

Thesis Project Portfolio

An Analysis of Geometric and Machine Learning Approaches to Speaker Diarization
(Technical Report)

The Real Value of Work in an Increasingly Artificial World

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

Oliver Olsen

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Department of Systems Engineering

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AI and Vocational Work

My technical project involves improving a machine learning algorithm's ability to diarize speakers in a conversation. As I began working on my technical project, I realized the intimate relationship engineers have with the public. I saw first-hand that AI has the potential to shift the way our society has viewed labor historically. My sociotechnical research has focused on the question of AI and its potential shortcomings for the workingman from a spiritual aspect. AI can be used ethically, to provide optimal decisions to stakeholders but it must be done with an approach that values all the actors involved in the technology, we must recognize that work is intended for the good of man.

In my STS research, I analyzed the way the West has viewed work and what responsibilities the government has to the working man. Specifically, I turn our attention towards the dangers AI will pose to the laborer and provide suggestions for how our society can engage with AI and keep our souls. The West's attitude toward work ultimately values strict productivity, while I will argue that man's most rightly ordered attitude will view work as a vocation, or a "voice" as Stephen Covey explains in his book *The 8th Habit*.

The technical portion of my thesis is an improved speaker diarization ML model. Specifically, we utilized a state-of-the-art technique to label two speakers in a database of conversations. Once we obtained a vast amount of labeled data, we were able to fine-tune Pyannote — a speaker diarization model by Herve Bredin — to provide a more accurate model that will be used in the future to distinguish between two speakers in a conversation.

STS perspectives support ethical responsibility in engineering by considering not only the technical aspects of our project but also the organizational and cultural elements intertwined in our problems. Martin and Schinzingers' *Engineering as a Social Experiment* has helped me better understand the retrospective tendency of engineers and entrepreneurs. We often have great ideas but fail to recognize the prospective shortcomings of the project. By considering all the actors involved in the problem, we have a more context-rich understanding of our current situation, and more easily understand what better looks like for our solutions.