5-1 JOURNAL

5-1 Journal: Computer Science Trends and Artifact Update

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* What is the significance of each trend?

“Zero Trust” is an increasingly popular policy that encourages networks to deny access or permissions as the default response to a request. Access, in this strategy, can only be granted once validation or trustworthiness has been shown, and each new attempt prompts the same default- deny response. This protects networks across the board as each section is protected independently. A common flaw in modern network architecture is that, once access has been granted, validation is not needed again to access different areas of the same network. This can result in massive breaches in security should a weak link be compromised, granting full access to a potential bad actor, a malicious user obtaining access through any means for nefarious purposes.

With the creation of large language models like ChatGPT, AI has never been more at the forefront of computer science development than every before. Massive companies like Google, Microsoft, and OpenAI are releasing products, like Gemini, Copilot, and ChatGPT-4 respectively, that can promise responsive services like chat generation, image creation, and even data analysis.

* How will each trend change the field of computer science?

The “Zero Trust” policy, if enforced, will encourage greater internal and external network security and hopefully lead to less frequent data breaches or compromises that have even hindered large companies. (Bhattarai et al., 2024) One of these large companies, Chase Bank, has been affected by this data breach that they have posted a whole forum detailing and defining what is lost due to this security issue (FAQ: DATA COMPROMISE, 2024) This default deny policy is for the best, when it comes to protecting data and users however additional development will need to be invested in software that needs this validation to function correctly.

As of right now, there are only theories of the implications that AI’s development could bring to the computer science field, but this is only because the possibilities seem limitless due to the sheer potential present. Generative AI models spark ideas of programs that could self-test, self-maintain, and self-produce new features independent of human interaction. Some may say that it might even replace the large need for researchers in computer science and many positions could be automated through AI’s use. However, this far stretched theory is far away from becoming a reality as current AI models still heavily struggle identifying objects like humans and are reliant on human generated source material.

* How will each trend change the experience of consumers, workers, or citizens?

This popular trend with default deny security responses will hopefully secure companies, their private data, their users, and their private data from falling into the hands of those willing to take advantage of them. Funds like social security and bank account information will be compromised less which means the public is able to rest peacefully knowing they are protected from theft over the internet.

Large language models like Chat-GPT are being marketed to all types of end users, promising an easy and efficient tool to auto-complete tasks that a user either already knows or does not. They are advertised for generative, simple tasks like recipes, emails, and even stock photos, but users also have been able to write essays, code programs, and even sell art from these tools. Because of the legally grey are surrounding artificial intelligence and generative models, there are some massive and possibly dangerous implications to AI’s advancements. Job security, spread of misinformation, and reduction in education are all controversial topics surrounding AI currently. (Graefen & Fazal, 2024) The following quote from a study on AI’s use and education sums this topic up nicely:

“… Chat GPT has the potential to revolutionize the way we teach and learn. Its ability to generate human-like responses and adapt to the user's language and style of communication makes it an effective tool for personalized learning. On the other hand, there are also concerns about the use of Chat GPT in education. Critics contend that it might not be as successful at teaching critical thinking and problem-solving techniques and that it might result in a decline in human connection and individualized learning. According to our research, Chat GPT has certain drawbacks and difficulties even though it has the potential to be an effective teaching tool. Therefore, it is important that educators and policymakers carefully consider the potential advantages and disadvantages of using Chat GPT in their classrooms and develop appropriate strategies for responsible use.” (Graefen & Fazal, 2024)

* How will each trend fit in with your career interests or aspirations?

As I am currently applying for a position at a medical company that services thousands of hospitals and health centers across the globe, security and protecting client data has never been more of a priority for my career aspirations. I’m currently seeking a system administrator position that is responsible for maintaining and supporting the messaging system in relation to Microsoft services, so the concept of reject all external and internal requests on a network level is very relevant. A system is only as secure as it’s weakest link, so I am excited to protect and learn more in this area should I receive the position.

As for AI, I am mostly interested in image generation as I enjoy creating images related to my various hobbies that I would otherwise lack the skill to create. Toying around and messing with chat generation prompts to produce the perfect image is very satisfying and enjoyable. However, there are legal risks to this image creation freedom, like if the art generated was used to make a profit. Now the art the AI model uses to train is in a way infringed on its copyright and reproduction. I would also like to research where the art is gathered that trains these models, the protections the original pieces do or do not possess, and if the artists are compensated and aware of their arts use.

* Which course outcomes have you achieved so far, and which ones remain?

In my artifact’s current state, post enhancements, I have achieved the following course outcomes successfully:

* 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.
* 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.

The enhancements I have left to incorporate into my artifacts are as follows:

* 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.

Resources

Bhattarai, H., Kulkarni, A., & Niamat, M. (2024). Trust Score-Based Zero Trust Architecture for Advanced Metering Infrastructure Security. NAECON 2024 - IEEE National Aerospace and Electronics Conference, NAECON 2024 - IEEE National, Aerospace and Electronics Conference, 334–339. https://doi.org/10.1109/NAECON61878.2024.10670642

*FAQ: DATA COMPROMISE*. (2024). Chase.com. https://merchantservices.chase.com/support/protect-your-business/faq-data-compromise

Graefen, B., & Fazal, N. (2024). From Chat bots to Virtual Tutors: An Overview of Chat GPT’s

Role in the Future of Education. Archives of Pharmacy Practice, 15(2), 43–52.

https://doi.org/10.51847/TOuppjEDSX

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I ran into some troubles with my Relentless Heroes project and think that it has grown outside what I can complete within the time frame of this course. Seeing that it is already past it’s submission due date, I will prioritize circling back and simplifying the scope of the project to get it done sooner while still accomplishing the desired enhancements. I just got a little too passionate and overbooked myself on this one.

As for the Travlr Getaways project, it is way too large for me to submit to Github in one go. Would I be able to instead submit it to its original GitHub repository as a new branch, identifying the additional repository in the one hosting my Pages site? Otherwise, I’m not sure how to put it into the current repo.

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| **Checkpoint** | **Software Design**  **and Engineering** | **Algorithms and Data Structures** | **Databases** |
| **Name of Artifact Used** | Relentless Heroes | Travlr Getaways | Grazioso Salvare Animal Rescue |
| **Status of Initial Enhancement** | Submitted | Submitted | Submitted |
| **Submission Status** | Near Completion | Submitted | Submitted |
| **Status of Final Enhancement** | Near Completion | Completed | Submitted |
| **Uploaded to ePortfolio** | Not completed | Too large (85mb) | Submitted |
| **Status of Finalized ePortfolio** | Not completed | Not completed | Not completed |