October 7, 2025

Dear Hiring Manager,

I am thrilled to apply for the AI Software Engineer II position at Terex Corporation's 3rd Eye division in Austin, Texas. With a Ph.D. in Chemical Physics and over a decade of experience designing and deploying intelligent systems, I bring a unique blend of theoretical depth and hands-on expertise in AI, machine learning, and edge device integration. My passion for crafting innovative solutions that bridge complex data challenges with real-world impact aligns seamlessly with Terex's mission of transforming the waste industry through sustainable, technology-driven solutions.

My career as an AI-focused software engineer and physicist has equipped me with the precise skills outlined in your job description. I am proficient in Python, C++, and Linux, with over five years of experience using these tools to develop complex algorithms and real-time control systems. At Elastium Technologies, I architected automation frameworks for high-performance materials manufacturing, integrating embedded systems and real-time data processing on edge devices—work that mirrors the embedded AI deployment and firmware collaboration required in this role. My projects involved modeling and testing machine learning solutions for process optimization, ensuring seamless integration with hardware teams, much like the cross-functional partnerships emphasized at 3rd Eye.

A standout achievement is my development of a custom control system for a single-crystal shape-memory alloy furnace at NRD LLC, where I leveraged Python and Pandas to analyze vast datasets, build predictive models, and implement real-time processing solutions. This required pulling data from multiple sources, employing ETL processes, and ensuring projection accuracy through rigorous statistical analysis—skills directly applicable to creating and testing AI software for large data swaths as described in your posting. Additionally, my familiarity with relational databases like MySQL and tools such as Git for version control aligns with your technical requirements, while my experience with Agile practices and test-driven development ensures I can contribute to rapid, efficient solution delivery.

Beyond technical expertise, I offer a proven ability to innovate within collaborative environments. As a Senior Lecturer at Cal Poly, I've honed my capacity to communicate complex concepts clearly, fostering teamwork across diverse groups—a critical asset for working with machine learning and data engineering teams at Terex. My personal projects, like Physics Cloud, a bespoke learning management system, demonstrate my initiative in building full-stack solutions from scratch, integrating data science and user-focused design to solve intricate problems. This mirrors the analytical and problem-solving skills Terex seeks for aligning AI strategies with company goals.

What excites me most about this opportunity is Terex's commitment to environmental stewardship through its Connected Collections ecosystem. I am inspired by the chance to apply my AI and computer vision expertise to enhance eco-friendly equipment and technology, contributing to a greener, healthier planet. I am confident that my multidisciplinary background, from developing embedded AI applications to partnering on cutting-edge hardware integrations, positions me to make an immediate and lasting impact at 3rd Eye.

Thank you for considering my application. I am eager to bring my passion for AI innovation, my technical acumen, and my collaborative spirit to Terex Corporation, helping to advance your mission of improving lives through sustainable technology.

Best Regards,

Christopher Culbreath

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