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CS-499 Computer Science Capstone

Artifact Narrative: Grazioso Salvare

1. Briefly describe the artifact. What is it? When was it created?

    a. This artifact is the Grazioso Salvare Dashboard. It is a full-stack web application that was developed for my CS-340 Client/Server Development course. It was developed in February and March of 2025. It is a comprehensive platform made to assist Austin Animal Shelters and Grazioso Salvare in identifying and managing dogs with the potential for search and rescue training in different fields. It consisted of an interactive dashboard and CRUD operations on a MongoDB database hosted on Apporto services. It provided basic filtering and data visualization.

    b. Currently, this artifact is composed of two main components: a backend and a front end. The backend is a Python-based CRUD (Create, Read, Update, Delete) module that interfaces with a MongoDB database. It is enhanced with a secure JWT (JSON Web Token) authentication system, role-based access control (Admin, Analyst, Viewer), and advanced data aggregation pipelines for analytics. The frontend is an interactive dashboard built with Dash and Plotly in a Jupyter notebook. It provides a user-friendly interface for data visualization, filtering SAR dogs by mission type (Water, Wilderness, Disaster), and user management, all presented through dynamic charts, data tables, and maps.

2. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in software development? How was the artifact improved?

   a. I selected this project for my ePortfolio because it demonstrates a complete transition from a simple data visualization tool to a secure, full-stack business intelligence application. It showcases my ability to design and integrate complex, production-grade features. The artifact was improved by adding a complete user management system and interactive analytics dashboard, turning a basic data viewer into a powerful, multi-user platform for making data-driven decisions. This transformed the artifact from a static data table into a dynamic platform where secure user logins control access to interactive analytics for rescue operations.

3. Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?

   a. I successfully met the course outcomes four and five. I was able to utilize JWT for secure stateless authentication, bcrypt for password hashing, and MongoDB's aggregation framework to perform a complex data analysis within a database instead of depending on Python to process data. This addresses course outcome four. Addressing course outcome five consisted of enhancing security and data protection. I implemented authentication, authorization, and hashing to demonstrate a proactive approach to securing user data and application access.

4. Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?

a. This artifact was the one that I struggled with the most, but it has taught me that security is a multi-layered endeavor that, in this case, involved password hashing, token management, and granular access controls. One of my biggest challenges were correctly implementing the JWT token lifecycle within Dash's callback structure to manage user state and permissions securely. I struggled when connecting the Python backend authentication to the Dash frontend. This was eventually solved by implementing a system for user sessions and designing callback chains that render the UI based on the authenticated user's role, ensuring a secure and responsive experience.