Applications of LLMs to Planning

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Abstract

This research focuses on the development of a personalized event recommendation system that integrates Large Language Models (LLMs) with calendar data to cater to the residents of Berkeley. The system leverages calendar integration for dynamic event filtering, allowing users to receive recommendations tailored to their schedules and availability. LLMs are employed to analyze user preferences, such as interests, budget, and location, and to generate personalized, contextually relevant event suggestions. By applying this technology within a diverse and dynamic event ecosystem, the system aims to enhance local engagement and simplify event discovery, fostering stronger community involvement and user satisfaction.

Introduction

Berkeley residents have access to a vibrant array of events, yet finding activities that align with individual schedules, interests, and preferences can be a daunting task. To address this, this research develops a system that integrates LLMs and calendar Application Programming Interfaces (APIs) to provide personalized event recommendations. By drawing event data from platforms such as Cal Events, which offers a diverse range of categories including featured events, academic activities, lectures, sports, performing arts, films, exhibits, and more, the system dynamically filters options based on user availability and preferences. This approach simplifies event discovery while enhancing user engagement with the Berkeley community, fostering greater participation in local activities and creating a tailored experience for residents.

Methods

To streamline event discovery for Berkeley residents, we developed a system that integrates LLMs with calendar APIs for personalized recommendations. Event data from sources like Cal Events and local databases is aggregated, cleaned, and standardized into a unified schema. LLMs analyze user preferences—such as budget, location, and interests—using tailored prompts to generate curated recommendations ranked by relevance.

Calendar integration aligns recommendations with user schedules and location constraints through temporal and spatial filters. The modular architecture includes category-specific nodes (e.g., food, music) managed by a dispatcher agent that invokes relevant workflows based on user input. Tools like Python, Pandas, and Gradio were used for implementation, with Gradio enabling an interactive interface for exploring and refining recommendations.

Acknowledgement

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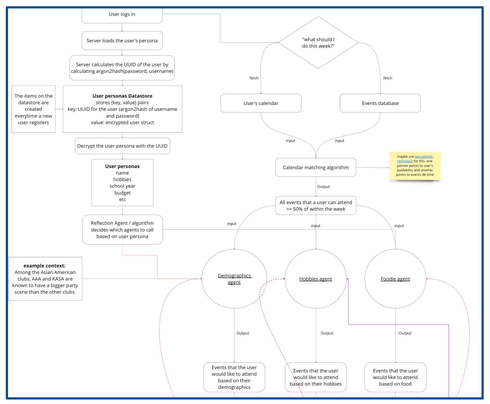
Findings

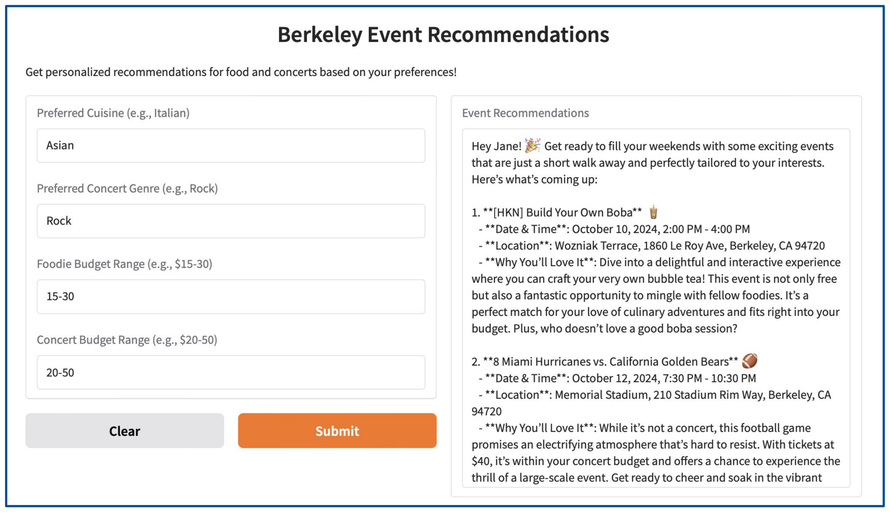
The system architecture is designed to seamlessly integrate user preferences, constraints, and feedback into a dynamic pipeline for personalized event recommendations. The process begins with user input, capturing details such as interests, budget, and availability. This data is processed through a pipeline consisting of event ingestion, LLM-driven analysis, and calendar matching. Event ingestion involves gathering and standardizing data from platforms like Cal Events, which features a diverse range of events. Large Language Models (LLMs) analyze user preferences to identify relevant events, while calendar integration ensures recommendations align with the user's schedule and location constraints. The output is a ranked list of tailored event suggestions. Implementation relies on Python for the core logic, Pandas for data manipulation, and Gradio for a user-friendly interface. LLM APIs are central to processing and generating recommendations, creating a system that efficiently bridges user needs with Berkeley's rich event offerings. Our findings were that an agentic structure for LLMs (that uses slightly cheaper AI models) performs the same as just prompting a more expensive LLM with all of the information.

