**Module 5: Milestone 4**

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CS-499

**Milestone 4**

**Introduction**

This milestone gave me the opportunity to focus on the database side of my capstone project and see how it connects to the rest of the application. While the algorithm powers the matching logic, the database is what actually makes the application functional by storing and serving recipe data efficiently. Working with MongoDB for this enhancement pushed me to think about how information is structured, how it can be retrieved quickly, and how to keep it adaptable for future changes.  
**Artifact Description**

The artifact for this milestone is the MongoDB integration in my recipe recommendation web app. The enhancement I implemented was moving recipe and vocabulary data from static JSON files into a MongoDB database, creating schemas to define structure, and setting up a seeding process to populate the database from existing data. The API endpoints were updated to retrieve recipes from the database instead of reading from files, which allowed for better scalability and flexibility.

## **Justification for Inclusion in ePortfolio**

I chose this artifact because database work is a core skill for any software developer, and this enhancement shows my ability to design, implement, and integrate a working database into a full-stack project. The schema design ensures that each recipe is stored with consistent fields for name, ingredients, vector data, and eventually images or instructions. This structure makes it possible to expand the app with minimal disruption. It also demonstrates that I can move beyond simple local file storage and into a real database solution that could be deployed at scale.

## **Course Outcomes Addressed**

This enhancement aligns with the course outcome focused on implementing computing solutions using software engineering, design, and database principles. I planned from Module One to integrate MongoDB into the project, and this milestone brought that plan to life. It also indirectly supports outcomes related to system architecture and data management because it required updating the backend logic to work with asynchronous database calls instead of synchronous file reads.

## **Reflection on the Enhancement Process**

Integrating MongoDB was straightforward in concept but required careful attention to schema design and data consistency. I learned how small mismatches in field names or types could break the search logic. I also had to adjust my thinking to account for asynchronous operations in Node.js, ensuring that API responses were sent only after data was fully retrieved. The seeding process was a useful addition because it made it easy to reset or expand the database without manual entry. Overall, this enhancement improved the maintainability of the app and opened the door for future features like recipe images or user accounts.

## **Conclusion**

Completing this milestone reinforced the idea that a well-structured database is just as important as the application logic. Without reliable and consistent data, even the most efficient algorithms will fail to deliver meaningful results. This step moved my capstone closer to being a scalable, production-ready application and gave me practical experience with tools I will continue to use in my career.