

Book review

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**Kenny, Dorothy, ed. 2022. *Machine translation for everyone: Empowering users in the age of artificial intelligence*. Translation and Multilingual Natural Language Processing 18. Berlin: Language Science Press**

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*Machine translation for everyone: Empowering users in the age of artificial intelligence* is the 18<sup>th</sup> and most recent contribution in the book series *Translation and Multilingual Natural Language Processing* published by the open-access publisher Language Science Press. It is an edited volume that contains nine chapters by 11 authors, including editor Dorothy Kenny, that form a comprehensive guide for using machine translation (MT). As Kenny explains in the Introduction, it is aimed both at casual, everyday users of MT, as well as professional translators and translators in training. The book is predicated on the idea that all MT users should possess a certain level of "MT literacy" (Bowker and Ciro 2019, 32), depending on how they intend to use the technology. Accordingly, the topics range from more general chapters, which introduce the reader to the basic concepts of machine translation and the relevant skills used to maximize the quality of its output, to those discussing complex issues such as the ethical considerations surrounding MT or the integration of MT into language learning. This volume is one of the outputs of the Erasmus+ project entitled "MultiTraiNMT: Machine Translation training for multilingual citizens". It is supplemented by the exercises and activities accompanying each chapter, as well as the interactive MutNMT platform, which allows users to learn about custom MT systems.

In Chapter 1 (pp. 1-22), Olga Torres-Hostench sets the stage by giving a rich factual overview of the state of multilingualism in the EU, taking a critical approach towards certain policies that have the goal of increasing linguistic diversity. Furthermore, the author points out that the linguistic diversity of the EU currently relies on the language policies of each member state, which are often contentious



because they fail to protect regional and minority languages. At the same time, Torres-Hostench argues, these policies completely ignore the effect of migrations on multilingualism, thus failing to protect the language rights of migrant groups. On the other hand, the citizens of the EU have the right to communicate with its institutions in any of the 24 official languages, as well as read legislation that is relevant to them in these languages. In order to make this possible, the Directorate-General for Translation has been increasingly relying on machine translation, and the author suggests that the rising quality of MT output not only enables an increase in the quantity of translated documents, but that it is also a promising venue for securing the representation of regional and immigrant minority languages. Torres-Hostench also criticizes the “mother language plus two” policy as being overly one-dimensional, demonstrating that, even though a vast majority of secondary-level pupils study a foreign language, not nearly as many attain the expected or desired level of competency. The proportion of languages studied as a foreign language in schools is another problematic aspect highlighted in this chapter; the popularity of English among pupils far outweighs that of other languages, followed by French, German, and Spanish. This disbalance, along with the role that English as a Lingua Franca plays in the internationalization of universities, leads the author to wonder whether European multilingualism is being substituted for monolingualism at the peril of many underrepresented local languages. Torres-Hostench again sees the solution to both of these issues in MT, recognizing it as a great potential for supporting language learning, as well as policies with the aim of transforming universities into places that allow different languages to co-exist.

Chapter 2 (pp. 23-50), authored by Kenny, explains machine translation by contrasting it to human translation, and therefore serves as a general introduction into the volume’s topic, while also inviting readers less familiar with translation studies and linguistics to consider ideas such as equivalence in translation or cognitive processes involved in understanding text. After describing how human and machine translation differ, the author gives a brief history of machine translation. The author further emphasizes that even modern MT systems depend on human translators because they use human translations as training data. Kenny adds that good MT cannot exist without human translations that serve as the gold standard for its evaluation, and furthermore, because understanding the differences

between the kinds of mistakes humans and machines make helps detect and correct MT errors. The author provides a simplified explanation of how neural machine translation works, which is later expanded upon in Chapter 7.

In Chapter 3 (pp. 51-80), Caroline Rossi and Alice Carré build on the basic concepts explained by Kenny to guide readers through the evaluation of machine-translated texts. The authors take a pragmatic approach to evaluation, which means they consider the quality of a translation to be inextricably linked with its fitness for purpose; depending on the domain or genre, different levels of quality will be acceptable, or rather, different human assessment criteria will take precedence. Rossi and Carré give the example of instruction manuals, whose usefulness depends on their accuracy, rather than fluency. The authors describe different ways in which humans evaluate translations and suggest that those who do not have the time to evaluate large amounts of samples may find automatic evaluation and evaluation via measuring post-editing effort more useful. This is followed by a demonstration of how different automatic evaluation metrics work, and core concepts behind automatic evaluation are explained through a comparison of three such metrics – BLEU, ChrF3, and TER.

