

Thesis Project Portfolio

An Interdisciplinary Approach to Sports Analytics in a University Setting

(Technical Report)

Creating a Framework for Target-Setting Problems of Univariate Data

(STS Research Paper)

An Undergraduate Thesis

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

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In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

My technical project was centered around the proposal for an establishment of a Sports Analytics Center for UVA athletics. As of 2019, sports analytics has grown to be a \$780 million industry. Many organizations and institutions contribute to the field through research in exercise science, optimization of in-game decision making, sports marketing, business performance, and sports compliance fields. We proposed an open, interdisciplinary approach to sports analytics within institutes of higher education to work across many fields and provide opportunities to diverse members within the community, enable research and communication across fields, serve the surrounding community, and ethically use data.

I was killing time in an airport when the idea for my STS paper came to me. My friend pulled out his laptop to introduce me to a game called Bustabit in order to make what he comically referred to as “free money.” The game involved gambling bitcoins over the internet with an international user base. Within 5 minutes, my friend netted about \$40 worth of bitcoin effortlessly. Immediately, two courses I had taken during my Systems Engineering study came to mind: Stochastic Decision Modeling, and Linear Statistical Models. I knew that there must exist a better way to play the game than my friend was doing, and I also knew that his short-run success was not indicative of the game as a whole. Ten minutes and negative \$100 dollars later, I realized that people all over the world are lured in by the potential of “free money” in gambling, only to fall victim to what is truly going on: a negative expected return. So, I sought to apply analytical processes to (1) debunk the notion of gambling being in our best interest by demonstrating that the expected return for the game is negative and (2) create a framework for target-setting problems of univariate data.