



# Chapter 4

## Strengths and Limitations of Machine Translation and Human Translation

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### ABSTRACT

*The development of machine translation (MT) has profoundly reshaped the translation industry, which reignites debates about its relationship with human translation (HT). This chapter provides an exploration of the strengths and limitations inherent in MT and HT and emphasizes their complementary rather than competitive nature. First, the progression of MT is explored. Comparative analysis from multiple perspectives. MT excels in rapidly producing consistent translations of standardized content, yet it persistently struggles with complex, culturally embedded language, implicit meanings, and high-stakes specialized contexts. Human translation remains indispensable in scenarios demanding deep cultural insight, interpretive creativity, domain-specific precision, and ethical discernment. All of these underscores the continuing necessity for human translators. Acknowledging these complementary roles, the chapter further examines the rise of hybrid translation models. Lastly, this chapter concludes with the future tendencies within a collaborative framework.*

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## 1. INTRODUCTION

Translation serves as a crucial bridge across languages and cultures in the globalized world. The emergence of machine translation (MT) has changed the field, as it allows for rapid, large-scale text conversion at minimal cost. The discussion of the relationship between MT and human translation (HT) has been a heated topic as early as the beginning of the 21st century. Instead of competing with human translators, machine translation has been regarded as the complementary for quite a long time (Hutchins, 2001). With the introduction of neural machine translation (NMT) and artificial intelligence (AI)-driven models, MT has become more sophisticated. The landscape of translation has dramatically changed, since the generative AI-empowered MT offers greater fluency and coherence than earlier systems. Despite these developments, machine translation still faces numerous linguistic problems, especially when deep context understanding, cultural sensitivity, and pragmatic accuracy are required. These ongoing limitations have led scholars to reconsider the relationship between machine translation (MT) and human translation (HT) in the context of recent technological shifts (Calvo-Ferrer, 2024). In order to examine recent developments in the age of AI, this chapter revisits the relationship between MT and HT, particularly in terms of their strengths and limitations, as well as the future of translation.

The chapter first reviews how machine translation has evolved historically, from its earliest forms to recent advances driven by AI (Section 2). Next, it compares machine translation with human translation from four main angles (Section 3). Section 4 addresses the increasing adoption of hybrid translation methods and considers their potential future development. Finally, the chapter concludes by suggesting possible future directions and exploring their broader significance.

## 2. THE EVOLUTION OF MACHINE TRANSLATION

Although the initial endeavours in machine translation were marked by high expectations, the early results were limited in terms of both accuracy and practical application (Hutchins, 2001). MT has been largely improved after decades of development. The evolution through diverse methodologies illustrates advancements in linguistics, computer science, and artificial intelligence. The progression from rule-based machine translation (RBMT) to statistical machine translation (SMT), and subsequently to advanced neural machine translation (NMT) and Generative AI-powered machine translation, illustrates a series of incremental advancements and technological innovations (Koehn, 2010). This section mainly discusses the

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