

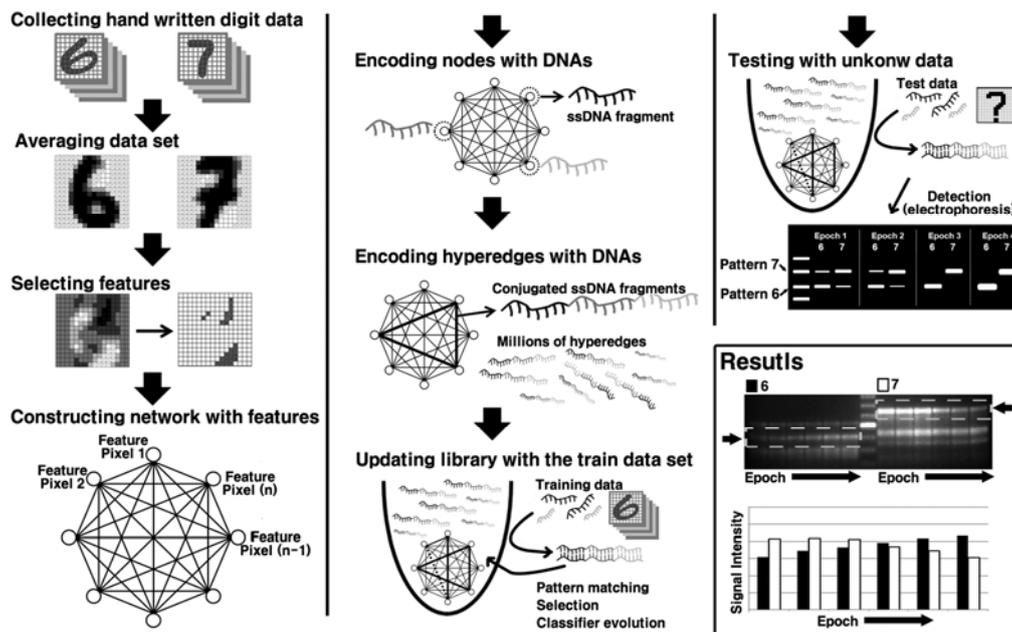
An *In Vitro* DNA Hypernetwork for Digit Pattern Recognition

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Abstract. We proposed a molecular evolutionary learning model (DNA hypernetworks) to solve digit pattern recognition problems and executed *in vitro* experiments. By applying data mining technique for large scale digit data, we obtained 25 feature pixels from 16 by 16 pixels. From the DNA hypernetwork structure perspective, the selected pixels as the network nodes are encoded to DNA sequences, and order-3 hyperedge DNA strands were generated by their random combination. The classifiers for digit recognition are directly evolved from the first hyperedge DNA pool called initial library with a set of training data set by DNA computing operation such as hybridization, size fraction, splitting and amplification. A set of test examples is evaluated; the classification performance is improved by repeatedly updating full matched classifiers. This study shows that pattern classifiers can be learned with DNA chemistry *in vitro* and suggests application of DNA computing in other pattern recognition such as direct gene expression pattern or image pattern analyses with DNA computer.



References

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