LLMind to Enhance Diagnostic Decision-Making in Mental Health: Synergy Between AI Language Models and Clinical Expertise

Friday, September 12, 2025 12:00 PM (15 minutes)

Background and aim: This study investigates the application of large language models (LLMs) as collaborative tools for mental health professionals, focusing on their integration with the ICD-11 framework. At the intersection of artificial and human cognition, we introduce LLMind Chat, an AI-driven interface to augment clinical reasoning by combining real-time retrieval of ICD-11 guidelines with advanced natural language processing.

Methods: Built on a Retrieval Augmented Generation (RAG) architecture using Gemma 2 (27B parameters), the system dynamically synthesizes diagnostic criteria, case histories, and evidence-based insights to support clinicians in complex decision-making scenarios. LLMind Chat's validation framework involved comparative analysis against the DSM-5-TR Clinical Cases manual, supplemented by expert clinicians'evaluations.

Results: Results indicate strong alignment between the model's diagnostic suggestions and clinical judgments (76.1% accuracy with moderate inter-rater agreement) particularly in cases involving anxiety-related and psychotic disorders-areas where ICD-11's approach benefits from computational precision. The tool prominently reduced classification errors most in disorders with overlapping symptomatology (e.g., trauma-related conditions).

Conclusions: By emphasizing the collaborative potential of AI rather than autonomous diagnosis, this work underscores how LLMs can extend clinicians'cognitive capacities while preserving human oversight. The system's dual chat modes -interactive case exploration and validation feedback- create a bidirectional learning loop refining algorithmic performance and clinical engagement. As mental health care navigates the complexities of modern classification systems, LLMind Chat exemplifies the transformative role of AI in bridging technological capabilities with psychological expertise, fostering a new paradigm where artificial and human intelligence coexist to enhance diagnostic accuracy and patient outcomes.

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