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**Automated Translation of English Statements to Symbolic logic**

Introduction

Logic has played a vital role in the lives of man. In a broad definition, our

Reasoning is a form of art which people perform, unknowingly, in their everyday interactions. Then when they reason their thoughts, they argue. And arguments appear in forms: valid and invalid. People are however bound by habits, hunches, emotions and the like which tend to bring arguments into being illogical and irrational, thus giving way to principles, methods and rules in logic to prevent such actions. The study of logic helps one to reason well by revealing the principles of correct reasoning.

Considering that real world arguments appear more complex and far more repetitive to point things, through an arguer’s point of view, clear enough different conventions was invented in presenting propositions decreasing complexity of statements.

Field: Automated Translation / Formal Logic / Information Extraction

Translation of English Statement into Symbolic Logic

Problem:

With our existing ideas and current knowledge on **natural language processing**, how effective would it be to automate the process of translating English statements to a language used by logicians, clausal logic. Humans use rules and guidelines when manually translating. The aim of the thesis project will be: **to understand a propositional sentence structure and create an algorithm to analyze statements in formal logic in order to automate translation.**

Formal logic is used to construct statements about the natural world and mathematical relationships. Propositional logic statements are expressed in terms of a single proposition or more joined by logical connectives. For example,

*“If we arrive at the station by dusk, we'll catch the train.”*

in propositional logic, can be represented as ‘*P -> Q’.* Where P stands for the proposition “we arrive at the station by dusk” and Q is for “we’ll catch the train”.However, another statement,

“*We’ll catch the train if we arrive at the station by dusk.*”

is also represented as the same. Identifying logical connectives in an English statement is easy since there are hint words to specify whether they are negation, conjunction, disjunction, implication or bi-conditional. Problems arise such as, how would a computer know that there is no difference in the statements ‘*the pizza will not be delivered*’ and ‘*no pizza will be delivered*’. Though there are hint words, statements can appear in different forms though they express equivalent thoughts. And how will the statement “no pizza will not be delivered” be analyzed as a contradiction to the first two statements. Moreover, arguments in real world are far more complex.

Result:

The results of the project, as viewed by the proponents, would be relevant to a wide variety of problems related to formal logic, such as automated theorem proving, and would shed light on the relationship between syntax and semantics in logical statements.

Solution:

At the best of the proponents’ knowledge, studies of this type do not yet exist. Therefore, the researchers formulate their own solution in approach to the said problem. There are however, books that discuss manual translation.

What I want to do:

I want to research and consider an in-depth analogy of propositional sentence structure to automate the process of translation.