

GLOBAL SOUTH AI FOR PANDEMIC AND EPIDEMIC PREPAREDNESS AND RESPONSE NETWORK

AI4PEP



ABOUT US



The AI4PEP Network is a multi-regional research network under the auspices of YORK UNIVERSITY, Toronto, Canada, with an avid commitment to advance the deployment of digital health solutions across the GLOBAL SOUTH. We are operating in nodes across six regions:

We take a decolonial lens towards the restoration of SDGs, 3 and 5

AI4PEP brings together an interdisciplinary team of data scientists, epidemiologists, physicists, mathematicians, software engineers, as well as disaster and emergency management, clinical public health, citizen science, and community engagement experts.

Our mandate is anchored in furthering Sustainable Development Goals 3 (Health and Wellbeing) and 5 (Gender Equality). As a network, we firmly believe that, if thoroughly harnessed, Global South-led Artificial Intelligence based solutions have the potential to strengthen the prevention, preparedness, mitigation, and response to emerging and re-emerging infectious disease outbreaks.



**For us,
Artificial intelligence
is the entry point
and One Health is
the unifying
approach**



OUR OBJECTIVE AND RESPONSIBILITIES

Our general objective is to strengthen equitable and responsive public health systems that leverage Southern-led responsible Artificial Intelligence based solutions to improve prevention, preparedness, mitigation, and response to emerging and re-emerging infectious disease outbreaks.

AI4PEP operates as a convener with key responsibilities of:

- Facilitating and supporting locally driven (Global South-led) health research initiatives**
- Fostering community participatory approaches**
- Advancing a strong Gender Based Analysis (GBA+) to help understand and tackle intersecting health disparities (Pioneering a Gender & Intersectional Approach)**
- Mobilizing locally based, relevant and relatable AI as a catalyst for a sustainable health solution**
- Investing in Global-South based researchers as co-creators of a sustainable, and resilient health futurity**
- Advancing national, regional, trans-regional and global collaborative initiatives to foster sustainable global health outcomes**

MEET THE EXECUTIVE DIRECTOR



Dr Jude KONG
Executive Director, AI4PEP



Dr Kong is a professor at the Dalla Lana School of Public Health; Institute of Health Policy, Management and Evaluation (budgetary cross-appointed) and Mathematics Department (cross-appointed), University of Toronto, where he serves as the director of the Artificial Intelligence and Mathematical Modeling lab (AIMM lab). Additionally, he is the Director of the Africa-Canada Artificial Intelligence (AI) and Data Innovation Consortium (ACADIC) and the Global South Artificial Intelligence for Pandemic and Epidemic Preparedness and Response Network (AI4PEP). He is also the Regional Node Liaison to the steering committee of the Canadian Black Scientist Network.

