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## Translation of Electronic Dialogs

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## **Translation of Electronic Dialogs**

### Abstract

Techniques for translation of all or subsets of an electronic communication sent by a first user (via a corresponding client device) to one or more additional users (for consumption via corresponding client device(s)). The translation is from a source language of the electronic communication to target language(s) of the additional user(s). For example, assume a first user creates an electronic communication in Chinese and transmits the electronic communication to a second user who only understands English. Techniques described herein may translate all or portions of the communication from Chinese to English and present (*e.g.*, visually and/or audibly) the translated English version of the communication to the second user (in addition to, or in lieu of, the Chinese version of the communication). Some techniques described herein relate to automatically determining the source language of a communication based on one or more signals such as a primary language of the application utilized to create the communication, language(s) utilized by the creator of the communication in one or more applications, etc. Some techniques additionally or alternatively relate to automatically determining the target language of a translation based on one or more signals, such as signals specific to the recipient of the translation. Some techniques additionally or alternatively relate to selectively translating only a subset of an electronic communication in response to one or more signals.

### Description

Individuals engage in electronic dialogs with one another utilizing a variety of electronic communications such as emails, rich communication services (RCS) messages, short message service (SMS) messages, multimedia messaging service (MMS) messages, over-the-top (OTT) chat messages, social networking messages, voice messages (*e.g.*, real-time or non-real-time),

audio-video messages, etc. Moreover, users engage in such dialogs utilizing a variety of computing devices, such as smart phones, tablet computers, wearable devices, and so forth.

In some situations a user may create a communication in a source language (*e.g.*, in the primary language of the user) and transmit that communication to one or more additional users whose primary language is not the source language and/or does not understand the source language. An additional user that receives the communication may need to “copy and paste” the communication into a separate translation application in order to translate the communication from the source language to a target language of the additional user (*e.g.*, the primary language of the additional user). However, this can be burdensome and “slow down” the dialog. Additionally, this may introduce unexpected errors as the additional user may not be aware of the source language, causing the translation application to “guess” the source language, which can cause translational errors (*e.g.*, where multiple language(s) share set(s) of characters). Moreover, “copy and paste” may not be available for communications that include audio.

In view of these and/or other considerations, techniques described herein automatically translate all or portions of an electronic communication from a source language of the communication to target language(s) of one or more recipients of the communication.

In some situations, the source language of the electronic communication is automatically determined based on one or more signals. Those signals may include, for example, the characters of the electronic communication, a primary language of the application utilized to create the communication (*e.g.*, a user set primary language), language(s) utilized by the creator of the communication in one or more applications (*e.g.*, language(s) utilized in other communications, user set primary language(s) of the other applications), etc. As appreciated, many of the aforementioned signals are not directly indicated by the electronic communication

itself. This may enable more accurate translation in many scenarios as such signals may improve the accuracy of an automatically determined source language. For example, relying on only the communication itself may lead to a “false positive” identification of a source language. For instance, assume characters included in a communication are common to both Language A and Language B. Relying on only the communication itself may lead to an incorrect selection of Language B when Language A is the actual source language. However, using techniques described herein may enable a correct selection of Language A as the source language. For instance, Language A may be selected in lieu of Language B based on determining that Language A is the primary language of the application utilized to send the communication, that the user who sent the communication most frequently utilizes Language A, etc.

In some situations, a target language of the translation for a given recipient of a communication is additionally or alternatively automatically determined based on one or more signals. Those signals may include, for example, primary language(s) of application(s) utilized by the recipient (*e.g.*, a user set primary language of a communication application), language(s) utilized by the recipient in one or more applications (*e.g.*, language(s) utilized in other communications), etc. This may obviate the need for the recipient to explicitly indicate a desired target language and/or increase the likelihood the translation is in a language that is understandable by the recipient.

