An Exploratory Study of How Technology Supports Communication in Multilingual Groups

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ABSTRACT

In this paper, the authors study how new technology can support multilingual groups. Their results show that no significant difference was found between group members' comprehension of contributed comments and their stated minimum acceptable understanding. However, comprehension of relevant comments was higher than that for off-topic text, indicating that the sharing of important information was achieved. Further, reading comprehension tests of translations from Chinese, German, Hindi, Korean, Malay, and Spanish to English show that, except for Hindi, the automatic translations achieve accuracies that are acceptable for graduate studies at a university in the United States.

Keywords: *Communication Technologies, Electronic Meetings, Group Support Systems, Machine Translation, Machine Translation Accuracy*

INTRODUCTION

Businesses in today's global economy must take into consideration differences in time zones, languages, and cultures. For example, 75% of multinational companies managed networks of 20 or more overseas operations over ten years ago (John et al., 1997), and Microsoft conducts business in about 80 different languages (Feely & Harzing, 2003). Other organizations must communicate over large distances with different cultures, as well. The United Nations used a distributed, electronic meeting in January 1998 to link 10 Pacific island countries, and officials saved time and over US $25,000 in travel costs (Wescott, 2001). Development Decision Centers (DDC) equipped with electronic meeting technology help to improve communication, increase effectiveness and efficiency of public and private administration, and support democratization and political stability in Africa (de Vreede et al., 2003; Splettstoesser, 1998),

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and electronic meeting systems have been used throughout the world (Nunamaker et al., 1996).

Meetings with cultural diversity have a positive influence on decision-making as these groups generate more ideas in electronic discussions than do homogenous groups (Daily & Steiner, 1998). However, this diversity can also have a negative influence on communication, often due to differences in the members' native languages (Shachaf, 2008; Shigenobu et al., 2007). Further, there is an emerging shortage of human translators (Levin, 2009), resulting in fewer interpreted encounters (Fügen et al., 2007).

Incorporating automatic translation into electronic meetings can reduce this negative influence on intercultural communication (Morikawa et al., 2008). For example, Pangaea, a non-profit organization that enables children around the world to communicate across language boundaries, has been using a machine-translation-embedded chat system called *AnnoChat* for several years (Pangaea, 2009). Language needs are likely to become one of the essential requirements of mature information societies with global communications infrastructures, and access to information in a user's chosen language will become a prerequisite (Tiffin & Terashima, 2001). It is now widely accepted that global communications must be accessible and transferable, in a timely manner, in as many languages as feasible (Sert & Açıkgöz, 2006).

This paper describes how machine translation (MT) can support electronic meetings and introduces a new multilingual system that provides communication in 51 different languages. Such a system could be especially useful in many multinational meetings such as those within the European Union where 23 languages are spoken and the United Nations that has over 350. We also discuss the minimum comprehension necessary for meeting success, and illustrate how the technology can be used in multilingual discussions.

MT COMPREHENSION

One of the first demonstrations of a translation system occurred in January 1954 (Hutchins, 2007), and MT was implemented on personal computers in 1981 and on the Web in 1997 (Yang & Lange, 1998). *Google Translate* (http://translate.google.com/) appeared on the Web a few years later, and accuracy improved considerably when the service began to use statistical machine translation (Lopez, 2008), as tests of 20 MT systems involving translations between English and Chinese or Arabic showed that it was often the most accurate (NIST, 2006). Currently, *Google Translate* supports 51 languages in 2,550 language-pair combinations, but accuracies vary considerably (Aiken et al., 2009).

It is difficult to determine the minimum level of translation accuracy required. Obviously, 100% is sufficient and 0% is not, and the importance of accuracy varies with the topic and task. Medical or legal matters require more attention than do informal, ad hoc communication. In some cases, interpreters might be expected to be 80% accurate in meetings (Fügen et al., 2007), and in other situations, such as intelligence analysis, just 40% accuracy might be enough (Caulfield & Reeder, 2001).

Tests of reading comprehension can provide a direct measure of the usefulness of translations (Somers, 2007). For example, in one test of comprehension (Fügen et al., 2007), questions were answered correctly 74% of the time when a human translated material (presumably with 100% accuracy), but when MT was used, only 58% was comprehended and 52% of the questions were answered correctly.

In order to assess the validity of reading comprehension tests, we chose the Test of English as a Foreign Language (TOEFL) to evaluate the accuracies of translations from Chinese, German, Hindi, Korean, Malay, and Spanish to English. Samples of the reading comprehension portion of the test were obtained online

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