Thesis Project Portfolio

Forecasting Breakthroughs: Identifying Future Leaders in the Semiconductor Industry

(Technical Report)

Generative AI's Impact on the Labor Market

(STS Research Paper)

An Undergraduate Thesis

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Executive Summary

Technology has and will continue to have a major impact on the economic landscape. Because of this, I have decided to examine the technological impact from two unique perspectives. For my technical report, I helped create a binary statistical model that will predict which private semiconductor companies will become financially successful, with the specific measurement being whether the company can reach a valuation of $500 million within 5 years after its initial funding round. The purpose of this is to allow institutional investors the opportunity to examine which businesses have the potential to develop technological disruptors that have the opportunity to change the economic landscape. As for my STS research paper, I looked at the impact that generative AI will have on the labor market to see what can be done going forward. The purpose of this is that generative AI is already becoming the next major disruptor in how businesses will function and being able to examine how it will impact workers and what could be done in the future is ideal to ensure a better future for the next generation of workers.

We find that various institutions can benefit from being able to predict technological disruptors. For example, businesses can better understand the evolving needs of consumers from the market trends technological disruptors form. At the same time, educational institutions can adjust their curricula to better prepare students with applicable skills and knowledge. The overall objective of our research is to predict whether a company will reach the predetermined benchmark ($500 million within 5 years) by labeling certain private companies as a success or failure. This is achieved mainly through 3 methods: a binary classification model, a network of shareholders, and feature engineering.

Via the use of the LASSO Logistical Regression Model, we could accurately predict 77.7% of companies as a success or failure. The ability to predict success or failure was using an 11-year timeframe of private semiconductor companies. The specific timeframe was to avoid major market disruptions like the “dot com bubble” and the 2008 financial crisis while still being able to see the actual results of a company’s success or failure to compare to the model’s predictability. Some notable indicators of success include the number of employees, total invested equity, and country of origin. Overall, being able to predict technological disruptors is key for industries to be ahead of the curve as to what significant changes will lie ahead.

As for my STS research, I examined what impact generative AI will have on the labor market. To examine the findings, I examined why businesses are investing in generative AI technology and seeing what the positives are of a future with generative AI. At the same time, I examined potential pitfalls and concerns of generative AI to understand what can be done in the future to minimize the potential risks associated with generative AI. By making these evaluations, I can understand what workers need to do going forward and create recommendations going forward to ensure a better future for the next generation of workers.

The results show that concerns about job displacement are valid. In the short term, there are potential job losses that lie ahead. However, the job displacements will create new opportunities for workers in the long run. At the same time though, workers on lower incomes will be more impacted by generative AI than higher-wage workers. Going forward, policy recommendations that are needed are investments in training and development, ensuring accuracy with the spread of information, and creating a committee of people focused on addressing workers’ concerns to AI developers. If policymakers focus on those recommendations, our future with generative AI will be a lot better and prosperous for workers.