CS 499 Artifact 1: Friend Finder Development Narrative

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This artifact is my Friend Finder final project created for CS 340 Client Server Development. It was created in August 2024 and includes database backend management, RESTful API calls, as well as UI Dashboard/Data Visualizer based in Python. This made the project ideal for both categories of Software Design/Engineering and Databases. I chose this particular artifact because I believe it shows off various interacting user interface elements and therefore showcases knowledge of full-stack development from the database all the way to the front end.

The improvements I have done concerning the Database include hosting my own local MongoDB server, registering an admin account, and upgrading deprecated methods as necessary that use more updated libraries. Please note that this Mongo server is local on my machine and the CSV file was imported locally as well.

The improvements related to Software Engineering and Design include expanding on the data visualization and user interface by adding an additional pie chart of “outcome types” (results of animal care) and a histogram of animal ages. The Python "Dash" framework works hand in hand with NumPy, Pandas, and PyMongo to create a UI experience that combines HTML coding with Python callbacks that utilize matplotlib. I have also added user authentication to my dashboard notebook file. All connection variables were originally hardcoded in my “shelter.py” file. I still have the host and port hardcoded because these data are not as sensitive. However, I have now encapsulated the username and password authentication from the user. In this way, the database itself determines whether the login was successful.

These enhancements meet these three course outcomes:

“Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts”

**This would refer to my data analysis, manipulation, and visualization**

“Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals”

**This of course is the inclusion of multiple professional-level libraries interwoven to create the user experience.**

“Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources”

**This is reflected in my choice not to hardcode all of the database’s connection variables and instead let the database itself decide whether provided credentials are correct**

Overall, I have learned a few valuable lessons from working on this enhancement. Being able to properly install dependencies and troubleshoot them for deprecated methods and learning how they work has been a satisfying experience. Particularly, the Dash framework and Plotly which are the two main modules used here for the Dashboard and the UI in this project. I have been diving deeper into these libraries than the course ever covered. Software Engineering is a rapidly changing field, and for many reasons API’s are updated for security reasons or even for better efficiency.