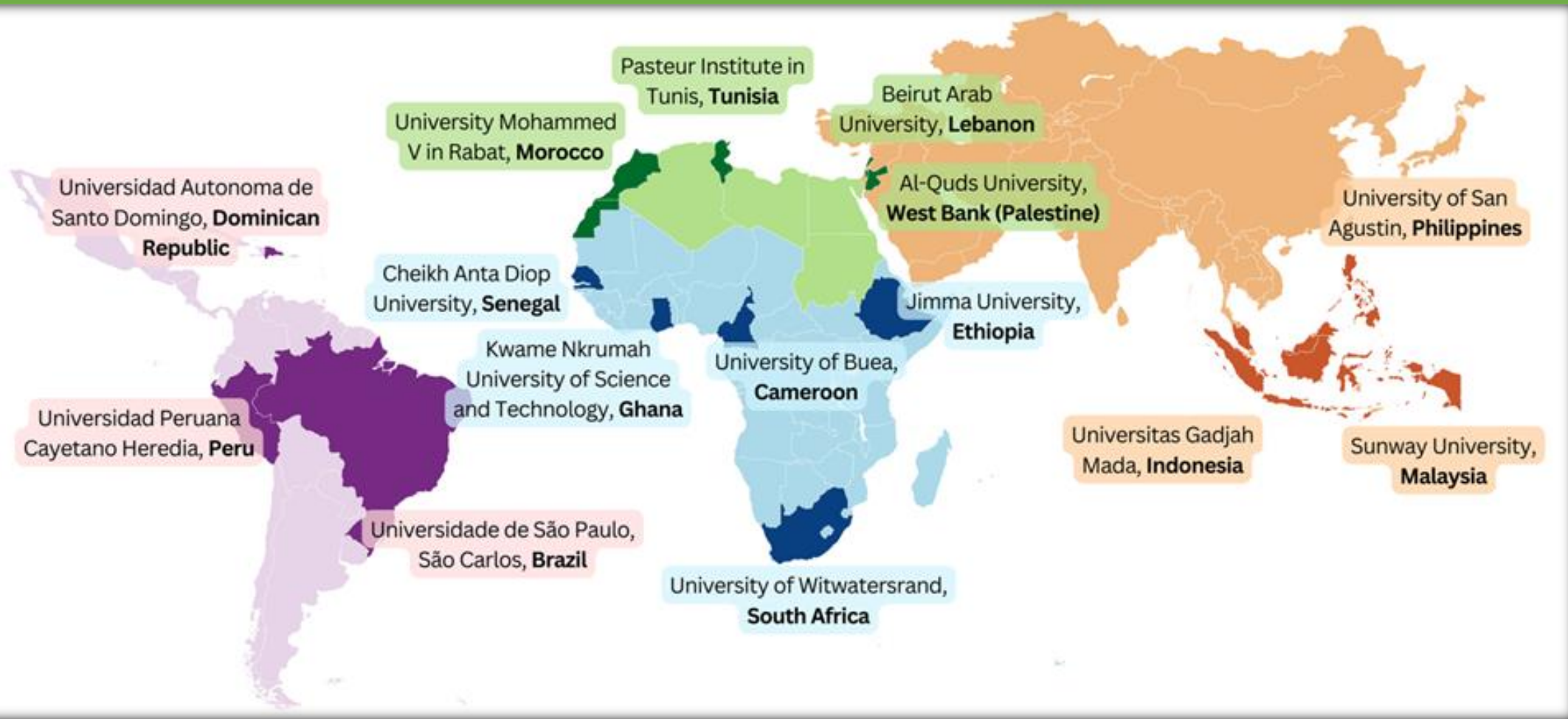
He obtained his Ph.D. in Mathematics with a certificate in Artificial Intelligence from the University of Alberta, and his MSc in Mathematical Modelling from the University of Hamburg, Germany, and the University of L'Aquila, Italy. His principal research program focuses on developing and deploying innovative artificial intelligence, mathematical and data science methodologies, and technologies for decisionmakers in communities, public health, government, and industry to provide important insights into local and global-scale socio-ecological challenges.

During the COVID-19 pandemic, Dr Kong led a team of 52+ researchers across nine African countries, using AI to help contain and manage the virus. In 2022, he founded the AI4PEP network, overseeing 160+ researchers from 15 countries. Dr Kong's many research contributions and exceptional leadership have earned him several prestigious awards and recognitions.



