Artificial Intelligence – A Game Changer for the Health Sector in Uganda

Photo: One of CENIT@EA interns, Hillary Kaluuma who successfully implemented a project at the Ugandan Health Innovations Academy in Uganda.

For a period of 6 months, the Infectious Diseases Institute (IDI), through the Ugandan Academy for Health Innovation at Makerere University in Kampala, Uganda, gained valuable contribution from the young professionals of the Centre of Excellence for ICT in East Africa (CENIT@EA). CENIT@EA is a digital transformation project spearheaded by the German Development Cooperation in collaboration with the East African Community (EAC).

"Working with Young Professionals whose expertise in Artificial Intelligence, Machine learning and Data analytics to mention but a few, supported by the state-of-the-art curriculum of Masters in Embedded and Mobile systems offered by CENIT@EA, is quite unique to find in the East African context highly in demand of tech-enabled solutions for long existing health challenges" as stated by Dr Martin Balaba, Senior Academy Lead for Adaption and Partnerships at IDI.

There is an estimated 1.5 million people living with HIV and more than 60,000 with tuberculosis (TB) in Uganda. In order to support the organization's mission, to strengthen health systems in Africa, through research and capacity development, the Infectious Diseases Institute (IDI) partnered with the East African Community's Centre of Excellence through an internship and research collaboration between the Centre and IDI's project, the Ugandan Academy for Health Innovation and Impact, in the Young Professionals Programme whose main goal is to foster

industry and academia partnership in Innovation transfer and knowledge exchange. The Health Innovations Academy's work is centered around laying the foundation for improved health outcomes of livelihoods in Uganda through innovations in clinical care, capacity building, systems strengthening and research, which inform policy and practices, with a strong emphasis on infectious diseases such as, HIV and TB. The Health Innovations Academy is funded by Janssen as part of its commitment to global public health through collaboration with the Johnson & Johnson Corporate Citizenship Trust, with a core focus on innovative collaborations that spark creativity and inspire public health leadership. IDI implements numerous projects with and for Ministry of Health Uganda, Centre of Disease Control (CDC) and USAID among others.

During the 6-months internship programme, the Health Innovation Academy engaged two CENIT@EA interns who were keen on taking complex challenges to drive health innovations using ICT. One of the interns, Hillary Kaluuma, has successfully developed a mobile application that enhances capacity of existing software being used in the national covid-19 response, a project that has been presented to the Ministry of Health for implementation, currently being integrated to IDI's existing systems.

One of the other projects, being implemented by Favour Ceasar, was the development of Artificial Intelligence (AI) algorithms to determine outcomes on adverse effects on patients who are on the HIV treatment. Incorporating Machine Learning and Artificial Intelligence in health innovations is a key research area of interest for the Health Innovations Academy, noted Francis Musinguzi, Internship supervisor and Software Development Lead at IDI. Interestingly, the projects worked on are also master theses that are feasible and practical to the industry.

"I am happy to say that the CENIT@EA Young Professionals internship programme has contributed largely to the success of our ongoing programs, combining on-going innovation with available technologies will be key to unlocking impactful solutions for public health", explained Dr Martin Balaba. IDI has committed to offer an employment opportunity to one of CENIT@EA's young professional through the success of the project implemented.

Notably, is the successful development of a mobile application system to enable efficient use and the implementation of the Home-Based Care Services to patients in outbreak of covid-19. The mobile system is targeted for us by the Village Health Teams (VHTs), which are part of Uganda's healthcare delivery structure. The system will explore the use of Home-Based Care as an alternative to Hospital based treatment, to reduce the pressure/stress on the existing healthcare systems resulting from the increasing spread of covid-19 and inadequate resources in the healthcare centers.

This mobile system encompasses the use of Android technology, server-side scripting technologies, database technologies, the existing Uganda healthcare system structure of VHTs and IDI's academy's Call for Life (C4L) system. The system offers IDI another unique product which the Ministry of Health (MOH) can use to strengthen the existing healthcare system, which is line with the overall mission of IDI. Furthermore, it solves the problem of delayed access to information on covid-19 patients in their localities, as it can share real-time information to any preferred system of Ministry of Health in Uganda. IDI is proud to further implement the project as it provides a proof of concept that applies an existing idea into a fully functional system that can be refined and used to pitch for grants as a prototype. The digital solution in place is believed to be a potential game changer for the Ministry of Health in Uganda as it offers Uganda's health system of VHT, a platform that enables them to carry out home

based treatment and care in their localities while building capacity and a robust structure that supports the health sector of Uganda and the East Africa region in general, to handle future disease outbreaks and sudden enormous influx of patients.

"My work at IDI posed as a great challenge and fascinating learning curve that prompted me to critically think on suitable solutions for problems, offering me an opportunity to contribute to improvement in the healthcare services for my country and save lives." I look forward to a rewarding career opportunity with IDI and hope to embrace for as long as it takes", adds Hillary Kaluuma.

Designing digital health solutions in East Africa is simply backed by the need to improve access to best healthcare for vulnerable communities in the region. The ultimate goal of digital innovations in health is to improve our ability to meet public and personal healthcare needs and demands by optimizing the performance of the health system.

Through the collaborative programme, IDI and the Health Innovations Academy have been able to engage the expertise of the master's students leveraging the knowledge transfer and exchange on technologies to demonstrate a sustainable health impact for the region. Simply put, the ultimate goal of health innovations is to improve our ability to meet public and personal healthcare needs and demands by optimising the performance of the health system. In theory, innovations in healthcare should yield scalable solutions and improvements in health policies, systems, products, technologies, services, and delivery methods, in order to improve treatment, diagnosis, education, outreach, prevention, research quality and delivery, and access to healthcare.

The World Health Organization (WHO) explains that 'health innovation' improves the efficiency, effectiveness, quality, sustainability, safety, and affordability of healthcare. CENIT@EA's curriculum encourages new innovative approaches that uses the power of ICT to tackle issues of access to quality products and services, improving efficiency and effectiveness of industry operations.