Breaking barriers: Scientist uses AI to transform healthcare

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Mbithe Nzomo won a prestigious UNESCO-L'Oréal for Women in Science Award for her work involving Artificial Intelligence (AI) to develop tools that could help prevent serious conditions, such as a common heart rhythm disorders and their related complications. [Courtesy]

A young Kenyan scientist is defying the odds to develop personal health monitoring systems that bring advanced medical insights closer to everyday life.

Mbithe Nzomo, a doctoral student at the University of Cape Town, has won a prestigious UNESCO-L'Oréal for Women in Science Award for her work involving Artificial Intelligence (AI) to develop tools that could help prevent serious conditions, such as a common heart rhythm disorders and their related complications.

Her doctoral research focuses on a software architecture designed to streamline the creation of these tools. The systems would analyze data from wearable devices and integrate it with medical knowledge, electronic health records, and other patient information.

"I propose a hybrid approach," Nzomo said. "It detects patterns in data and models medical knowledge. It can help predict and prevent conditions like heart disorders."

Nzomo, who began her PhD in Computer and Information Science in March 2021, focuses on wearable sensor data and knowledge-driven AI models.

Her goal is to predict an individual's risk of disease early and suggest strategies to mitigate it. She conducts this research at the Artificial Intelligence Research Unit at the University of Cape Town.

The UNESCO-L'Oréal Awards aim to support women researchers worldwide as women remain underrepresented in science, technology, engineering, and mathematics (STEM).

Health monitoring

Globally, women account for less than 30 per cent of researchers, according to UNESCO. In the field of AI, recent industry reports suggest that women constitute only around 20 per cent of the workforce worldwide. In sub-Saharan Africa, the numbers are even smaller, with fewer women gaining opportunities to specialize in advanced AI research.

In an interview with The Standard, Nzomo shared that her interest in computer science began during her secondary school years in Nairobi.

"I became interested in computer science in secondary school," she said. "For my final exam, I built a system to computerize the records of a cleaning company." She then decided that computing and technology were fields where she could excel and make a difference.

Generative artificial intelligence (AI) technology has applications in the healthcare industry. [iStockphoto]

She hopes her work will improve outcomes by alerting caregivers and patients to health risks

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early. She wants to see this technology used in ways that expand access to healthcare in resource-constrained regions.

“My research on health monitoring systems could help expand access to healthcare, particularly in remote, rural regions,” she said. In many parts of Africa, health data is not always readily available in digital form. Hospitals and clinics may lack comprehensive electronic health record systems. This shortage of reliable data complicates the creation of AI-driven health solutions.

Nzomo acknowledges this challenge. “In Africa, we are often resource-constrained,” she said, noting that a lack of digitized records limits the potential of AI in predicting diseases.

Data collection

She calls on governments and healthcare institutions to improve data collection and storage believing that better access to high-quality data will boost the accuracy and reliability of AI models. The researcher also recognizes the importance of trust. Introducing AI tools in healthcare demands acceptance from both clinicians and patients. “It is not something that will replace clinicians,” she said. “It is a tool they can collaborate with.”

By working first with medical professionals, Nzomo believes her system could gain credibility. Clinicians, who patients already trust, can then help explain the benefits of these AI solutions.

Another priority is data privacy. Nzomo points to federated learning as a promising direction. In this approach, data never leaves the individual’s device helping safeguard sensitive health data and ensuring patient confidentiality.

Bias in AI systems is another concern. Women, Africans, and other underrepresented groups need to be more involved in building solutions. Nzomo is aware of the inequalities and acknowledges that, to reduce bias, more African researchers must shape the tools and platforms that serve their communities

The UNESCO-L’Oréal recognition brings with it funds for travel and publishing. Conference participation and journal publication require investment and access to these resources helps researchers gain visibility, build networks, and refine their ideas.

Nzomo said the award has already made a significant impact on her career. She has met other scientists, discussed ethics in AI, learned about branding, and improved her negotiation skills. She expects these lessons to guide her future efforts.

Practical metrics

Looking ahead five to ten years, Nzomo aims to measure her success using practical metrics. She hopes to see a reduction in the prevalence of certain non-communicable diseases across the continent.

Her goal is to improve early disease detection. She plans to regularly update her models, incorporating new data and insights as they become available. Her systems are designed to be flexible, adapting over time as health conditions, data availability, and technologies evolve.

As an African woman in a male-dominated field, Nzomo understands the importance of representation.

She recalls questioning her sense of belonging: “I have sometimes questioned whether I belong,” she said. “But my ideas and contributions are just as valuable.” She wants young women to know that it is possible to thrive in STEM.

She highlights the UNESCO-L’Oréal initiative as one of many supportive communities and urges women to believe in themselves and seek out these opportunities.

“In the end, I matter, my perspective matters, and my research matters,” Nzomo says.

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