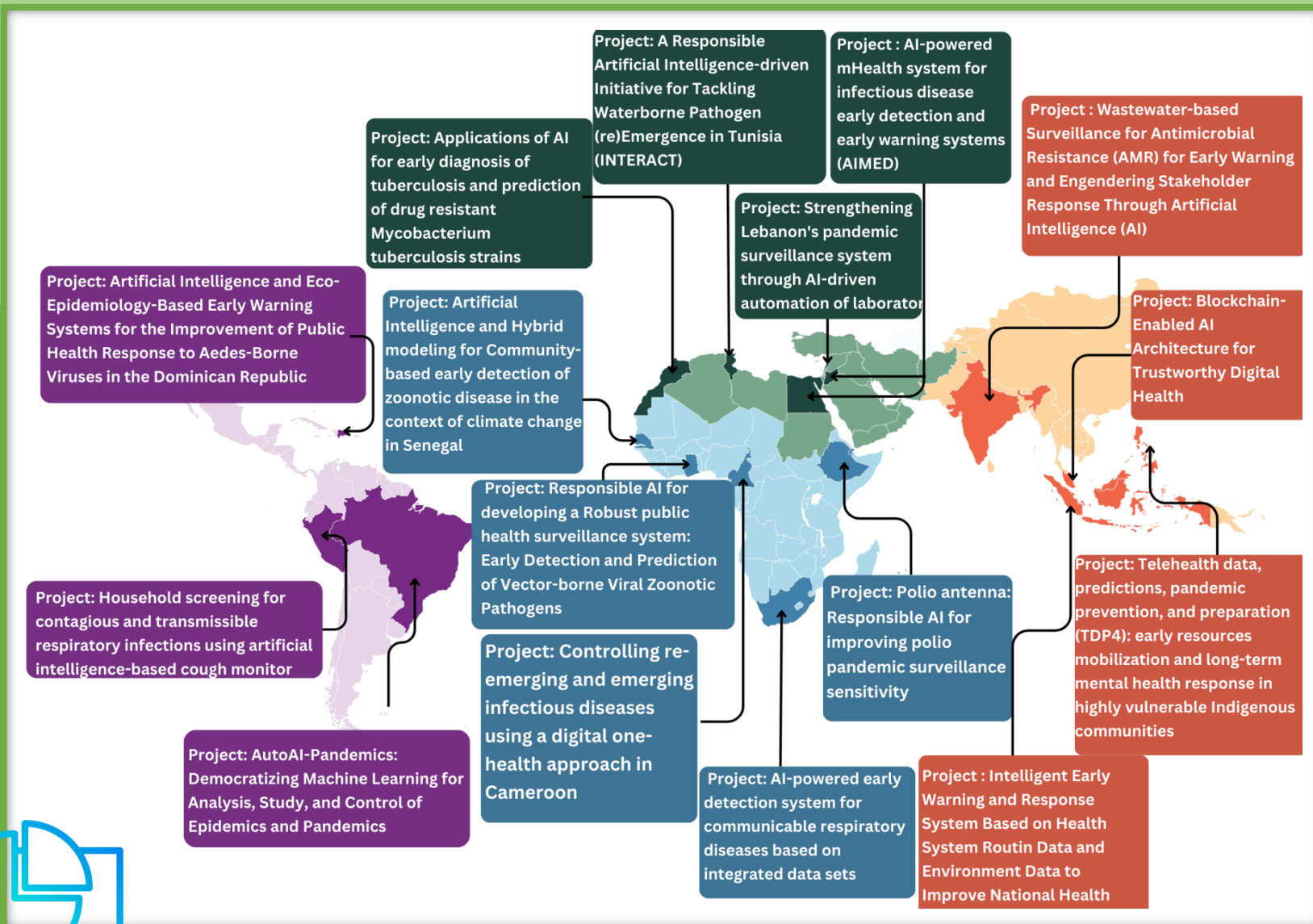
OUR HUBS

AI4PEP has 16 hubs,
4 from each region of the GLOBAL SOUTH: AFRICA, ASIA, LATIN AMERICA and the CARIBBEAN, and the MIDDLE EAST and NORTH AFRICA. Each node contains a diverse blend of research and implementation experts.





OUR PROJECTS



AI4PEP has 4 research FOCUS AREAS:

Early detection, Early warning systems, Early response, and mitigation and control of developing epidemics with AI being the entry point. One Health is the unifying approach that integrates and combines all these domains, that are usually siloed.



KEY

ACHIEVEMENTS 1

RESEARCH COLLABORATIONS:

Engaging 15 top academic, research, training and global health institutions across 4 regions of the Global South: Sub Saharan Africa, Asia, Latin America, and the Middle East & North Africa.

7 MAJOR AI SOLUTIONS:

Developed AI models for predicting and detecting public health threats:

- AI-powered IoT system for air quality monitoring in SOUTH AFRICA
- Polio Antenna Mobile App in ETHIOPIA for Acute Flaccid Paralysis (AFP) surveillance to Polio.
- Fake News Detection Solution and “Dominique” Chatbot in BRAZIL to combat public health related misinformation.
- AI-driven Mosquito and Climate Monitoring and Tracking System in GHANA
- ATIPAN+: AI-driven disease surveillance and prediction of mental health impact of public health emergencies using telehealth data in the PHILIPPINES.
- AI-driven wastewater surveillance of water-borne pathogens
- AI-powered Cough Monitor for household screening for contagious and transmissible respiratory infections

SOUTH AFRICA

The South African Consortium of Air Quality Monitoring (SACAQM)/the AI4PEP team at the University of Witwatersrand is tackling Air pollution with AI.

An AI_r system that uses affordable sensors to monitor air quality in real-time has been developed and deployed.

