Journal Entry #5

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CS-499-10941-M01 Computer Science Capstone 2024 C-4

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08/11/2024

**Part One: Emerging, Disruptive, or Game-Changing Technologies**

**Technology 1: Artificial Intelligence (AI) and Machine Learning (ML)**

Artificial Intelligence (AI) and Machine Learning (ML) are not just rapidly advancing fields within computer science, but they are also the source of awe-inspiring potential. These technologies have already started to disrupt various industries, creating systems capable of performing tasks that typically require human intelligence, such as speech recognition, decision-making, and visual perception. ML, a subset of AI, focuses on developing algorithms that allow computers to learn and make decisions from data without being explicitly programmed for specific tasks, opening up a world of possibilities.

Impact on Computer Science and My Career: The rise of AI and ML is pushing computer science to new heights, emphasizing the importance of data science, algorithm design, and most importantly, ethical considerations in technology development. For my career, AI and ML open up opportunities to work on innovative projects that leverage these technologies, such as predictive analytics, natural language processing, and automated systems.

Impact on Humans, Communities, and the World: AI and ML have the potential to revolutionize the way we live and work. They can improve healthcare through better diagnostics, enhance education with personalized learning experiences, and drive efficiencies in various sectors, such as manufacturing and finance. However, they also raise ethical concerns, such as job displacement and the potential for biased algorithms, which require meticulous and careful consideration.

**Technology 2: Quantum Computing**

Quantum computing is not just another game-changing technology but a seismic shift that promises to revolutionize the field of computer science. Unlike classical computers, which use bits as the smallest unit of information, quantum computers use qubits, which can represent both 0 and 1 simultaneously. This allows quantum computers to solve complex problems much faster than classical computers, particularly in cryptography, drug discovery, and complex system modeling. The potential of quantum computing is genuinely revolutionary.

Impact on Computer Science and My Career: Quantum computing is poised to disrupt traditional computational models, requiring new algorithms and approaches to problem-solving. For my career, understanding quantum computing could open doors to specialized fields that require this expertise, such as cryptography, cybersecurity, and advanced scientific research.

Impact on Humans, Communities, and the World: Quantum computing has immense potential, from breaking encryption methods to solving intractable problems. However, it poses significant risks, particularly regarding data security, as it could render many encryption techniques obsolete. As quantum computing becomes more accessible, developing new security protocols to protect sensitive information will be crucial.

Course Outcomes Achieved and Remaining: I have achieved several course outcomes, including those related to software development and database management. However, I am still working on outcomes related to advanced algorithms and data structures, particularly as they pertain to emerging technologies like quantum computing and AI.

**Part Two: Status Checkpoints**

| Checkpoint | Software Design and Engineering | Algorithms and Data Structures | Databases |
| --- | --- | --- | --- |
| Name of Artifact Used | 3D Pyramid Rendering Application | Animal Shelter Management System | Animal Shelter Management System |
| Status of Initial Enhancement | Completed | Completed | Completed |
| Submission Status | Submitted | Submitted | Submitted |
| Status of Final Enhancement | In Progress | In Progress | In Progress |
| Uploaded to ePortfolio | Pending | Pending | Pending |
| Status of Finalized ePortfolio | Not Started | Not Started | Not Started |

**References:**

Sarma, K. V., & Sharma, S. (2022). *Introduction to Artificial Intelligence and Machine Learning*. Wiley.

Zhang, F., & Wang, Q. (2021). *Quantum Computing for Computer Scientists*. Cambridge University Press.