

# Bridging the Gap Between Machine Learning and Social Impact

Machine Learning's allure isn't in abstract algorithms but its social transformative potential. It isn't a magic trick but a tool to empower my community. This realization sparked the creation of Simue Labs, my R&D hub, where machine learning became a catalyst for change.

My journey began with designing and building a three-phase fault detection system that leverages artificial neural networks (ANN) and a Decision Tree Classifier to identify and classify symmetrical and asymmetrical faults in power grids, detect partial discharge before it becomes dangerous, and isolate failed parts of the grid to prevent cascading faults. This initiative aimed to ultimately reduce downtime and improve operational efficiency. It didn't stop there. I also developed a smart weighing scale for enhanced inventory management and a cybersecurity threat-hunting system.

My latest project involves building a machine learning platform for rural youth in agriculture to increase yields and reduce the persistent cycle of poverty and food insecurity. The platform is part of a larger project tentatively named "Kula Smart" that offers modular technology kits, including affordable agricultural IoT kits for optimal soil conditions monitoring and crop disease and pest monitoring.

Kula Smart will offer personalized financial education, recommendations (for crop selection, planting times, etc.), microloans, and an e-commerce section to help them access new markets. The goal is to support 10,000 young rural farmers in my village and the larger part of rural Kenya in 5 years.

I'm also captivated by the potential of digital twins and spatial computing. Beyond the buzzwords, I envision them revolutionizing numerous industries, including e-commerce, social media, and the medical industry. I envision AR applications where firefighters could see heat signatures through smoke-filled rooms or surgeons could view patient data projected onto their bodies during surgery. I also envision the creation of digital twins that would use ML models to simulate drug interactions at a molecular level, accelerating early-stage drug discovery and saving pharmaceutical companies millions on lab testing. I would love to work with the university to research machine learning models that can streamline spatial computing development.

Other than these, my ultimate goal is to create a Pan-African health-tech startup dedicated to affordable medical devices. Here, 3D printing and ML converge. By producing 3D-printed implants, prosthetics, and smart ML-powered medical devices, we can reduce costs by up to 60% while maintaining healthy profit margins. I envision Simue Labs creating accessible medical devices that can detect and warn of epilepsy occurrences before they occur and call for help, sense ECG patterns to detect heart problems at home, and affordable hearing aids integrated with machine learning, among many other medical devices. I understand that I will

need to take further studies in biomedical engineering in the future, but this degree will expose me to computing principles that will contribute immensely to making the health-tech startup a possibility.

My ambitions may seem audacious, but my journey with ADHD has been a testament to perseverance, patience, and hard work, which I believe I will need while pursuing these big goals. Joining your esteemed program isn't just about acquiring knowledge – it's about joining a community that shares my vision of a future empowered by responsible innovation.

This isn't just a personal statement; it's an invitation to co-create a transformative future. You'll gain a passionate and driven student eager to learn from your esteemed faculty and collaborate on groundbreaking research by admitting me. The opportunity to network with mentors who can guide me in selecting the most impactful projects will be invaluable in achieving my ambitious goals.