Thesis Project Portfolio

Forecasting Breakthroughs: Identifying Future Leaders in the Semiconductor Industry

(Technical Report)

Resigning From Uber: An Actor-Network Perspective on Algorithmic Management

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

My capstone project and Science, Technology, and Society (STS) research paper come together to show how technical innovation and social dynamics intertwine within technological networks. My technical project focuses on predictive analytics in identifying potential leaders in the semiconductor industry, while my STS research explores the socio-technical interactions within Uber through Actor-Network Theory (ANT). Both projects delve into how human and non-human factors collaborate and conflict within technological contexts, highlighting the significance of understanding both elements to grasp the full picture of technological success and failure.

My technical project aimed to predict technological disruption within the semiconductor industry by developing models to forecast which semiconductor companies are likely to achieve significant market valuations. By analyzing data from 244 companies using penalized regression and boosted tree models, we identified key predictors of company success, such as the number of employees, investment equity, patent activity, and geographical location. This project demonstrates the power of data analytics in predicting technological disruption and the importance of understanding the interplay of various factors that contribute to a company's success in a highly competitive industry.

In my STS research paper, I employed Actor-Network Theory to analyze the complex relationships within the network of the ride-share company, Uber. These relationships include those between the drivers, riders, and the algorithm, which are all overseen by Uber's management. The management acts as the network builder, constructing the network based on the alignment of the actors' goals. My research paper argues that Uber's instability stems from the lack of transparency and communication between its algorithmic manager and drivers, as

well as the false promises of autonomy and potential earnings that often mislead drivers. The analysis provides a nuanced view of how the relationship between technology and human actors within a network can destabilize an entire system.

Working on these projects simultaneously has given me perspective on how technology is shaped by multiple technical and social influences. My technical project deepened my understanding of data's role in strategic decision-making. The STS research highlighted the critical importance of considering the human aspect of technology, the social implications, and individual experiences that data alone cannot capture. In future technical projects, especially those within my field of data analytics, I can integrate a socio-technical perspective to better understand the social dynamics that data alone cannot fully capture.