

## ABSTRACT

**T**here is an increased need for language translation in the modern world. Attempts of language translation are as old as computers themselves. Machine translation is the attempt to automate all, or part of the process of translating from one human language to another.

The present work reports our attempt in developing a bi-directional transfer-based machine translation system from Arabic to English and vice versa. The translation from Arabic to English and vice versa is very useful in developing expert systems in both languages. According to transfer approach of machine translation, the system consists of three main components analysis, transfer, and generation for each direction. The analysis component assigns grammatical structures to the input by means of source language grammatical rules and a source language lexicon. The transfer component builds target language equivalents of the source language grammatical structures by means of transfer rules that relate every source language representation to some corresponding target language representation. The generation component provides the target language translation. This involves the synthesis of the target language.

A major design goal of this system is that it can be used as an agent that provides services to remote users on the web and be specialized in the agricultural domain. The system is implemented in C++. Experiments on real sentences taken from expert systems in the agricultural domain are performed and results are reported.

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