

PERSONALIZED MUSIC RECOMMENDATION SYSTEM

Week 5 Status Report

MSDSP 498 - Capstone

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## Project Status Summary

Overall, the project is progressing well, with key milestones being achieved as planned.

The team has completed the data enrichment, basic frontend development, and database integration. This week we are working on integrating frontend and backend, app deployment, and analysing model performance.

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## ****Progress against Plan****

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| --- | --- | --- | --- | --- |
| **Phase** | **Planned Tasks** | **Current Status** | **Next Steps** | **Comments** |
| **Data Collection** | Collect users' last 50 songs dataset | ✅ Completed | Train Models. | Successfully gathered user interaction data |
| **Data Preprocessing** | Clean and preprocess 1 million song dataset | ✅ Completed | Add Locale using LLM. | Data ready for enrichment |
| **Data Enrichment** | Fill missing locale information for songs | ✅ Completed | Review and refine locale data to ensure accuracy | Initial training dataset is completed. |
| **Database Setup** | Create SQL database for user login and preferences | ✅ Completed | Develop functions for CRUD operations | All inputs and app data has been migrated to a database. |
| **Frontend Development** | Build React UI | 🟡 In Progress | Interact with backend with HTTPS to populate data | Pages have been created for each feature |
| **Backend Development** | Implement recommendation engine | 🟡 In Progress | Integrate API calls, model training and inference. | Developing APIs |
| **Testing** | Create Test cases. | 🟡 In Progress | Start working on proposed test plan and user feedbacks. | Pending app deployment |
| **Deployment** | Deploy app to cloud. | 🔴 Not Started | Cloud deployment | Testing and Bug fixes. |

## ****Risks, Issues & Mitigation Plans****

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| --- | --- | --- | --- |
| **Risk/Issue** | **Impact** | **Mitigation Plan** | **Status** |
| **Slow LLM Processing for Locale Data** | Delays in completing data enrichment | Optimize batch size, explore parallel processing | ✅ Completed |
| **UI Development Complexity** | Potential delays in frontend features | Prioritize core features first | ✅ Completed |
| **Cold-Start Problem for New Users** | Reduced recommendation accuracy for new users | Use genre-based or trending song recommendations | 🟡 In Progress |
| **Chat Feature** | Project delays | Development started | 🟡 In Progress |
| **Cloud Deployment** | Project delays | Start immediately after beta app is created. | 🔴 Not Started |
| **Test Cases Creation** | We will not be able to analyze the recommendation accuracy. | Start Parallelly after backend is completed. | 🟡 In Progress |
| **Data Quality** | The data quality will impact the quality of recommendations | Leveraging lyrics APIs and ‘*langdetect’*  package to improve the accuracy of locale information | 🟡 In Progress |

## ****Next Week’s Priorities****

* **Backend Development**

Backend development is progressing as planned. Key APIs have been identified to support seamless frontend functionality, with active development and integration of third-party services like Ticketmaster to enhance user engagement. Exception handling is being implemented to ensure system stability, and overall development timelines remain on track.

* **Model Refinement**

The baseline performance of the MVP needs to be assessed to pinpoint areas for improvement. While current recommendations perform well on the dataset, discrepancies remain in aligning results with user preferences, listening history, and, in some cases, language. These inconsistencies will be analyzed to enhance model accuracy, as personalized recommendations are central to the app's functionality.

* **Integration & Deployment Progress Update**

Initiate the integration of the UI with backend services to ensure seamless API connectivity and data flow. This includes optimizing user interactions with music data. For deployment, we're evaluating cloud infrastructure options, setting up CI/CD pipelines for automated testing and deployment, and configuring security protocols to protect user data. The goal is to achieve a scalable and responsive application to ensure system stability and performance.

* **LLM Development**

We are advancing the LLM-based chat feature, focusing on refining prompts and enhancing context awareness for personalized music recommendations. Efforts include fine-tuning the model to generate relevant, engaging responses that align with user listening habits and preferences. This feature aims to boost user engagement through interactive, dynamic recommendations.

* **Performance Testing**

Initial load testing is underway to evaluate database performance under varying loads. This includes measuring query execution times, optimizing indexing strategies, and ensuring efficient handling of concurrent requests. The focus is on identifying bottlenecks early and enhancing system responsiveness to deliver a seamless user experience.