TransType : A Target-Text Mediated Interactive Machine Translation System

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1 Introduction
Interactive Machine Translation (IMT), where a human translator is assisted in real
time by a MT system, is a promising idea for improving the productivity of transla-
tors. IMT first appeared as part of Kay’s MIND system (Kay, 1973), where the user’s
role was to help the computer analyse the source text by answering questions about
it. Most later work on IMT has followed in this vein, concentrating on streamlining the
question-and-answer process in various ways.

TransType is based on the novel idea, first proposed in (Foster et al., 1996), of shifting
the focus of interaction in IMT from the meaning of the source text to the form of the
target text. In this approach, a translation emerges from a series of alternating contribu-
tions by the MT system and a human translator, with the translator’s inputs serving as
progressively informative constraints for the MT component. This relieves the translator
of the burden of having to provide explicit analyses of the source text and allows him to
translate naturally, assisted by the machine whenever possible.

Our current prototype for English to French translation embodies a simple version
of this idea in which the machine tries to guess the next few words the translator will
type. The translator is given access to the system’s proposed completions and can incor-
porate them into the target text whenever desired.

2 Description
From a user’s viewpoint, TransType operates as follows: a translator selects a sentence and
begins typing its translation. After each character is typed, the system displays a new set
of proposed completions in a pop-up menu. The top proposal can be accepted using a
special key, and other proposals can be selected with the mouse. The translator may
reject all proposals by continuing to type normally. Figure 1 shows a screen dump of the
interface, which is implemented in Tcl/Tk, a multi-platform script language.

To generate completions, the system relies on a model for \( p(w|h, s) \), the probability that
a word \( w \) will follow a sequence of words \( h \) in the translation of a source sentence \( s \). This
allows for the rapid retrieval of the most probable words in the current context. We model
\( p(w|h, s) \) using a linear combination of a tri-
gram language model for \( p(w|h) \) and the clas-
cial IBM translation model 2 for \( p(w|s) \), as
described in (Foster et al., 1997; Langlais and
Foster, 2000). To predict more than one word,
we allow \( w \) to range over certain multi-word
units (Langlais et al., 2000a). We have also
experimented with Maximum Entropy based
models for \( p(w|h, s) \) (Foster, 2000a; Foster,
2000b). The completion generator is writ-
ten in C++ using a flexible object-oriented
architecture which facilitates experimentation
with different statistical models.

3 Evaluation
We have conducted a theoretical evaluation of
TransType on a word completion task which assumes that a translator carefully observes
each completion proposed by the system and accepts it as soon as it is correct. Under
this optimistic scenario, we have shown that TransType allows for the production of a
Top-notch Canadian science is helping make the translator’s difficult task a little easier.

Researchers at the Université de Montréal’s Laboratoire de Recherche Appliquée en Linguistique Informatique (RALI), have developed a remarkable series of language tools designed specifically for translators.

http://www-rali.iro.umontreal.ca/ProjectTransX.en.html

With support from NSERC, Professor Guy Lapalme and his team have created TransType, “which tries to anticipate, in real time, what a translator will type next.”

The predictions of the system are based on the partial translation the translator has already entered and possible translations the system calculates for the source text.

La science canadienne de premier plan simplifie quelque peu la tâche difficile du traducteur.

Les chercheurs du Laboratoire de Recherche Appliquée en Linguistique Informatique (RALI) ont développé une gamme impressionnante d’outils linguistiques adaptés aux traducteurs.

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Figure 1: Example of an interaction in TransType with the source text in the top half of the screen. The target text is typed in the bottom half with suggestions given by the menu at the insertion point.

Translation by typing less than a third of its characters. We have also conducted a series of more realistic tests involving actual translators (Langlais et al., 2000b). The results of this study, although much more modest, nonetheless support the validity of the approach and encourage further research.

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