Thesis Portfolio

Thunderstruck the Meter – An Affordable DC Panel Meter

The Impact of AI on Future Education

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

Jacob Clatterbuck
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Department of Electrical and Computer Engineering

Table of Contents

Sociotechnical Synthesis

With the recent advances in Natural Language Processing and AI technologies, many new societal challenges are being discovered. While these tools are incredibly powerful and stand to provide an incredible boon to humanity, there have already been incidents of individuals using them for dishonest purposes. My STS thesis investigates the impact these AI technologies will have on the field of education, both positive and negative. Uses such as Automated Teaching Assistants can help students and teachers by providing immediate feedback and information while reducing workload, but uses such as instant essay generation could harm society by allowing students to plagiarize undetected with ease. Research is conducted and the data analyzed to determine both the efficacy of currently existing tools as well as the plausibility of using AI for academic fraud.

While there are existing DC Panel Meters on the market, they can be extremely expensive, ranging anywhere from one hundred dollars up to several hundred dollars. The available options either include unnecessary features or are poorly designed and provide low accuracy with no protection. Our technical project aims to find a middle ground, taking into consideration both an attractive price point as well as well thought out functionality. We designed a DC panel meter that can read current and voltage down to 1mA and 10mV resolution, while still providing the necessary reverse polarity, short circuit, and over-current protection. The device is designed to be paired with an existing power supply, eliminating the need for purchasing a new and more expensive power supply that has these filters built-in. While this design choice does eliminate waste by allowing the user to utilize a preexisting power supply to create a lab bench, making the design more sustainable and environmentally sound, it does create an ethical issue in the form of removing business and jobs from manufacturing companies that are creating newer products with these built-in features.

The technical subject of the STS thesis and the technical topic for the Dept. of Electrical and Computer Engineering are not related.