CSC485 Assignment 2 June 15, 2020

1. Using features in grammars

   (a) For the Grammar 1, I implemented grammar rules and lexicons directly from the assignment sheet. I did not add and apply any new design and features.
   There are many limitations for this grammar. First, except the singular and plural feature, the grammar can not handle other features like tense. In addition, since the grammar is too straightforward and simple, some meaningless sentences could be parsed successfully. For example, one of the test sentences (in sentences.pl), "Biscuits feed Fred.", follows this grammar, but it is meaningless.

   (b) For the Grammar 2, I add two features to handle the simplified grammar rules. One is the singular and plural feature for nouns and verbs. I implemented it by adding the *num* type. The other is to specify whether the noun is the proper noun or not. I implemented it by add the *proper* type. Thus, the categories are $has\_feature$, det, p, and pp since det, p, and pp do not have any feature in this grammar. Because the sentence is consist of subject and verb, the $has\_feature$ type should contain s, noun, and verb with the *num* feature. The name *sg* indicates the word is singular, and *pl* indicates the word is plural. The noun type includes n and np with the is_pr feature, which specifies whether it is the proper noun. The verb type includes v and vp.
   The limitations for this grammar are same as those for the Grammar 1.

2. Verb complements and gap features

   (a) See twoa.txt for details.

   (b) For this grammar, I add tense and list feature for v_sem based on the starter code. In order to implement thematic roles for each verb, I add specific features corresponding to the agent, theme, beneficiary, or experiencer to each word and restrict the type of theme to the infinitive clause and other roles to noun phrase. Since we only need to fit five verbs, I wrote grammar rules for each word to satisfy the role restriction. I use list feature to transfer the thematic roles. For example, tend has two thematic roles: agent and theme. I designed and implemented v_inf__vp_tend rule for the verb phrase of tend. Tend has subcategories A and B, where A represents the agent for tend, and the experiencer for sleep. I set the infinitive clause to be the theme of tend, and transfer the list of the infinitive clause and A to the verb phrase. We can use the list feature to achieve it easily.
   For the tense feature, I rename it to tense2 in order to follow the syntax of TRALE and eliminate the ambiguity of the tense feature of mood. This feature can restrict the verb of infinitive clauses to be present, and the predicate of the sentence to be the past tense, since we are only required to implement these tense.
   There are many limitations for this grammar. First, since I wrote grammar rules for each word, the structure of sentences must follow rules I defined. Although there are other correct structures, the grammar cannot parse them successfully. For example, the sentence, "the student appeared", is correct, but my grammar cannot handle this sentence since it missed theme for appear. In addition, the singular and plural feature for noun and verb is restricted. The grammar cannot handle the plural verb and noun. Moreover, my grammar can only parse the past tense sentences with the infinitive clause "to sleep". The sentence that does not have the verb "sleep" would be fail in this grammar.

CSC 485, Summer 2020: Assignment 2

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I declare that this assignment, both my paper and electronic submissions, is my own work, and is in accordance with the University of Toronto Code of Behaviour on Academic Matters and the Code of Student Conduct.

Signature: 程嘉豪