

# **Thesis Project Portfolio**

## **Measuring Airport Similarity to Create a Towering Decision Aid**

(Technical Report)

## **The Takeover of AI in Sports**

(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**

The STS thesis investigates the use of artificial intelligence in sports, specifically in the realm of American Football. I start off by taking a step back and exploring the use of computer generated algorithms in some of the largest industries in society such as healthcare and stock market trading. The goal of the thesis is to investigate how artificial intelligence in American Football compares to healthcare and stock market trading in order to try and analyze how computers are changing the role of coaches, and where it might go in the future. By exploring how and why the role of the coaches is changing we can better adapt to the modern era of algorithmic decision making. It is important to understand how computers have helped other industries in order to comprehend how sport coaches can acclimate to similar computerized decision making. Since sports play such a vital part in our society today, being able to apprehend the changing roles of coaches is very stimulating to me. Moving forward, it will be very intriguing to see if even more decisions, especially ones that are less black and white, will be generated by algorithms rather than a coach's gut feeling.

The technical thesis focuses on the need for a new system for determining the benefit of an ATCT specifically for smaller airports in class D airspace. The criteria used in the current model is vastly outdated and is biased against smaller airports in class D airspace. The primary goal of my project is to quantify the benefits that an Air Traffic Control Tower would provide to a Class Delta airport. I will not be proposing any changes in the design of the tower, airplanes, or technology; but rather, the focus will be on formulating a system to consider if it is beneficial for a smaller airport of Class Delta to build an ATCT. Some areas of focus are safety, financial, customer experience, and environmental benefits. We were able to create a final model that can quantify the benefit of having an air traffic control tower at an airport that currently lacks one.

Hopefully, this model can be beneficial for Air Traffic Control and will make it easier for airports to verify their need for a traffic control tower.

Although my projects were very disconnected, I think both were extremely stimulating and allowed me to use much of what I have learned at the University of Virginia in order to accomplish extensive research and problem solving. I want to thank everyone who helped me during my last year at the University of Virginia, and to those who guided me during my research. I want to make a special thanks to Professor Ferguson and Professor Fleming who took extensive time in order to teach and lead me in my projects.