Use of Symmetric Internal Loops for Molecular Pattern Classification

Ji-Hoon Lee, Christina Baek, Hyo-Sun Chun, Je-hwan Ryu, Russell Deaton, Byoung-Tak Zhang

*Graduate Program in Bioinformatics, Seoul National University, Republic of Korea
*Graduate Program in Brain Science, Seoul National University, Republic of Korea
School of Computer Science and Engineering, Seoul National University, Republic of Korea
Electrical and Computer Engineering, University of Memphis, United States
Graduate Program in Cognitive Science, Seoul National University, Republic of Korea
jhlee@bi.snu.ac.kr, allcotton76@gmail.com, hs Chun@bi.snu.ac.kr, jhryu@bi.snu.ac.kr, rjdeaton@memphis.edu,
bt Zhang@bi.snu.ac.kr

We present an in vitro molecular pattern classification model using the symmetric internal loops of DNA. When two single stranded DNA of the same size undergo the hybridization process, mismatch hybridizations form the symmetric internal loops of DNA[1]. We found that the internal loops of dsDNA can be used to measure the differences in the extent of mismatches present for each instance and thus, can be used to train DNA molecules[2]. The molecular pattern classifier was trained by sentences from TV shows 'Friends' and 'Prison Break'. We used a total of 20 sentences chosen from the TV shows for the training experiments. The given test questions chosen from the scripts were not used in the training process. We experimentally demonstrate that the molecules learned from the given sentences, recognize and classify the given test sentences. As a result, all the test sentences were classified correctly into their corresponding classes.

Reference

Acknowledgment
This work was supported by the Air Force Research Laboratory (AFOSR, FA2386-12-1-4087), Samsung Research Funding Center of Samsung Electronics (SRFC-1401-12), and the National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIP) (NRF-2010-
0017734-Videome). The Seoul National University Institute of Computer Technology provides research facilities for this study.