IDRC CRDI

AI_r: An African Solution for AI Health

<https://www.sacaqm.org>

AI_r is an integrated system

Air Quality Sensor → IoT Communication through 4G + LoRa → Dashboard + AI modelling

GC-0036

Predictive Deep Learning

Prediction curves for 3 days ahead Station: BEE

THE KANYE CONVERSATION Africa

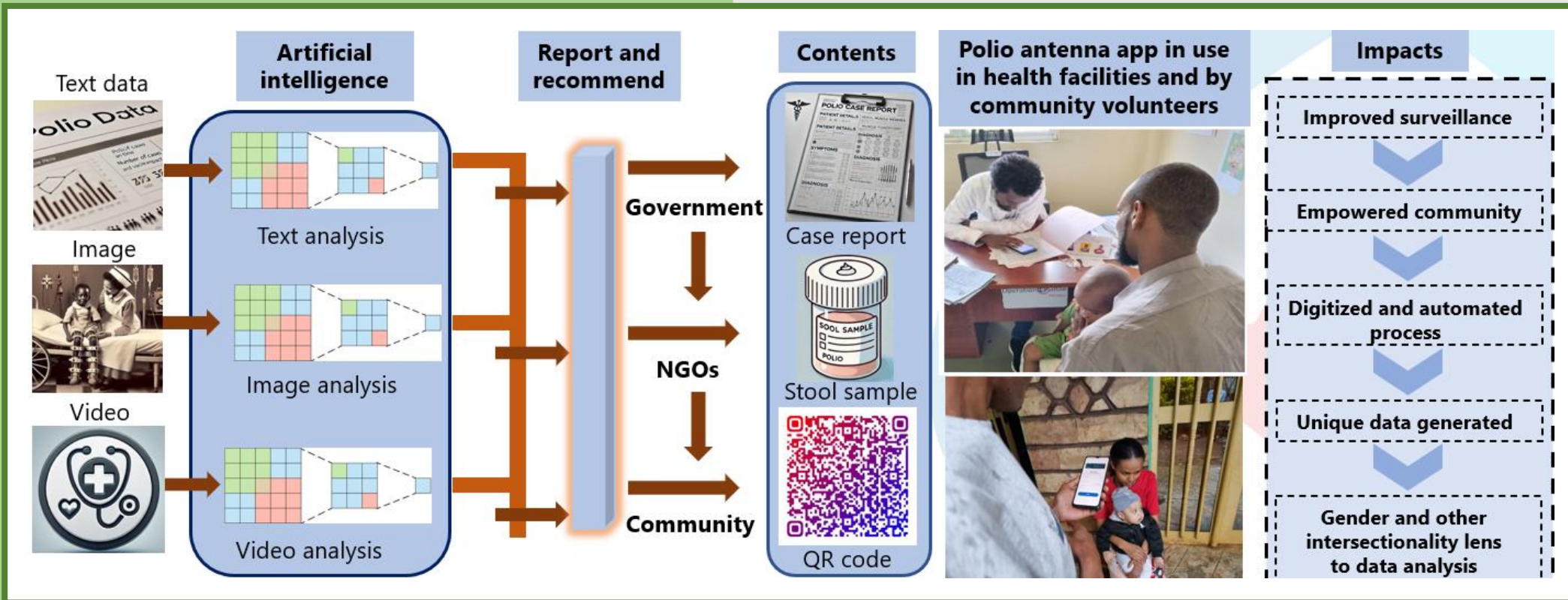
Feedback on current air status is sent to the AI powered central database in real time

AI Powered Central Database

Ai_r is made up of a collection of small boxes. The boxes can be mounted on a window sill of any building, where they take air samples

