Magnetic DNA random access memory with nanopore readouts and exponentially-scaled combinatorial addressing

Nowadays, synthetic DNA can be used as a storage medium. Several experiments have been conducted, providing proof-of-concepts. The authors of [1] present a new decoding technique that works on the raw signals of the biological sequencer when retrieving stored data. This method was partially already presented in [2].

The student’s task is to understand the working flow of DNA-based data storage. Further, one needs to understand the error-correction mechanisms and the specific overall experimental setup of [1]. The pros and cons of this scheme have to be evaluated and discussed.

[1] Lau, B., Chandak, S., Roy, S., Tatwawadi, K., Wootters, M., Weissman, T., & Ji, H. P. (2023). Magnetic DNA random access memory with nanopore readouts and exponentially-scaled combinatorial addressing. Scientific Reports, 13(1), 8514.

https://www.nature.com/articles/s41598-023-29575-z

[2] Chandak, S., Neu, J., Tatwawadi, K., Mardia, J., Lau, B., Kubit, M., ... & Ji, H. (2020, May). Overcoming high nanopore basecaller error rates for DNA storage via basecaller-decoder integration and convolutional codes. In ICASSP 2020-2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 8822-8826). IEEE.

https://www.biorxiv.org/content/biorxiv/early/2020/02/13/2019.12.20.871939.full.pdf

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