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(57) Abstract :

Abstract This invention is an English–Hindi Machine Translation System developed using deep learning techniques to provide accurate, fluent, and context-aware translation suitable for Indian linguistic requirements. The invention operates in the fields of artificial intelligence, natural language processing, and neural machine translation, and is intended to overcome the limitations of conventional translation approaches by leveraging advanced neural architectures capable of learning complex language patterns from large-scale bilingual data. In India, a substantial amount of digital content, official communication, educational material, and public information is predominantly available in English, creating accessibility challenges for Hindi-speaking users. The invention addresses this gap by enabling efficient translation of English text into Hindi while preserving semantic meaning, grammatical correctness, and cultural relevance. By doing so, the system supports improved access to information and promotes digital inclusion in a multilingual environment. The proposed system utilizes neural machine translation models incorporating encoder–decoder architectures, attention mechanisms, and transformer-based frameworks. These deep learning models are trained on extensive English–Hindi parallel corpora sourced from diverse domains such as governance, education, healthcare, legal documentation, and digital media. The use of attention and self-attention mechanisms allows the system to capture long-range dependencies, resolve contextual ambiguities, and perform effective word sense disambiguation, resulting in more natural and coherent Hindi translations. The invention further emphasizes scalability and adaptability, enabling deployment across web platforms, mobile applications, and enterprise systems with support for real-time translation. Optimization techniques ensure consistent performance and translation quality even under high-volume usage. Additionally, the system is designed to be extensible, allowing future integration of additional Indian languages and domain-specific customization. Overall, the invention provides a robust, intelligent, and India-centric English–Hindi Machine Translation System that enhances cross-lingual communication, improves accessibility to digital resources, and contributes to the advancement of language technology and digital empowerment in a multilingual society.

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