


Chapter 3


Evolution of AI in Interpretation: From Traditional Approaches to Real-Time Solution

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ABSTRACT

Traditional methodologies have become real-time solutions thanks to AI in interpretation, improving cross-language communication. Traditional approaches like consecutive and simultaneous interpretation relied on human skill, which was effective but slow and inaccurate. Neural machine translation (NMT) and deep learning have made context-aware, scalable, and efficient language processing possible. AI interpreters now capture complex language, idioms, and cultural subtleties, enhancing translation quality. Managing cultural sensitivity and algorithmic bias requires a hybrid approach that blends AI and human control. This integration preserves human communication while using AI's speed and efficiency. As AI evolves, its interpretation role will be crucial to global communication and understanding.

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1. FOUNDATIONS OF INTERPRETATION TECHNOLOGY

1.1 Historical Overview of Interpretation Techniques

Human interpretation has developed over time to accommodate varied societies' complex communication needs (Zalasiewicz et al., 2021). Cross-linguistic communication relied on human-based translation, successive interpretation, and simultaneous interpretation before contemporary technology changed the picture. Each strategy had pros and cons in different situations.

Ancient civilizations used human-based translation. Aslanyan, 2021; Scorpo, 2023) renowned intellectuals and diplomats translated religious, literary, and legal materials to bridge civilizations. Their work promoted regional knowledge sharing, worldwide trade, and cultural exchange. Except for textual content or long-term contexts, human translation was time-consuming.

In the early 20th century, successive interpretation allowed interpreters to deliver spoken content in real time in diplomatic and legal settings (Pöchhacker, 2022; Tipà & Moratto, 2024). In successive interpretation, the speaker stops to let the interpreter deliver each message piece. The accuracy of this method makes it ideal for smaller settings that require fast involvement. It doubles communication time, making it unsuitable for fast-paced events.

Developed during World War II for the Nuremberg Trials, simultaneous interpretation was a major advance (Baigorri-Jalón et al., 2021). Interpreters immediately translate the speaker's message without interruptions. This method demands talent and concentration, typically requiring interpreter teams to avoid cognitive fatigue. Multilingual environments like the UN, where fast information flow is vital, adopted simultaneous interpretation. It works, but it requires specific equipment and trained staff.

These classical methods addressed accuracy, immediacy, and cultural sensitivity, laying the groundwork for modern interpretation technology (Zhao et al.2024; Lim, 2024). They also enabled the development of AI in interpretation, which tries to mimic and improve human talents. AI has transformed interpretation from human-dependent to real-time, automated solutions, from rule-based systems in the 20th century to machine learning and neural networks. This chapter describes AI's evolution from supporting existing approaches to pioneering instantaneous, scalable language interpretation.

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