Thesis Project Portfolio

Digital Identification: Creating a Document Management System

(Technical Project)

Developing Ethics via Framework Within Machine Learning Systems

(STS Project)

An Undergraduate Thesis

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Introduction

Modern information systems must navigate two goals: effectively performing their practical and operational obligations, while upholding strong ethical standards. These information systems connect vast amounts of data from the internet to a variety of applications, ultimately striving to improve the daily lives of people. However, this improvement depends heavily on the ethical and conscionable use of this data. As systems gain access to sensitive data, make impactful decisions, and directly influence people's lives, maintaining the balance between utility and integrity becomes increasingly critical. My capstone and STS research approach this challenge from a practical and theoretical approach, respectively.

Capstone

In my capstone report, I approach the information systems problem practically by addressing systems that lack key accountability and security features. To combat these shortcomings, I developed an electronic document management system designed to improve security during document generation and distribution. This system provides users with a peace of mind regarding their documents. Through integrated security checks such as e-sealing documents, long-term validation, and documentation verification, my system identifies and addresses critical areas that deliver high-impact utility to users. These safeguards also promote ethical data handling by ensuring documents are managed with transparency and respect for document honesty. By strengthening security and increasing user confidence, the system improves both document and data integrity, contributing to a more secure and accountable digital world.

STS Research

Alongside the practical considerations of my capstone project on secure information systems, my STS research investigates the ethical considerations involved during machine learning and its applications, bridging the gap between technical implementation and ethical accountability. As machine learning increasingly shapes human lives, from job screenings to trial evaluations, it is essential to consider not only direct technical performance, but also ethical implications. Historical analysis played a key role in uncovering unethical applications driven by discrimination and bias, laying the foundation to integrate ethics during machine learning development. Further research into machine learning accountability and ethics revealed a gap in existing methodologies: the absence of a comprehensive ethical framework for machine learning. I highlight key considerations in the creation of an ethical framework, including data transparency, model accountability, and mitigation of discrimination, providing researchers and developers with insights into promoting ethical practices.

Conclusion

My capstone project and STS research demonstrate how technical design and ethical reflection can reinforce each other to build more trustworthy and socially responsible systems. The capstone tackles immediate real-world concerns about document security and accountability, while the STS research situates these concerns within a broader ethical context in the emerging field of machine learning. Together these topics highlight the necessity of embedding ethical considerations directly into the development lifecycle of information systems. Utilizing this integrated approach not only improves system reliability and user confidence, but also ensures that technological advancements serve the public good.