Chapter 4 (pp. 81-104) shows readers how they can influence MT output quality by pre-editing source texts. Sánchez-Gijón and Kenny discuss how controlled language rules and writing for a global audience can improve the translation product. Domain and genre once again prove to be important factors, in this case determining how pre-editing rules will be applied. The authors also stress that pre-editing guidelines can be completely different depending on the type of MT system. While the errors of earlier, rule-based and statistical MT systems could be curtailed by controlled language rules due to their systematicity, modern neural MT systems are at risk of producing fluent, but inappropriate texts in respect to the communicative function of the source text, a problem that is mitigated through writing for a global audience. This discussion is followed by the authors' proposal for a set of pre-editing guidelines that they divide into three categories: lexical choice, structure and style, and referential elements. Finally, the authors claim that pre-editing contributes to a less arduous post-editing process, which Sharon O'Brien tackles in the next chapter (pp. 105-120).

O'Brien introduces readers to post-editing guidelines which should help users spot and fix MT errors. The author problematizes the distinction between light post-editing, used to improve the comprehensibility of the text, and full post-editing, which is used to ensure that the final text is fluent, arguing that it is not always clear what constitutes essential fixes. One of the examples O'Brien uses demonstrates that sometimes it may be necessary to introduce many edits in order to make a sentence merely semantically correct. Another example shows that major errors that impact comprehensibility can also be of a syntactical and grammatical nature. The author further stresses that post-editing can be cognitively demanding, by explaining the traditional interface used for post-editing: translators working with computer-assisted translation (CAT) tools have to perform additional functions besides translating, one of them being revising fuzzy matches from translation memories, and another being post-editing MT suggestions while keeping post-editing guidelines in mind, all usually under a tight time constraint. O'Brien then familiarizes the reader with two emerging interfaces for post-editing that may present a solution to these issues: adaptive and interactive MT, designed so that MT systems can learn from their mistakes and improve their output in real time. The chapter also deals with how post-editing effort is measured, explaining simpler methods, such as measuring time, and more advanced ones, such as eye-tracking. The author concludes by stating that post-editing is a valuable skill for both translators and everyday MT users.

In Chapter 6 (pp. 121-140), Joss Moorkens presents the readers with a selection of the most pressing ethical questions related to machine translation. The author shows that the ethical use of MT concerns everyone from developers to language service providers, but also casual users of free online machine translation (FOMT) systems. Moorkens addresses the question of the ownership of translation data, highlighting the disadvantageous position of translators, mostly working as freelancers, who donate data to clients in the form of updating their translation memory databases, while not receiving compensation for when their work is used in MT training. Translators also rarely have any choice in (or knowledge of) how their data is used, which may lead to them unwittingly working towards goals that they do not support. The author warns that the personal data of translators can also be at risk and that translation companies will not necessarily protect their interests, stating that data breaches have been covered up in the past in order to avoid costly

GDPR fines. Additionally, data leaks can also occur through the careless use of MT itself, and all users should be careful when they enter data into FOMT systems. On a related note, the author points out that translators may be held accountable if MT errors cause injury or loss. Moorkens also criticizes the overhyped claim that MT has reached human parity, saying that this idea is based on automatic evaluation scores and crowd work, both of which rarely align with the judgment of professional translators. Moorkens believes MT should be incorporated into the codes of ethics of many translators' associations, with rules that would describe the ethical behaviour between developers and users, translation agencies and freelance translators, but also translators and clients. The author then raises some concerns about sustainability and translation, emphasizing that working conditions, worsened by the negative effects of the automatization of the profession, may lead to a shortage of quality multilingual data. Another important question regarding sustainability is the effect of greenhouse emissions produced while training neural machine translation systems on the environment. The author concludes by presenting some underdeveloped research focuses: de-biasing MT systems and building systems for low-resourced languages.

The aim of Chapter 7 (pp. 141-164), written by Juan Antonio Pérez-Ortiz, Mikel L. Forcada, and Felipe Sánchez-Martínez, is to provide a more detailed explanation of how neural machine translation works, a topic which is less extensively covered in Chapter 2. The chapter is highly informative for anyone who wants to know more about neural machine translation systems, and it does not require any knowledge of advanced mathematical concepts or machine learning. The authors explain how artificial neurons come together to form the layers of deep artificial neural networks, which are organized in such a way that the output of one layer informs the work within another layer. This process is repeated from one layer to the next until the solution to the task is found, or in the case of MT, a translated segment or sentence is formed. The authors then describe the trial-and-error process of training a neural network with a set of examples, which ends when the network produces an output that most closely resembles the examples in the training corpus. In doing so, the authors define core concepts such as *learning algorithms*, *the loss/error function*, *learning rate*, *generalization*, and others, in an accessible and understandable way. The chapter continues with a well-exemplified explanation of word embeddings – vectors that represent words – and how they relate to other