In some situations, language(s) understood by a given recipient are additionally or alternatively automatically determined based on one or more signals, such as those described above. In some of those situations, a degree of understanding may also be determined for each of the understood language(s). For example, it may be determined that User A’s primary language is Language A, the user has a “good” understanding of Language B, and has a “basic”

understanding of Language C. Determining what language(s) are understood by a given user may enable translation of all or a subset of a communication to be performed only when it is appropriate. For example, if the user's determined primary language is Language A, it is unnecessary to translate a communication sent to that user that is also in Language A. Also, for example, if the user has a good understanding of Language B, a communication sent to that user that is also in Language B may not be automatically translated and/or the translated version may not be automatically presented (*e.g.*, instead a selectable "option" may first be presented before translation and/or presentation of the translated version). As yet another example, if the user has a good understanding of Language B, the entirety of a communication sent to that user that is also in Language B may not be automatically translated and/or the translated version may not be automatically presented. Rather, for example, only a subset of the communication may be translated and/or presented, such as one or more terms/phrases that are indicated in one or more databases as "infrequent", "often requiring translation", etc. As yet another example, if the user has a basic understanding of Language C, a communication sent to that user that is also in Language C may be automatically translated and the translated version may be automatically presented, along with the original Language C version.

Various techniques described herein may be implemented on one or more client devices and/or one or more remote computing devices (*e.g.*, computing device(s) of a communications system managing a dialog). For example, a client device of a recipient of an electronic communication may perform a translation of the communication and/or may determine language(s) of a user and/or degree(s) of understanding of the language(s). Also, for example, a remote computing device that is in network communication with a client device of a sender of a

communication and/or a recipient of the communication may perform the translation and/or determine language(s) of the sender and/or recipient.

Some examples herein are described with respect to translation of text in an electronic communication that includes text. However, techniques described herein may additionally or alternatively be utilized to translate voice electronic communications, text in images (*e.g.*, via OCR of the text), etc. As one example, when the electronic communication is a voice communication (*e.g.*, a live phone call), a voice recognition engine may convert the voice communication to text in the source language of the voice communication, the text then translated to a target language, and the target language translation provided to the user. For example, the target language translation may be displayed to the user (*i.e.*, as text in the target language) and/or audibly provided to the user (*i.e.*, using a text-to-speech engine to “speak” the target language translation). In some situations, a recipient of a voice communication may be audibly provided with both the original voice communication and the target language translation. In some of those situations, the recipient may be able to control the volume of the target language translation relative to the original voice communication. For instance, the target language translation can be made louder, while the original voice communication is still audible to enable the recipient to discern the original volume, pitch, tone, inflection, etc.

Turning now to the figures at the end of this description, additional description of various implementations is provided. FIG. 1 illustrates client devices 106<sub>1</sub>-106<sub>N</sub>, a translation system 120, and databases 152, 154, and 156. Each of the client devices 106<sub>1</sub>-106<sub>N</sub> is illustrated with a message client 107<sub>1</sub>-107<sub>N</sub> to facilitate receiving and/or sending electronic communications. The message clients 107<sub>1</sub>-107<sub>N</sub> may be stand-alone applications and/or implemented through another application (*e.g.*, a browser). Although the translation system 120 is illustrated as separate from

the client devices 106<sub>1</sub>-106<sub>N</sub>, one or more aspects of the translation system 120 may be implemented on one or more of the client devices 106<sub>1</sub>-106<sub>N</sub>. For example, each of the client devices may implement an instance of the messaging system 120. In situations where all or aspects of the translation system 120 are remote from a client device, the client device may communicate with the translation system 120 via a network (*e.g.*, the Internet).

The messaging system 120 includes a source language engine 122, a recipient language engine 124, a translation engine 126, and a presentation engine 128. The source language engine 122 may automatically determine a source language of an electronic communication sent by one of the client devices 106<sub>1</sub>-106<sub>N</sub>. For example, the engine 122 may determine the source language of a communication based on signals such as: characters of the electronic communication, a primary language of the application utilized to create the communication, language(s) utilized by the creator of the communication in one or more applications, etc. In some situations, the signals may be included in attributes database 152. For example, the attributes database 152 may include, for the sender of the communication, language(s) utilized by the sender. A utilized instance of the database 152 may be stored locally at a corresponding client device of the sender.

The recipient language engine 124 may automatically determine a target language for a translation for a given recipient of a communication. For example, the engine 124 may determine the target language for a recipient based on signals such as: primary language(s) of application(s) utilized by the recipient, language(s) utilized by the recipient in one or more applications, etc. In some situations, the engine 124 additionally or alternatively determines other language(s) understood by a given recipient based on one or more signals. In some of those situations, the engine 124 also determines a degree of understanding for each of the language(s). In some situations, the signals utilized by the engine 124 may be included in

attributes database 152. For example, the attributes database 152 may include, for the recipient of the communication, language(s) utilized by the recipient. A utilized instance of the database 152 may be stored locally at a corresponding client device of the recipient.

