**Current Challenges and Resolutions**

The project is progressing well, but key challenges and risks remain, requiring proactive mitigation strategies.

* Backend and API integration delays could create bottlenecks, so API development for critical functionalities is being prioritized alongside parallel frontend integration.
* Cloud deployment has yet to begin, posing potential risks to testing and user feedback; thus, infrastructure setup will commence immediately after beta testing.
* Data enrichment has proved to be challenging due to LLM hallucination in identifying the locale of songs. We have achieved 80% accuracy in generating locale data and are targeting 90–95% accuracy to finalize the task. To improve accuracy, we are integrating track language and lyrics data from public datasets and additional third-party APIs.
* Model latency, particularly in generating real-time recommendations, stems from large model inference, slow API calls, and inefficient database queries. To address this, we are using quantization, pruning, asynchronous API calls, caching, and database indexing to optimize performance.

**Potential Risks and Mitigation Strategies**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Impact** | **Mitigation Strategy** | **Status** |
| **Cloud Deployment Delays** | Could affect overall project timeline | Start cloud infrastructure setup in parallel with UI-backend integration | 🔴 Not Started |
| **Database Queries** | Slow application response time | Optimize indexing, caching strategies, and database query execution | 🟡 In Progress |
| **Context aware chat feature** | Limited ability to provide better recommendations for users | Use langchain framework to create context aware bot | 🟡 In Progress |
| **Scope Creep in LLM Development** | Overextending features could delay MVP | Prioritize core chat functionalities and phase additional enhancements | 🟡 In Progress |
| **Testing** | Could impact quality assessment and issue resolution | Start running test cases in parallel to development efforts | 🟡 In Progress |
| **Feedback Implementation** | Delays in adapting user feedback could slow down iteration cycles | Prioritize critical feedback first and phase out minor adjustments over future releases | 🟡 In Progress |

**Materialized Risks and Resolutions**

One of the initial challenges was slow LLM processing of locale data. We addressed this through batch inferencing to avoid excessive processing time.

Another challenge was frontend development complexity, where the UI's intricate design and multiple interactive components led to minor delays. To overcome this, the team prioritized essential features and streamlined component interactions, ensuring smooth development without compromising functionality. This issue did not impact the critical path.

A pertinent risk is the time allowance for cloud deployment as there could be emerging issues that impact final testing and impact the critical path. Since deployment has not yet begun, the plan is to initiate this process as soon as the backend integration is 90% complete.

**Scope Creep & Management**

We need to guard against the expansion of LLM-based chat features beyond the MVP scope as this could lead to additional complexity and extended development time.

Similarly, additional locale enrichment of metadata using external APIs beyond what is required for the first release may increase processing demands and delay deployment, hence the team has proposed a target of 90% enrichment.

Furthermore, potential changes in UI based on feedback could result in unexpected rework, affecting both frontend development and backend integration.

The core scope boundaries have been defined, and the team has a clear “definition of done”. Any new features must be categorized as "Nice-to-Have" to ensure that the core scope is covered first. Additionally, all scope changes are assessed to ensure they align with project timelines and resource availability, preventing unnecessary strain on development efforts.

Through this the project remains focused on schedule while leaving room for future enhancements if time allows.