Discussion

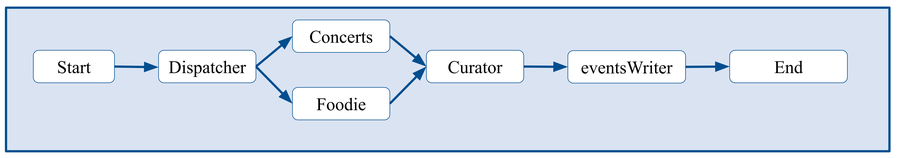
This study introduces a personalized event recommendation system designed to enhance event discovery and community engagement for Berkeley residents. By integrating user preferences—such as interests, budget, and availability—the system dynamically filters and tailors recommendations. Event data is aggregated from platforms like Cal Events, encompassing diverse categories such as lectures, performances, and exhibits. Leveraging LLMs, the system analyzes preferences and generates contextually relevant suggestions. Calendar integration ensures recommendations align with user schedules and locations for maximum usability. Built with Python, Pandas, Gradio, and LLM APIs, the system combines modern computational tools with user-centric design. This approach simplifies event discovery, fosters participation in Berkeley's cultural and academic activities, and highlights the potential of AI-driven solutions for strengthening community connections.



Segment of Detailed Workflow



User Interface



Simplified Agentic Architecture

Limitations

This study introduces a personalized event recommendation system designed to enhance event discovery and community engagement for Berkeley residents. Event data is aggregated from platforms like Cal Events, encompassing diverse categories such as lectures, performances, and exhibits. However, there are limits to this data set at the moment, as it doesn't encompass all event on campus due to data collection time constraints and the lack of a centralized data source.

Leveraging Large Language Models (LLMs), the system analyzes preferences and generates contextually relevant suggestions. Calendar integration ensures recommendations align with user schedules and locations for maximum usability. Built with Python, Pandas, Gradio, and LLM APIs, the system combines modern computational tools with user-centric design, creating a simple prototype.

Despite some of these limitations, our product is a great start for simplifying event discovery and highlights the potential of AI-driven solutions for strengthening community connections.

Future Research

The developed system successfully deployed a prototype capable of delivering personalized event recommendations tailored to individual preferences and schedules. The prototype demonstrated robust performance across various event categories, including food events such as vegan festivals and open mics, music events like concerts and community performances, and general activities such as voting awareness events and career panels. For the future, we hope to collect user feedback to better align suggestions with user interests and constraints. Furthermore, we hope to continue iterating on the agentic architecture to optimize these recommendations. Our current results and user persona's highlight the system's potential for fostering greater engagement with local events and enhancing user experiences. We are excited about the possibility to continue expanding on this endeavour and providing a platform students can rely on for event recommendations in Berkeley.