SERRANT: a syntactic classifier for English Grammatical Error Types

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Abstract

SERRANT is a system and code for automatic classification of English grammatical errors that combines SErCl (Choshen et al., 2020) and ERRANT (Bryant et al., 2017). SERRANT uses ERRANT’s annotations when they are informative and those provided by SErCl otherwise.

1 Introduction

In grammatical error correction (GEC), an erroneous part of a sentence and its correction is called an edit. It is often useful to categorize edits into types, e.g., to improve results (Junczys-Dowmunt et al., 2018; Kantor et al., 2019) and for system evaluation (Choshen and Abend, 2018; Bryant et al., 2019a). A set of edit types is called a taxonomy. In current annotations, taxonomies always differ between datasets of different languages (Rozovskaya and Roth, 2019; Lee et al., 2016) and mostly differ between datasets of the same language (Dahlmeier et al., 2013; Berzak et al., 2016). For English, there are two automatic edit type classifiers, ERRANT and SErCl following two different taxonomies. These classifiers can be applied to any dataset containing corrections1 and are thus the instrument of choice whenever more than one dataset is used. We present an attempt to combine the two taxonomies and the two classifiers into one system, which present outputs in a unified way.2

ERRANT (Bryant et al., 2017) is a rule-based classifier of errors for English. ERRANT types include general categories like Spelling, Morphology and more specific categories reflecting the dominant POS in the edit (e.g. ADVERB or ADJECTIVE). These categories may be further refined through sub-categories such as Inflection (e.g., VERB:INFL). ERRANT was used as the official taxonomy of the BEA shared task (Bryant et al., 2019a) and provides a precise set of rules to map edits to types.

A recent study presented SErCl (Choshen et al., 2020), a cross-lingual taxonomy of syntactic errors. SErCl defines an error type as the concatenation of morphosyntactic features of the text fragment before and after the change. Formally, given a span from a learner sentence l and its correction c, and given a Universal Dependencies (Nivre et al., 2016) annotation for these spans, such as UPOS tags, dependency-relation labels, or morphological-feature specifications for the heads of the spans’ subtrees, which we denote as UD_l and UD_c respectively, the type of the error is UD_l → UD_c. Thus, the type for an edit where a noun becomes a verb would be NOUN→VERB, and when a noun changes its number from plural to singular, the type is NOUN:SINGULAR→NOUN:PLURAL. If UD_l is identical to UD_c, we denote this type with UD_l for brevity, and if the span was deleted or added, the type is UD_l→NONE or NONE→UD_c respectively.

Choshen et al. (2020) showed that some of ERRANT’s categories are not informative or not consistent, while others are. They also note that ERRANT’s POS-based types sometimes include cases where the POS changes. When POS is changed upon correction ERRANT is not well defined, it may assume the dominant type is the source or the correction, and quite often no type would be attached to the edit known as OTHER type. ERRANT does have the benefit of being more human-readable when it is accurate, hence, SERRANT’s default behaviour is chosen to be ER-
The special cases are the following:

1. ERRANT’s Other category signifies failure to find informative type. Hence, we rely on SErCl types in this case. We do keep the Other category for unreliable cases, which we define as edits involving Intj, Num, Sym, X, and Punct POS tags. We also find that proper noun (Propn) is generally unreliable since the current parser uses it as a fallback for various erroneously spelled words. We do keep the Propn→Propn type because repetition reduces the risk of parser errors.

2. ERRANT’s morphology error type (Morph) comprises a multitude of phenomena. We replace it with SErCl’s types. We also expose the information originally captured by the Morph type in a different way. When the lemmas do not match between the source and the target, we add a sub-category suffix “WC”. This indicates that while the POS did not change, the main error is in the choice of word and not in morphosyntactic features (e.g., consume→eat would be Verb:WC but eat→ate would not). We ignored the problematic cases mentioned in connection with the Other ERRANT type but kept cases of Adj→Propn or Propn→Adj, such as China→Chinese.

3. We added a suffix “MW”, which corresponds to a multi-word change in either the source or the correction. MW is only added when the multiword is not of an already named type such as Verb:Tense.

4. ERRANT’s orthography (Orth) type is generally correct, for example when reflecting a missing whitespace. However, it does contain cases where a proper noun should have been capitalized. While this is an orthographic error, unlike most such errors, it sometimes changes morphosyntax and/or the meaning. Therefore, if the word was not the first in the sentence, and was changed into a proper noun (Propn), SERRANT returns SErCl’s annotation X→Propn (e.g., “He founded apple” → “He founded Apple”).

5. The ERRANT Verb type reflects both Aux and Verb edits. We follow SErCl and mark them as Aux where needed.

6. When a noun is changed into a verb, ERRANT marks this as Verb:Form. As this is not a change in the verb form, we denote this with Noun→Verb. (e.g., trap→trapped).

7. Cases where a pronoun becomes a determiner or the other way around (e.g., these→their) are included in the ERRANT types Pron and determiner Det. We replace these annotations with more informative types Pron→Det and Det→Pron.

8. ERRANT lumps tense, aspect, and mood together under Verb:Tense. When both the original and the corrected wordform have the lemmas be or have or the wordform is "will" we name it Verb:Tense. When both words are modal verbs (can, could, may, might, shall, should, will, would, must), we add the suffix “Modal”. Otherwise we return the annotation provided by SErCl.

3 Examples

In this section, we give some examples of the annotations returned by the model. The errors and corrections themselves are made up. The model follows the m2 format, but, for convenience, we provide a more visual format. More examples are provided with the code. In the examples → represents a correction of a given word (no multiword errors in the examples for simplicity), in brackets are the type SERRANT would give the error.

- I werk→work (R:Spell) for pen→Pen (R:Noun→Propn)
- gilly→Gilly (R:Orth) is imagination →imagining (R:Noun→Verb)
- I drive→ride (R:Verb:WC) the→∅ (U:Det) my bicycle.
• I should→shall (R:MODAL) do as as I must.

We also add some examples from level A learners of the W&I corpus (Bryant et al., 2019b):

• In addition to it—that (R:PRON→DET), we can also take a comfortable short nap on the back seat and wake up fresh.

• My family think that my cook→cooking (R:MORPH:NOUN) is amazing.

• It is great→very (R:ADV→ADJ) fun→funny (R:ADJ→NOUN).

• How are you? I’m writing to inform→give (R:VERB:WC) you that→∅ (U:PRP) some advice on travelling and working in my country.

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