

Thesis Project Portfolio

Cloud Computing: How Cloud Computing is Revolutionizing IT

(Technical Report)

The Future of Cloud Computing: Cloud-Based Artificial Intelligence

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
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In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Introduction

My STS research was inspired by my technical research as both topics focus on cloud computing and artificial intelligence. My STS research took a look into cloud-based artificial intelligence's advantages, ethical and technical risks, and future outlook. My technical capstone research utilized cloud-based artificial intelligence as a tool to help users efficiently use the cloud. This used users' cloud usage along with predictive analytics to give feedback to the user to see how they were using the cloud and how to minimize cost as much as possible.

Project Summaries

In my STS research, I investigated the advantages, ethical and technical risks, and future outlook of cloud-based artificial intelligence. Looking at all perspectives on the topic allowed for a more comprehensive understanding. Advantages such as reduced costs, analytical advantages, data management, accelerated productivity, and autonomy give support to the technological advancement. I divided up the ethical and technical risks as they focus on different aspects. The technical risks include connectivity issues, cloud downtime, and overall internet dependency. On the other hand, the ethical risks include data privacy, biased algorithms, and the spread of misinformation. The ethical risks allowed me to transition into future resolutions of these risks so that we could eventually rely upon and trust cloud-based artificial intelligence. These resolutions include government and business regulations, creating a code of ethics, and having a transparent relationship between businesses and users.

The technical portion of my thesis produced a product called CloudTracker that used both cloud computing and artificial intelligence. The goal was to utilize users' cloud usage data to create a product that accurately informed users about future costs and how to minimize them. The forecast is presented to the user through a graph to show the past data and how the future could look based on past patterns. There are multiple graphs returned such as general forecast,

weekly forecast showing a breakdown of price by day of the week, monthly forecast showing a breakdown of price by day of the month, and holiday breakdown showing price by holiday. The product also gives recommendations to the user to maximize cloud efficiency such as setting server run times, shutting down for holidays, what products to use, etc. It is user-friendly as there are filters and features for users to give control over their forecast. To create this product, my intern team used a Python library called Facebook Prophet along with AWS cloud computing resources. This product was eventually used within production and is a focal point for the future of the company as it assists customers in their everyday use of the cloud.

Conclusion

Working on both my STS and technical projects allowed me to experience the research I found. Having hands-on experience through my technical project allowed me to encounter the advantages and risks I had discussed within my STS research. For example, I noticed the ease of access as all data and applications were readily available within the cloud. After experiencing the effects of my product, I could see how cloud-based artificial intelligence could reduce costs for users. Analytical advantages were created by using Facebook Prophet to output the forecasts. I noticed some ethical concerns such as data privacy as I had access to vulnerable data. Ethical decisions are made in everyday life and being able to understand their impact of them within my field allowed me to properly analyze my decisions. I hope to see more focus on the ethical concerns within cloud-based artificial intelligence as it can be a tool to revolutionize the world. Being able to experience my technical project before my STS research allowed me to reflect and learn. I was able to improve my technical skills through my technical project while developing my ethical standards.

I would like to acknowledge my STS professor, Professor Richard Jacques, my capstone advisor, Rosanne Vrugtman, and my CloudTracker team at Accenture Federal Services for all their support throughout my projects.

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