words. The success of neural machine translation systems relies on words that appear in similar co-texts receiving similar embeddings through training. However, the authors state that researchers have moved onto training systems to distinguish between different meanings of one word through the use of *attention vectors*, which are subsequently explained, in order to compute *contextual word embeddings*. This is followed by a depiction of two types of neural network architectures: transformer and recurrent models. The chapter concludes with a presentation of some convenient modifications to neural machine translation systems that engineers have devised to maximize the quality of the output, including sub-word splitting, stopping criteria, and beam search.

Continuing on the subject of neural machine translation systems, in the following chapter (pp. 165-186), Gema Ramírez-Sánchez encourages readers to apply everything they have learned thus far by customizing their own MT system. The author portrays MT customization as an interdisciplinary field in which engineers learn to tweak the technology to get better results, linguists learn to curate the training data, while translators integrate adaptive MT systems into their workflow. Ramírez-Sánchez sums up MT customization with an illustrative allegory, inviting the reader to imagine how they would translate the communication between two aliens speaking different languages, if all they had was a large amount of in-domain and general texts in both languages, and a glossary. The author explains that the process of training a custom MT system occurs in two phases: feeding the system all kinds of data regardless of domain, and then, once the system becomes proficient enough, training it with texts in one domain. The following sections deal with customization through data, which is available through professional training kits, and the more advanced approach of customization through techniques. The rest of the chapter serves as a guide on how to obtain and organize data and use training kits, which prepares the readers to test their newly learned skills in the MutNMT environment<sup>1</sup>.

In the closing chapter, Carré, Kenny, Rossi, Sánchez-Gijón, and Torres-Hostench make a case for including machine translation into language learning. They provide an overview of the existing literature on the subject, from studies

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<sup>1</sup> However, readers should be aware that the default role assigned to new users in the MutNMT environment does not offer the ability to train neural engines.

advising against the use of MT in classrooms for fear of plagiarism and even degradation of language competencies, to those claiming that MT can be integrated as a valuable resource. The authors of this chapter disagree with the notion that MT promotes cheating, taking the view that there is nothing inherently plagiaristic in the tool itself, but that cheating comes from students either not knowing the rules of a language-learning setting, or simply consciously disobeying them. The authors cite some studies that found MT can help students with achieving short-term goals, such as writing compositions in their L2, while noting that the jury is still out on its long-term effects in language development. They add that MT seems to be more useful to learners who have had prior training and exposure to the technology, but also to those who already have a certain level of proficiency in their L2. In the next section, the authors sketch out some situational parameters that should help learners decide when to use MT. They then compare MT to other digital resources already used in classes, dictionaries and corpora, and list some advantages and disadvantages of each. Finally, the authors propose that learners should analyse errors in the MT output as an exercise that will not only teach them the aspects in which MT systems fail, but also shine a light on which mistakes in the output the learners are able to recognize.

In this last chapter, the multidisciplinary of the book becomes especially apparent. It is clear that the authors participating in the volume find that there are many unexplored ways to incorporate machine translation into people's lives, and that such an inclusion benefits from perspectives from all sorts of fields. An endeavour such as introducing MT into classrooms should, after all, be informed by findings in a wide range of scientific disciplines. In this way, the book has a two-fold purpose: it is not only a how-to guide for machine translation, but also a motion for thinking creatively about how machine translation can be of use in a multilingual society.

In conclusion, this volume appeals to a wide readership. Novice and experienced translators alike can learn from it and hone their profession in an increasingly automatized industry that is leading many of them to take on new roles and acquire new skills. The chapter on ethics is particularly illuminating for new translators because it raises awareness of the ethical conundrums translators often find themselves in, which have only gotten more complex since the advent of MT.

Translation scholars and linguists will also find the book interesting because it demonstrates how research can contribute to shaping language policies and concrete practices. The practical nature of the book is further reinforced by the accompanying interactive exercises which can be of use to translation teachers and students that are keen to take the advice of the authors on the educational prospects of MT. Furthermore, the platform MutNMT and Chapter 8 of this book complement each other very well and represent a step in the right direction for what this book is ultimately trying to promote – an MT-literate society.

## **References**

Bowker, Lynne and Jairo Buitrago Ciro. 2019. *Machine Translation and Global Research: Towards Improved Machine Translation Literacy in the Scholarly Community*. Bingley: Emerald Publishing Limited.