Test Automation Framework for Loan Delivery Assets
(Technical Report)

Impacts of Predictive Analytics on Decision-Making Process for Healthcare Providers

(STS Research Paper)

A Research Paper submitted to the Department of Engineering and Society

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Bachelor of Science, School of Engineering

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On my honor as a University Student, I have neither given nor received unauthorized aid on this
assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Sociotechnical Synthesis

The research involved in both the technical project and the Science, Technology, and Society (STS) research paper focuses on the impact of implementing new, advanced technology for system optimization within two different fields - mortgage finance and healthcare. While distinct in their specific goals and methodologies, these initiatives examine the integration and impact of integrating technological solutions within its respective field, highlighting the potential of data-driven practices. The technical project focused on implementing a custom-built test automation framework at Fannie Mae to enhance data reliability and streamline testing processes using AWS Cloud services. Concurrently, the STS research explored the effects of predictive analytics on healthcare providers' decision-making, specifically examining how introducing data-driven methodologies impacts the way healthcare workers diagnose and treat patients.

My technical project involved designing and implementing a custom-built test automation framework using AWS Lambda, DBeaver, and Python to automate the process of testing loan delivery data at Fannie Mae. This framework was developed to not only execute tests with greater speed and accuracy but to be integrated with the pre-existing data systems. The overall goal of this project aimed to improve data accuracy and operational efficiency in financial reporting, facilitating more informed business decisions. This initiative supported Fannie Mae's strategic objective to transition its asset management to a fully automated system. The custom-built test framework was built for the Cash Acquisition source system, and serves as a model framework for future designs of source systems. The framework ensures consistent data handling across all levels of operations, which is critical for maintaining compliance with financial regulations and standards in the mortgage industry. This automation effort has set a

benchmark for future endeavors, aiming to broaden the scope of automation within the company to include other key operational areas.

My STS research paper explored the transformative impact of predictive analytics on the decision-making processes of healthcare providers. The research explores the paradigm shift from traditional, experience-based decision-making to a more data-driven, evidence-based approach, which holds the potential to redefine standards of patient care and optimize healthcare outcomes. The findings highlight the necessity for ongoing training and development for healthcare professionals to effectively integrate these tools into their practice, ensuring that technology augments rather than replaces the nuanced judgment that quality healthcare demands.

Exploring these projects in tandem provided me with a broad understanding of the practical and ethical implications of deploying new technologies in different sectors. These advancements demonstrate that sectors like mortgage finance and healthcare can significantly enhance operations. However, they also highlight the urgent need to address the ethical and practical challenges that accompany such technological adoption.

Working on these projects offered a unique opportunity to reflect on the integration of technology in professional practices and its universal applicability across different sectors. The technical project deepened my understanding of the role of data systems in operational success, while reinforcing the importance of a coherent integration which was explored through the STS research in the context of healthcare. Likewise, the STS research provided a critical perspective on the ethical and practical implications of data reliance, which paralleled the challenges faced during the technical project of ensuring data integrity and system reliability. This dual engagement promoted a comprehensive appreciation and overall understanding of how

technological advancements can be tailored to meet specific sector needs while also considering

broader socio-technical impacts.