CS-499 Computer Science Capstone

Module 5-1: Computer Science Trends and Artifact Update

Southern New Hampshire University

Stephen Owusu-Agyekum

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PART ONE

Virtual Reality

One of the emerging developments or trends in the field of computer science that is making significant changes globally is Virtual Reality (VR). Virtual Reality creates entirely virtual environments that users can immerse themselves in, typically through headsets that block out the real world and replace it with a simulated environment. It makes them feel like they are in the real world.

One significant virtual reality trend is its ability to simulate realistic scenarios and environments, making it valuable for training simulations, medical procedures, architectural visualization, and virtual tourism, among other applications. "Through simulation, virtual reality (VR) creates a three-dimensional virtual environment that users can enter and interact with" (Wu & Kim, 2022). One significant aspect of the AI trend is its ability to augment human capabilities, drive innovation, and address complex challenges across various domains, leading to improved efficiency, decision-making, and quality of life.

VR has the potential to revolutionize the field of Computer Science by changing many aspects of our life like how we work, learn, entertain ourselves, and interact with digital content, driving forward advancements in human-computer interaction and shaping the future of immersive experiences. As VR technologies become more advanced and widespread, computer scientists will face new challenges and opportunities in developing realistic virtual environments, optimizing rendering techniques for immersive experiences, and creating intuitive interaction methods. In the field of computer science, VR will also be opening up new avenues for innovation, creativity, and exploration in digital experiences.

VR will empower consumers, workers, and citizens with immersive, interactive, and personalized experiences that redefine how they interact with digital content, collaborate, learn, and engage with

the world around them. Virtual Reality can also boost the productivity of its users. "With VR's potential for training and education, many scientists who use the technology hope that it will one day make their practical work more efficient" (Pells, 2023). It has the potential to revolutionize healthcare by facilitating remote consultations, virtual therapy sessions, and medical training simulations. For instance, "virtual reality provides a consistent, repeatable clinical training approach that is independent of the trainer's quality" (Pells, 2023).

With a career in software engineering, the virtual reality (VR) trend presents exciting opportunities to work on cutting-edge technologies and shape the future of human-computer interaction. I could contribute to developing VR applications and experiences, focusing on areas such as graphics rendering, user interface design, spatial computing, and immersive storytelling.

The trend of Artificial Intelligence

Another emerging trend in the field of computer science is Artificial Intelligence (AI). Artificial Intelligence (AI) is the simulation of human intelligence processes by machines, including learning, reasoning, problem-solving, perception, and decision-making. AI technologies are designed to enable machines to carry out tasks that traditionally require human intellect, like comprehending natural language, spotting patterns in data, forming conclusions, and acting independently in the environment.

AI trends will fundamentally change the field of computer science by advancing innovations in algorithms, methodologies, and technologies to develop advanced intelligent systems capable of simulating human-like intelligence. This will lead to advancements in areas such as machine learning, natural language processing, computer vision, and robotics.

Trends in Computer Science

The AI trend will significantly alter the experiences of consumers, workers, and citizens by enabling personalized services, task automation, and smarter decision-making processes across various industries. This will lead to enhanced convenience, efficiency, and productivity. "AI will emancipate humans from repetitive, everyday tasks, thus liberating us to be more productive and do more fulfilling work" (Mehan, 2022).

A career in software engineering AI trends will provide us with opportunities to work on developing intelligent systems, machine learning algorithms, and AI-driven applications, allowing us to leverage our skills to create innovative solutions and enhance user experiences in diverse domains. We will be able to integrate AI technologies into software development processes to optimize performance, automate tasks, and address complex challenges, contributing to the advancement of technology and driving a positive impact in the industry.

The course outcomes I have achieved so far would include the following:

- “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.”
- “Employ strategies for building collaborative environments that enable diverse audiences to support organizational decision-making in the field of computer science.”
- “Design, develop, and deliver professional-quality oral, written, and visual communications that are coherent, technically sound, and appropriately adapted to specific audiences and contexts.”
- “Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution while managing the trade-offs involved in design choices.”

There is one more course outcome that I have not met yet. I hope to meet it by the time I am done with the next course module.

- “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.”

PART TWO

Software Design and Engineering

I am currently at checkpoint six for the Software Design and Engineering artifact. I have already completed the initial enhancement and submitted it for the instructor's feedback. I've finished the improvement, which involved adding extra comments to every line of code in response to the instructor's feedback. I am getting ready to upload it to my ePortfolio. I will be able to complete it with a polished narrative and confirm navigation on the GitHub Pages site by the end of week six.

Algorithms and Data Structures

I have completed the initial enhancement and submitted the instructor's feedback. I implemented the feedback plan but have not yet met the criteria. To make it complete, I need to improve some areas in my code and narrative. I have not yet uploaded it to my ePortfolio.

Databases

For the database artifact, I am currently on the enhancement to submit it for instructor's feedback. I will incorporate the instructor's feedback and perform final enhancement and then upload it to my ePortfolio. I will upload it to ePortfolio when the final polishing is completed and confirm a review by week seven.

Trends in Computer Science

Checkpoint	Software Design and Engineering	Algorithms and Data Structures	Databases
Name of Artifact Used	**Artifact name:** Treasure Hunt Game: Human Brain and Artificial Neural Network **Origin:** CS 370: Current/Emerging Trends in Computer Science	**Artifact name:** Android Mobile App – Inventory App **Origin:** CS360 Mobile Architect and Programming	**Artifact name:** Traveler Website **Origin:** CS465: Full Stack Development I
Status of Initial Enhancement	Enhancements completed	Enhancements completed	Working on enhancement but on track for the submission deadline with a day to spare for issues
Submission Status	Submitted with feedback from the instructor	Submitted with feedback from the instructor	Submitted with feedback from the instructor
Status of Final Enhancement	Feedback was applied, and the final polish was applied	Feedback was applied, and the final polish was applied	Planned but not yet completed
Uploaded to ePortfolio	Completed with polished narrative and confirmed navigation on GitHub Pages site	Planned but not yet completed	Planned but not yet completed
Status of Finalized ePortfolio	Ready for review in Module Seven	Planned but not yet completed	Planned but not yet completed

References:

Wu, Y., & Kim, E. Y. (2022). Users' perceptions of technological features in augmented reality (AR) and virtual reality (VR) in fashion Retailing: A Qualitative content analysis. *Journal of Mobile Information Systems*, *2022*, 1–13. https://doi.org/10.1155/2022/3080280

Pells, R. (2023). Why scientists are delving into the virtual world. *Nature*. https://doi.org/10.1038/d41586-023-02688-1

Julie Mehan. (2022). Artificial Intelligence : Ethical, Social, and Security Impacts for the Present and the Future. ITGP.

Anderson, M. (2019, February 28). *The future of VR and AR*. IEEE Computer Society. https://www.computer.org/publications/tech-news/trends/the-future-of-vr-and-ar