MODULE 6-1 JOURNAL

Emerging Technology and Artifact Update

CS499 Computer Science Capstone

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October 13, 2024

Over the past few years, many technologies hit the Computer Science world as a storm and impacted every corner of human life, especially in the fields of Business and Finance, Healthcare, Transport, Surveillance, Quantum Computing, Edge Computing, Strategic planning, Robotics, and medicines. These technologies played a vital role in progressing by leaps and bounds and their evolution is too fast to keep track of their emergence. Among these technologies, I choose Machine Learning and blockchain as their impact is significant and felt across various domains and fields of human life and the social sector.

Machine learning is a specialized branch of Artificial Intelligence that uses existing data sets, algorithms, and models to process and analyze historical data to find and trace patterns of interest and insightful information to be used in decision-making and various other systemic decisions. There are various concepts involved in machine learning for example data, algorithms, models, training and testing, features and labels, supervised and unsupervised learning, semi-supervised, reinforcement, and deep learning. This technology has many uses and applications such as Natural language processing (NLP), Computer vision, Recommendation systems, healthcare, Finance, Automation systems, and financial planning. There are various algorithms employed to gain the competitive advantages of this specialized Artificial Intelligence field. Some of these algorithms are Linear Regression, Decision Trees, Random Forests, Support Vector Machines, K-Mean clustering, and Neural Networks. There are a few constraints and repercussions involved such as Data Quality, Bias and Fairness, Explainability, privacy concerns, and job displacement.

Blockchain technology evolved over the previous decade and is involved in decentralization and distribution of digital ledger. Blockchain revolutionized cryptocurrencies such as Bitcoin, Ethereum, and many others. Blockchain is widely used in decentralized financial

applications called DeFi. There are many fundament concepts used in blockchain technology such as Blocks and chains, Decentralization, Consensus Mechanisms, Immutability, smart contracts, and cryptography. The public blockchain, private blockchain, consortium blockchain, and hybrid blockchain are major types of blockchain technology. Blockchain technology is mainly used in cryptocurrencies, Supply chain management, healthcare, voting systems, real estate and property management, digital identity, decentralized finance DeFi, and Intellectual Property Protection. Blockchain technology offers various benefits such as transparency, security, decentralization, efficiency, and immutability. Currently, Blockchain technology faces challenges such as scalability, energy consumption especially Bitcoin mining, regulation and acceptability, interoperability, user experience, Govt. Sanctions, and privacy.

The major learning outcome of this course is how to enhance an already existing project or an artifact by adopting the best Software Design and Development techniques and procedures. Adopting new technologies plays a vital role in updating ePortfolio and enhancing one's skillset to be compatible with the job market and computer science field. Machine Learning and blockchain technology can be helpful in achieving the best portfolio eligible for lucrative jobs and financial benefits.

Checkpoint	**Software Design and Engineering**	**Algorithm and Data Structures**	**Databases**
Name of Artifact	Contact Service Unit Testing	Vector Sorting using Quick Sort	MongoDB Database on Animal Shelter
Status of Initial Enhancement	Completed enhancement and submitted during module 2	Completed enhancement and submitted during module 2	Completed enhancement and submitted during module 2

Submission of Status	Completed	Completed	Completed
Status of Final Enhancement	Completed and submitted in Module 3 Milestone 1 enhancement	Completed and submitted in Module 4 Milestone 2 enhancement	Completed and submitted in Module 5 Milestone 3 enhancement
Uploaded to ePortfolio			
Status of Finalized ePortfolio			