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CS-470 Final Reflection
https://youtu.be/rjHxJG__bFQ

Experiences and Strengths

This course has been instrumental in bridging theoretical knowledge with practical application in cloud-based full-stack development. Throughout CS-470, I gained hands-on experience with containerization, serverless architectures, and cloud storage systems, which directly support my aspirations in artificial intelligence and software engineering. For instance, working with Docker and Docker Compose provided insights into creating consistent environments, a critical skill for deploying machine learning models at scale. Additionally, deploying an Angular frontend to AWS S3 and integrating it with Lambda-backed APIs emphasized the importance of scalability and cost-effective resource management.

My strengths as an Android app developer and audio engineer complement these new skills. As an Android developer, I bring experience in creating user-friendly interfaces and optimizing performance for mobile platforms. Combining this with the ability to deploy serverless backend architectures, I can build cloud-connected mobile applications that process and store data efficiently. For example, leveraging AWS Lambda and DynamoDB, I could design real-time data synchronization for apps, enhancing user experiences with seamless updates and low-latency interactions.

As an audio engineer, my expertise in signal processing and understanding data streams aligns with the backend logic and API development covered in this course. The ability to integrate RESTful APIs with applications allows me to develop cloud-based solutions for audio processing, such as real-time audio analysis. These skills are particularly relevant in AI, where audio data often forms the basis for machine learning models in speech recognition or music recommendation systems.

Planning for Growth

Scaling and managing web applications in the cloud involves balancing performance, cost, and elasticity. To handle scale and error handling effectively, I would implement serverless solutions like AWS Lambda, which automatically scales with workload demands. For error handling, I would integrate logging and monitoring tools such as AWS CloudWatch to detect and resolve issues proactively.

Predicting costs for cloud services requires analyzing expected workloads and usage patterns. For example, serverless solutions such as AWS Lambda are charged based on execution time and the number of invocations, making costs easier to estimate for event-driven or intermittent tasks. By contrast, containerized solutions involve costs for the underlying virtual machines or cloud instances, which might lead to higher expenses for underutilized resources. Tools like AWS Cost Explorer would further aid in visualizing and forecasting expenses based on historical data.

Between containers and serverless, serverless architectures are generally more cost predictable for workloads that are event-driven and infrequent, as they eliminate the need to pay for idle compute resources. Containers, while offering more control and flexibility, can lead to higher costs due to the fixed nature of the infrastructure required to host them. For predictable, long-running workloads, containers might be more cost-effective, but for scaling and cost predictability, serverless solutions provide a clear advantage.

In the long term, these principles will be essential when building AI-driven applications that require scalable backend infrastructures. Combining my Android development expertise with cloud-based solutions will allow me to create sophisticated mobile and AI applications. Similarly, applying audio engineering skills to cloud platforms can enable the development of cutting-edge tools for audio analysis and production, reinforcing my journey toward becoming an AI researcher or engineer.