**Emerging Trends in Computer Science and ePortfolio Update**

**Part One: Emerging Trends**

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

Artificial Intelligence and Machine Learning are transforming how software is built and used. From recommendation systems to chatbots and self-driving cars, AI/ML technologies help automate complex tasks and provide insights from vast data sources. Their significance lies in their ability to enhance decision-making, efficiency, and innovation across industries.

In computer science, AI/ML is reshaping algorithm design, software engineering practices, and data management. These technologies demand strong foundations in statistics, programming, and ethics, and they are creating new branches in computing, including deep learning and natural language processing.

Consumers and workers benefit from smarter, more responsive technologies, such as personalized content, automated scheduling tools, and AI-assisted diagnostics in healthcare. However, these advancements also introduce concerns over privacy, bias in algorithms, and workforce disruption.

Personally, AI/ML aligns well with my software development goals. I want to build intelligent, user-focused systems, and learning about AI tools helps me stay current with industry practices. As I work on projects like appointment scheduling apps, I could see integrating machine learning to analyze usage patterns or improve scheduling suggestions.

**Trend 2: Cybersecurity and Zero Trust Architecture**

Cybersecurity is more critical than ever, and Zero Trust Architecture (ZTA) is a leading approach to defending systems. Rather than assuming users inside a network can be trusted, ZTA requires continuous verification for every access request. This reduces the risk of internal and external threats.

For computer science professionals, this trend emphasizes secure-by-design development, robust identity management, and encryption. Developers need to think more proactively about vulnerabilities and integrate security at every step of the process.

Users gain more control and protection, especially in services that manage sensitive data. For professionals, it reshapes how software and infrastructure are designed and maintained.

Security is essential in any project I work on. In my CS-320 Appointment Service project, I see opportunities to build more secure handling of user data. Understanding Zero Trust principles prepares me to architect safer, more resilient systems in future roles.

**How these trends relate to my goals and course outcomes**

Both AI/ML and Zero Trust principles fit into my career interests of creating secure, efficient, and intelligent applications. These trends help solidify my understanding of responsible software development and position me to succeed in full-stack and backend development roles.

As of now, I’ve achieved several course outcomes: designing secure software, integrating full-stack development, and improving project documentation and testing. My CS-320 project helped refine test coverage and service architecture. In CS-330, I worked with OpenGL to develop a 3D scene, enhancing my understanding of graphics and object interaction. In CS-465, I connected front-end and back-end components using tools like MongoDB and JWT. These courses together have strengthened my software engineering and system design skills.

**Part Two: Status Checkpoints for All Categories**

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| **Checkpoint** | **Software Design and Engineering** | **Algorithms and Data Structures** | **Databases** |
| Name of Artifact Used | CS-320 Appointment Service | CS-330 3D Scene (object reflection, simulation, layout) | CS-465 Full-Stack Trip Application |
| Status of Initial Enhancement | Refactored services, added unit tests, reduced folder depth | Attempted to integrate OpenGL libraries and configure project to recognize external dependencies. | Improved data structure usage and database access logic |
| Submission Status | Submitted to school portal | Submitted to school poral | Submitted to school portal |
| Status of Final Enhancement | Finishing touches before the final | Finishing touches before the final | Finishing touches before the final |
| Uploaded to ePortfolio | No | No | No |
| Status of Finalized ePortfolio | In progress | In progress | In progress |