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DEVELOPING A PARSER FOR SIMPLE PUNJABI SENTENCES

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ABSTRACT

The system has been developed for parsing of simple Punjabi sentences. Parsing is the first step in natural language processing. Given a sentence, what is needed is a procedure that recognizes the sentence and also discovers how it is built. Rule based approach of parsing is used. Prolog language is been used for the implementation purpose. The accuracy is calculated for system and for very simple Punjabi sentences, the accuracy is about 55%.

KEYWORDS

Parser, Natural language processing, Inflectional language, SVO(Subject-Verb-Object) order, SOV(Subject-Object-Verb) order.

INTRODUCTION

Parsing is a procedure that recognizes a sentence and discovers how it is built i.e. it gives its grammatical structure. Recognition involves finding out whether the sentence under consideration belongs to the particular language or not i.e. whether it follows all the rules of well formedness that the language prescribes. Discovering the structure involves identifying and marking the various components of the sentence- the phrases and individual parts of speech such as noun, verb, preposition etc. Parsing is one of the most widely used tools within language engineering. Parsing systems for various foreign languages are commercially or non- commercially available. However such a system is rarely available for Punjabi language. So there is great need to develop such systems for Punjabi language.

COMPONENTS OF A PARSER

A typical parser consists of the following components:

1. Database of words
2. Principles for joining words into phrases
3. Principles for checking the grammatical corrections of a phrase.

A database of words (i.e. vocabulary) is required for any parser so that the parser is able to recognize the words in the sentence that it has to parse. The database can be regarded as a kind of memory, whose chief characteristics are the items in it, the structure imposed on them, and the way they are accessed. Hence, the database of any parser would essentially consist of the words, along with all the different ways in which they are used in the language or part of the language that is to be parsed.

A phrase can consist of words, phrases or both necessitating the presence of some principles which can differentiate any grammatically correct phrase from a mere cluster of words. These principles constitute grammar.

Parsing with computers is fundamentally a search process, where one grammatical rule after another is tried on the input string until a set of rules is found that is completely satisfied by the string under consideration. Usually, no unique set is found and the parser has to output all the different breakdowns that it has obtained, not all of which may be correct. Of the numerous correct interpretations that may be obtained, which one is correct will depend upon other factors such as the context of the utterance.

STRUCTURE OF PUNJABI LANGUAGE

Punjabi is the official language of the state of Punjab in India and is spoken by a large number of people around the world. Some of the main grammatical features of Punjabi language are:

- Punjabi is mainly an inflectional language unlike English.
- Writing complex sentences is not in accordance with the general idiom of Punjabi.
- In Punjabi, the postpositions occur immediately after their nouns/pronouns.
- Punjabi make extensive use of gender and number in sentence formation.
- A typical Punjabi word can have only one prefix but the number of suffixes can be two or three.
- A grammar checking system for Punjabi language must pay careful attention to these unique grammatical features of the language.

The major difference between foreign languages like English and Punjabi language is that English language have SVO(Subject-Verb-Object) order for sentence generation. But Punjabi language have SOV(Subject-Object-Verb) order in sentences.

For example:

Ram eats fruit – English sentence having SVO order

Ram phal khanda hai – Punjabi sentence having SOV order

Another difference between English and Punjabi language is that the former has a rich derivational morphology and the latter has a rich inflectional morphology.

APPROACH USED

The various types of errors that can be there in a sentence written in Punjabi language include spelling errors, grammar errors, style errors and semantic errors. In the present research work, only grammar errors are covered like word order errors, subject and verb agreement errors in terms of gender, number and person etc. Bottom-up parsing approach is being used. In Bottom-up parsing approach, we begin from the words in the utterance and move towards the grammatical sentence. In this process, we first replace the words with their grammatical equivalents. Then we try to bind these grammatical entities to give parse and try to build bigger and bigger pieces of structure using various grammar rules. Eventually we hope to put all these pieces of structure together in a way that shows that we have found a sentence. Putting it another up other entities higher up in the hierarchy, finally reaching the sentence. Thus the basic idea of Bottom-up parsing approach is to begin with concrete data provided by the input string i.e. the words we have to way, Bottom-up parsing approach is about moving from concrete low level information to more abstract high level information.

CONCLUSION

Parsing is the mandatory part of natural language processing applications. A beginning has made for development of Punjabi parser, still a lot of work needs to be done before an efficient Punjab parser can be developed. Some of the major limitations of the grammar rules that I have covered for sentence generation in Punjabi are as follows:

1. Only active sentences having SOV(Subject-Object-Verb) order and formed by combination of noun-phrase and verb-phrase have been covered.

2. Exclamatory and interrogative sentences have not been covered.
3. Compound and complex sentences have not been covered.
4. Gender and number should also be included in the database for different Punjabi words and rules should be framed for their checking also.

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