Efficiently Inferring Non-hierarchical Structure in Parsing and Computation

Danny McClanahan

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Abstract: This paper proposes to revise the general definition of a "grammar"[1] as well as "parsing"[2]. A meta-language named "Simultaneous Productions" (or "S.P") is proposed for specifying a parseable grammar (similar in intent to EBNF[3]). This meta-language is shown to be able to represent recursively enumerable languages[4], and several favorable properties of this meta-language across various parsing use cases are discussed.

An actual "evaluation method" (or "parsing algorithm") is then introduced for the proposed S.P. grammar model, which shares some similarities with the CYK algorithm [5].This method is shown to terminate in **?** [6] time across **?** [7] inputs. This method is then demonstrated to have the peculiar property of directly parameterizing context-sensitivity [8] **?** [9]. The practical and theoretical ramifications of this result are discussed and speculated on.

This paper will frequently refer to free software provided at `https://github.com/cosmicexplorer/simultaneous-productions` *which implements all of the theoretical mechanisms discussed.*

Contents

1 Background

asdf

[1] cite: grammar defn
[2] cite: parsing defn
[3] cite: EBNF
[4] cite: RecEnum defn
[5] cite: CYK algorithm!
[6] TODO: parsing runtime?
[7] TODO: parsing inputs?
[8] cite: context-sensitivity defn
[9] TODO: is this peculiar?