Graph parsing application for bio problems

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Nowadays input data for parsing algorithms are not limited to be linear strings, and context-free grammars are used not only for programming languages specification. One of classical examples is a context-free path querying for graph data bases where input is a graph and path constraints are specified by a grammar.

We have some experience in the areas mentioned above [?, ?]. GLL-based context-free path querying algorithm [?] implemented by the authors is faster than solution which was presented at ISWC-2016 [?]. We have some ideas of graph parsing applications in bio data analysys. For example, context-free pattern search in metagenomical assemblies. We also want to investigate practical areas of application and to create solutions based on our framework to demonstrate its practical value.

References

- [1] Bar-Hillel, Yehoshua, Micha Perles, and Eliahu Shamir. "On formal properties of simple phrase structure grammars." *Sprachtypologie und Universalienforschung* 14 (1961): 143-172.
- [2] Doh, Kyung-Goo, Hyunha Kim, and David A. Schmidt. "Abstract LR-parsing.", Formal Modeling: Actors, Open Systems, Biological Systems., Springer, 2011. 90–109.

- [3] Grigorev, Semyon, and Anastasiya Ragozina. "Context-Free Path Querying with Structural Representation of Result." arXiv preprint arXiv:1612.08872 (2016).
- [4] Scott, Elizabeth, and Adrian Johnstone. "GLL parsing.", Electronic Notes in Theoretical Computer Science, 253.7 (2010): 177–189.
- [5] Verbitskaia, Ekaterina, Semyon Grigorev, and Dmitry Avdyukhin. "Relaxed Parsing of Regular Approximations of String-Embedded Languages." International Andrei Ershov Memorial Conference on Perspectives of System Informatics. Springer International Publishing, 2015.
- [6] Zhang, Xiaowang, et al. "Context-free path queries on RDF graphs." *International Semantic Web Conference*. Springer International Publishing, 2016. 632–648.