

Thesis Portfolio

Convolutional Neural Network for Automated Cobb Angle Detection
(Technical Report)

Analysis on the Effects of Machine Learning within the Healthcare System
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Sciences
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science in Engineering

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SocioTechnical Synthesis

Adolescent Idiopathic Scoliosis (AIS) affects up to 3% of children in the United States (U.S.), and it is the most common form of spinal deformation (U.S. National Library of Medicine, 2019). The current process to measure deformation of the spine is prone to error as the doctor will use a ruler, pencil, and protractor to make the measurements. This process also takes time that the doctor could be using to tend to other patients (Safari et al., 2019). Our team will develop a completely automated machine learning algorithm to accurately and efficiently calculate Cobb angles from X-ray images. The machine learning algorithm will improve upon the current art by eliminating human error and saving physicians valuable time.

The introduction of machine learning will alter the relationships between stakeholders within the healthcare system. As these relationships change, it could result in larger implications for the entire healthcare system. I will use Latour's Actor Network theory to analyze how introducing machine learning alters the relationships between stakeholders. To learn more about this process I will interview different stakeholders surrounding the healthcare system. I will supplement the interviews with case studies of medical organizations that utilize machine learning. My technology and STS research will determine how machine learning should be introduced into existing technical-socio systems. Specifically, this STS research will inform my team how to design and introduce our algorithm to better incorporate it into the medical field.