Developing a Recommendation System for Collegiate Golf Recruiting
(Technical Report)

Improper use of facial recognition technology due to the problem of many hands: The case of
Robert Williams, Detroit Police, and DataWorks Plus
(STS Research Paper)

An Undergraduate Thesis Portfolio

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Socio-Technical Synthesis

My technical report and STS projects are loosely tied together, both exploring technologies that are driven in largely by predictive modeling and machine learning. In what follows, I will first discuss the technical project set out in the Technical Report, a golf recruitment recommender system built by our team. Afterwards I will briefly summarize my STS Research paper, using Actor-Network Theory and the Problem of Many Hands to better understand failure of DataWorks Plus's facial recognition technology in the context of the improper arrest of Robert Williams by the Detroit Police department. In culmination, I will look at both projects and see how simultaneous effort on each project benefitted the other.

In the technical project, my team developed a recommender system for high school golf athletes. Prior to our work, there was no technical solution to this problem; the only recruitment aid for golfers was to hire a private consultant, an inefficient process due to large information asymmetries between players and programs. We built a predictive model-based solution that leverages several modeling techniques, delivering a recruitment dashboard that gives college programs both wholistic and nuanced views on high school golfers. A limited implementation of the dashboard is already in use—with our client showing it to several current programs, and college coaches have already begun recruiting several recommended players.

My STS research paper addresses the case of the failure of the Detroit Police department's use of DataWorks Plus's facial recognition technology. In this case, the Detroit Police improperly arrest of Robert Williams because of flawed use of facial recognition technology. This case has been scrutinized, and scholars have written on the topics calling for government control of facial recognition technology and analyzing systematic biases in these

systems. My analysis contributed to the literature by arguing that blame cannot be looked at from the individual perspective of either the Detriot Police and DataWorks Plus—that there is a collective responsibility that both hold to the citizens they affect (directly or indirectly). I use Actor Network theory to define the roles of the actors within the system and the Problem of Many Hands to define this joint obligation. My paper added to the understanding of how to analyze failures in highly interconnected systems with predictive model-based technologies.

At the onset of the technical project, the first thing my team did was to dive into the data; looking for potential connections, trends, and flawed or missing data. Generally, this is the initial approach when building a predictive model—looking at historic results, finding successes and then backing out common factors—however, working on my STS problem illuminated a few key lessons about predictive analysis. Firstly, when looking data, understanding the initial state of the data current approach and finding biases in the data is incredibly important. For example, the fact that a non-trivial amount of golfers game the junior rankings algorithm to maximize their rank, is incredibly necessary to control for in our predictive analytics, otherwise reintroducing this bias. Second, is understanding how key actors in the system will be affected by the introduction and assimilation of the technology into the world. My work on the technical project influenced my STS Research paper, by showing that the idea of predicting the effects of your technology is incredibly difficult to do. We leveraged the perspective of outside coaches to help validate our results, and they began recruiting players our preliminary models suggested. We as a team had not foreseen this and quickly realized technology can and will be leveraged immediately when released into the world. Both projects have had influence on the other, and without the STS project my technical report would likely not have paid any attention to removing potential biases.