**Automated Symbolic Logic Notation Construction from English Text**

**Overview**

Formal logic is used to construct and analyze statements about the natural world and mathematical relationships. One of the more elementary forms of formal logic is propositional logic, where statements are expressed in terms of propositions joined by logical connectives. These are done with the use of symbolic logic otherwise known as “Sentential Logic”.

This study aims to provide an automatic translator which gets a statement or set of statements and outputs a set of equivalent symbolic logic statements. There are guidelines in translating English statements into Logic statements, they are however, accomplished with human intervention. Automating this process may raise complexity and ambiguity problems. The researchers will still pursue the goal in spite of the problems and will state the encountered problems.

**Related Literature**

Hardegree (<http://courses.umass.edu/phil110-gmh/text/c04_3-99.pdf>) discusses his points in the said translation, “The translation process is primarily a process of *paraphrasing* – saying the same thing using different words, or expressing the same proposition using different sentences. Paraphrase is translation from English into English, which is presumably easier than the process of translating English into, say, Japanese”. And later on he mentioned, “The second aspect is paraphrasing simple statements into straightforwardly equivalent compound statements. For example, the statement ‘it is *not* raining’ is straightforwardly equivalent to the more verbose ‘*it is not true that* it is raining’. Similarly, ‘Jay *and* Kay are Sophomores’ is straightforwardly equivalent to the more verbose ‘Jay is a Sophomore, *and* Kay is a Sophomore’”.

To convert English statements into a symbolic form, we restate the given statements using the building block sentences and the connectives of propositional logic (not, and, or, if\_then, if\_and\_only\_if), and then substitute the symbols for the building blocks.   
For example, let *P* be the proposition "It is snowing", *Q* be the proposition "I will go the beach", and *R* be the proposition "I have time".   
Then first "I will go to the beach if it is not snowing" is restated as "If it is not snowing, I will go to the beach". Then symbols *P* and *Q* are substituted for the respective sentences to obtain ~*P* -> *Q*.   
Similarly, "It is not snowing and I have time only if I will go to the beach" is restated as "If it is not snowing and I have time, then I will go to the beach", and it is translated as ( ~*P* ^ *R* ) -> *Q*.

(<http://www.cs.odu.edu/~toida/nerzic/level-a/logic/prop_logic/E2L/E2L.html>)