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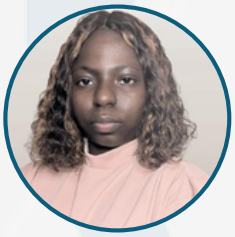

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Dynamic Music Recommendations: Tailoring Playlists to User Moods and Activities with Multi-Agent Systems

Abstract: This survey article presents a thorough examination of progress in Dynamic Music Recommendation Systems (DMRS) utilising Multi-Agent Systems (MAS) based on Large Language Models (LLMs). With music streaming platforms experiencing unprecedented user demand, traditional recommendation techniques often fall short in capturing and adapting to user-specific factors, such as mood, context, and activity, resulting in diminished user satisfaction. Recent studies have underscored the limitations of collaborative filtering and sequence modelling, as well as the potential of reinforcement learning and multi-agent approaches for enhancing user satisfaction.

This study evaluates several emerging methodologies. The inclusion of personalised popularity awareness in sequential music recommendations demonstrates promising improvements in balancing new and familiar content while accounting for unique music consumption habits, such as repeated listening.
Reinforcement learning frameworks, particularly simulation-based approaches, allow recommendation systems to evolve playlists dynamically, aligned with user satisfaction metrics through simulated environments and real-time feedback. In addition, emotion-aware recommendation systems incorporating real-time emotional data improve user engagement by tailoring music recommendations to the user's current mood, resulting in a more immersive experience.

We propose a framework that synergises the capabilities of multiagent systems and LLMs to address these challenges by assigning specialised agents to tasks such as mood detection, context adaptation, and playlist personalisation. Through this multiagent design, the system adapts dynamically to user preferences and contextual changes. This survey consolidates the current approaches in sequential recommendation, reinforcement learning, and emotion-aware music recommendation, suggesting a path forward for implementing highly personalised, adaptive DMRS using LLM-powered agents. The insights gained here provide a foundation for future research on LLM-based recommendation systems that respond to complex real-time user needs.

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Biography: Grace Farayola is a dedicated and skilled data scientist with five years of experience leveraging data to drive meaningful insights and improve decision-making across various industries. Proficient in Python, SQL, Tableau, and Power BI, Grace specialises in data analysis, machine learning, and data visualisation. Her expertise includes analysing complex datasets, building predictive models, and implementing data-driven strategies that optimise business processes and enhance operational efficiency. Grace's experience in fraud analysis has been particularly impactful as she has successfully identified patterns, mitigated risks, and bolstered fraud detection systems to safeguard financial assets.

With a passion for continuous learning, Grace remains at the forefront of advancements in data science and artificial intelligence, ensuring that her skill set evolves with the latest industry innovations. Her recent work has included predictive modelling for COVID-19 cases, sentiment analysis for financial data, and exploratory data analysis on job layoffs, showcasing her commitment to using data for real-world problem-solving. Grace's ability to communicate complex findings effectively and her dedication to upskilling make her a valuable asset, consistently delivering actionable insights that drive positive outcomes for organisations.

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