The translation engine 126 translates content of a received communication from a source language to target language(s) of recipient(s) of the communication. In determining the appropriate translation (if any) for a given recipient, the translation engine 126 may utilize the source language determined by the engine 122 for the communication and the target language determined by the engine 124 for the given recipient. The translation engine 126 may rely on one or more translation model(s) 154 in performing the translation. In some situations, the translation engine 126 includes a voice-to-text engine to convert audible electronic communications to text, then translates the converted text.

The presentation engine 128 audibly and/or graphically provides a translated version of a communication for presentation to a corresponding recipient via a corresponding one of the client devices 106<sub>1</sub>-106<sub>N</sub>. In some situations, the engine 128 provides the translated version for presentation automatically in lieu of the original version. In some situations, the engine 128 first awaits user input before providing the translated version. In some situations, the engine 128 provides both the original version and the translated version for presentation. In some situations, the presentation engine 128 may only provide a translated version for selected subsets of a communication. In some of those situations, the presentation engine 128 may utilize a language(s) database 154 to determine which subsets should be provided with a translated version. The language(s) database 154 may include, for each of one or more terms and/or phrases of a given language, indications of whether they should be translated if a user has “good”, “basic”, and/or other degree of understanding of the given language. The indication of a given

term/phrase may be based on various factors, such as its frequency in the given language, how often a translation of it was explicitly requested in the past (*e.g.*, via interaction with the system 120), etc.

FIG. 2A illustrates an example dialog between a given user (“You”) of the client device 106<sub>1</sub> and another user (“Bob”). In this example, Bob’s primary language is Spanish. The given user’s target language is English and is the only language the given user understands. Bob has used his client device to transmit communication 290A that is in a Spanish source language. The translation system 120 translates the communication 290A to a translated version 290B that is displayed to the user along with the communication 290A. For example, the translation system 120 may determine the translation should be provided based on Bob not understanding Spanish and may determine the translation should be from Spanish to English based on determining the source language and the target language (*e.g.*, based on various signals as described herein). The given user is able to create an appropriate reply 280A based on the translated version 290B. In some situations, the translation system 120 may translate the reply 280A to Spanish for “Bob” and provide the Spanish version for display to “Bob” on his client device (*e.g.*, if Bob does not understand English).

As in FIG. 2A, in FIG. 2B “Bob” has used his client device to transmit communication 290A that is in a Spanish source language. However, the translated version 290B of the communication 290A is automatically displayed to the given user in FIG. 3 without simultaneous display of the original communication 290A (whereas both were simultaneously displayed in FIG. 2A). A selectable option (“click [here](#) for original) may be selected by the given user to enable the given user to view the original Spanish language communication (*e.g.*, it may be displayed along with the translated version 290B – or may replace the translated version 290B).

FIG. 3 illustrates an example dialog between a given user (“You”) of the client device 106<sub>1</sub> and another user (“Bob”). In this example, Bob’s primary language is Spanish and the given user’s target language is Spanish and/or Spanish is a well understood language of the given user (in contrast to FIG. 2, where English was the only understood language). Bob has used his client device to transmit communication 390A that is in a Spanish source language. The translation system 120 does not translate the communication 390A based on determining that the source language of the communication 390A is Spanish and that Spanish is understood by the given user. The given user creates an appropriate reply 380A that is also in Spanish.

FIG. 4A illustrates an example dialog between a given user (“You”) of the client device 106<sub>1</sub> and another user (“Bob”). In this example, Bob’s primary language is Spanish. Also, in this example the given user’s target language is English and Spanish is also an understood language of the given user. Bob has used his client device to transmit communication 490A that is in a Spanish source language. The translation system 120 does not automatically present a translated version of the communication 490A based on determining that the source language of the communication 490A is Spanish and that Spanish is understood by the given user. However, the translation system 120 does provide a selectable option to translate a subset of the communication 490A (the selectable subset is indicated with underlining). In some situations, the translation system 120 selects that subset based on one or more signals. In response to user selection of the selectable option, a translation 490B of the subset is presented to the given user.

