information can be encoded as sequences of adenine, thymine, cytosine and guanine. In addition, DNA computing provides functional techniques to construct a content-addressable and associative memory system[3-5]. In this work, we propose a DNA-based learning system that can learn higher-order patterns of data through an evolutionary process. To represent higher-order relationships among features, we employ a hypernetwork model[6]. In our system, a hypernetwork learn patterns of training examples incrementally by cycles of perception, prediction and feedback steps. We focus on describing how the learning process can be implemented in a biomolecular system using DNA computing technique and how each step can be facilitated by the self-assembling property of DNA molecules. To verify the feasibility of our model, we will show results of computational simulation on MNIST dataset. Implementing the proposed model in a biomolecular system has a promising potential in biomedical application. Without transformation of representation, various kinds of biomolecular information such as RNA and protein can be directly accepted to our learning system. It will provide a quicker way of handling biomolecular information. Such a system could be applied for intelligent diagnosis and drug delivery systems.

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### References

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