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Southern New Hampshire University

CS-499 Computer Science Capstone

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07 December 2025

Module 6 Journal: Emerging Technology and Artifact Update

Part One:

Two emerging technologies that I believe are important for the future of computer

science are quantum computing and biometric authentication. Quantum computing is a

significant development because it introduces new ways of processing information that classical

systems cannot perform. Instead of using bits that represent zero or one, quantum computers use

qubits that can represent multiple states at the same time. This capability allows quantum

systems to solve highly complex problems much faster than traditional computers. I selected this

technology because it connects directly with information security, which is my long-term career

interest. Many encryption methods used today may become vulnerable as quantum systems

continue to advance. For someone like me who plans to work in secure software development or

cybersecurity, it is important to understand how new protection methods, such as post-quantum

cryptography, will defend future systems.

The second technology I selected is biometric authentication, which verifies identity

through physical traits such as fingerprints, facial features, iris patterns, or voice patterns.

Biometric systems are now common in smartphones, hospitals, banking applications, and large

organizations. I consider this technology important because it replaces traditional passwords that are easy to forget and easy to steal. It also affects my personal career goals because secure authentication is one of the foundations of protecting sensitive information. As a Navy Hospital Corpsman, I work with medical readiness information, radiation health records, and personal data every day. These responsibilities helped me understand why biometric data requires strong protection. When a password is stolen, it can be changed. When biometric data is stolen, it cannot be replaced. This makes secure design, safe storage, and ethical handling extremely important.

Both quantum computing and biometric authentication have major effects on individuals, communities, and global systems. Quantum computing can support breakthroughs in medicine, climate modeling, artificial intelligence, and logistics. At the same time, it may force industries and governments to redesign security standards. Biometric authentication improves convenience by removing the need to remember multiple passwords, but it also raises concerns about privacy and long-term data protection. These technologies show that computer science affects more than hardware or software. It also influences society, ethics, and human behavior. This remains an important part of how I think about my future career in information security.

Throughout this capstone project, I have completed several of the program outcomes. I met Outcome Four and Outcome Five in my software engineering enhancement for the Travlr Getaways full-stack application by building secure authentication, structured routing, and a scalable design. I met Outcome Three in my algorithms enhancement by improving the reinforcement learning model and documenting algorithmic efficiency. I have now completed the outcome for secure database management in my CS 360 mobile weight tracking app, where I

implemented encryption, hashing, a cleaner database structure, and improved data handling. My

remaining focus is on polishing my ePortfolio and preparing my professional self-assessment.

Part Two:

Status Checkpoints for All Categories

Checkpoint	Software Design and Engineering	Algorithms and Data Structures	Databases
Name of Artifact Used	Travlr Getaways Full-Stack Web Application (CS-465)	Deep Q-Learning Cartpole Project (CS-370)	Amos Weight Tracking App (CS-360)
Status of Initial Enhancement	Completed. Added full JWT authentication, RESTful CRUD routes, Angular interceptors, improved service architecture, and UI enhancements.	Completed. Includes improved epsilon logic, replay memory scheduling, and algorithmic documentation.	Completed. Added AES encryption, SHA-256 hashing, structured SQLite redesign, future cloud sync architecture, CSV export, and UI improvements.
Submission Status	Submitted and accepted for Milestone Two.	Submitted, and instructor feedback confirmed all	Submitted, and instructor feedback

		requirements were met.	confirmed all requirements were met.
Status of Final Enhancement	The final version is complete, polished, and submitted to ePortfolio.	Final version submitted and uploaded to ePortfolio.	Final version complete, polished, and submitted to ePortfolio.
Uploaded to ePortfolio	Yes, uploaded after positive feedback.	Yes, uploaded after positive feedback.	Yes, uploaded after positive feedback.
Status of Finalized ePortfolio	In progress.	In progress.	In progress.

References

Brooks, M. (2019, October 2). *Beyond quantum supremacy: the hunt for useful quantum computers*. Nature. https://www.nature.com/articles/d41586-019-02936-3

Schneider, J., & Smalley, I. (n.d.). Quantum Computing. *IBM*. Retrieved December 4, 2025, from https://www.ibm.com/think/topics/quantum-computing