FIG. 4B is similar to FIG. 4A. However, the displayed communication is presented with the subset of the communication underlined and the translation of the underlined portion provided in parentheses “(How are you?)”. In other words, the translation of the subset is presented without requiring the user to first select the subset.

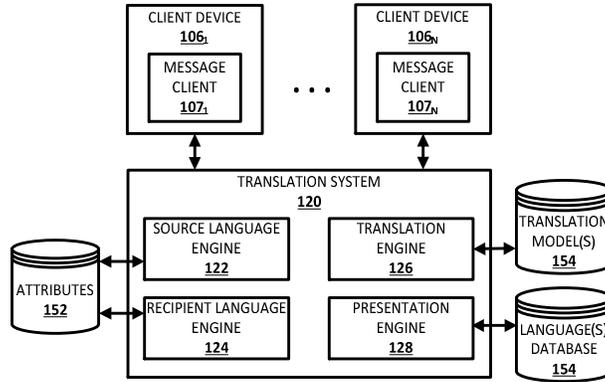


FIG. 1

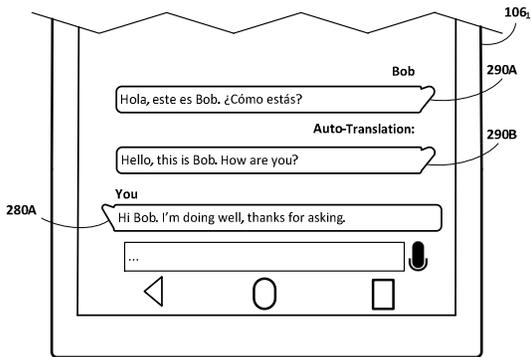


FIG. 2A

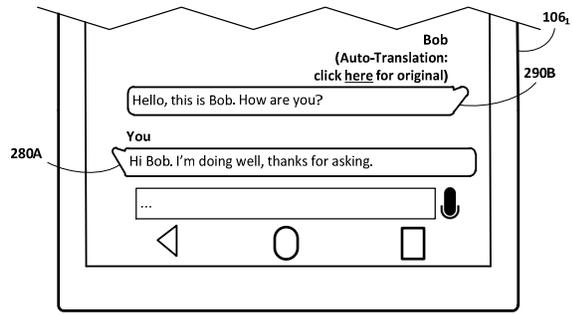


FIG. 2B

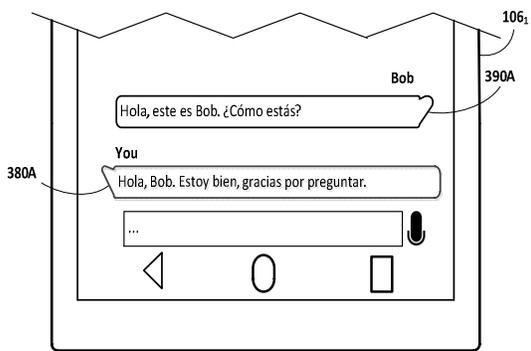


FIG. 3

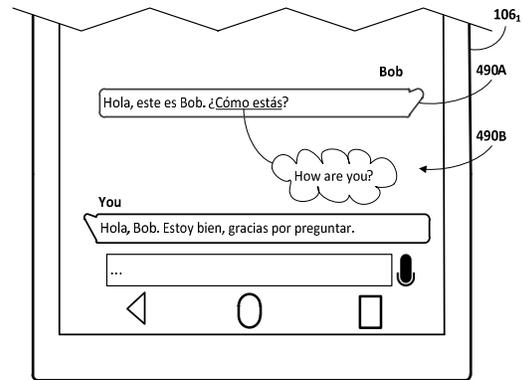


FIG. 4A

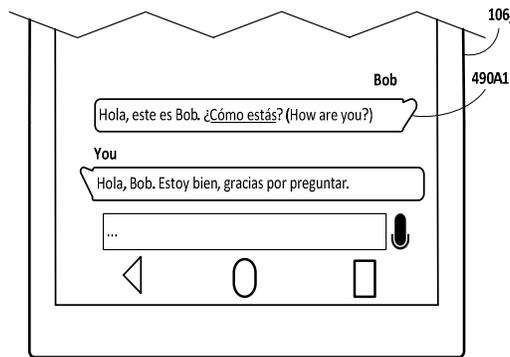


FIG. 4B