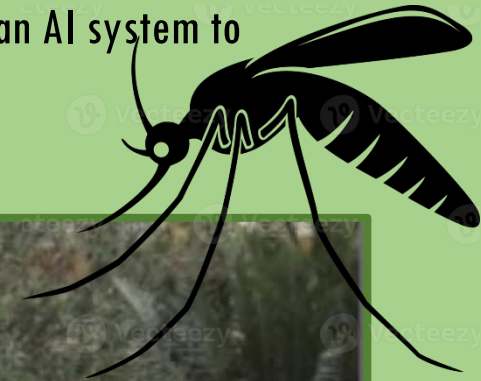
ETHIOPIA

Polio Antenna
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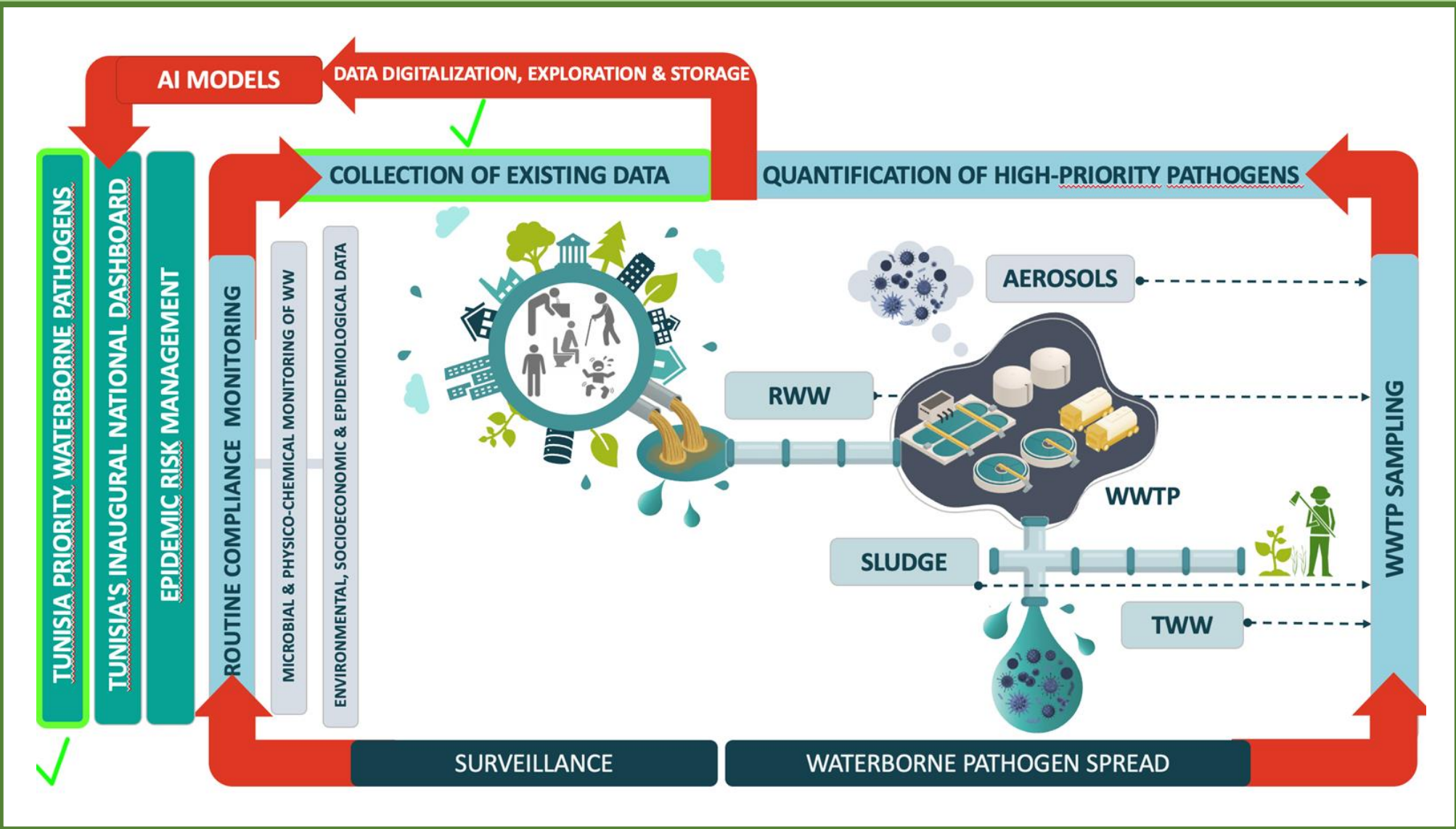
GHANA

AI-driven Mosquito and Climate Monitoring and Tracking System in GHANA. In GHANA, AI4PEP's RAPiD-VBP Project at Kwame Nkrumah University of Science and Technology is tackling malaria, by developing an AI system to track mosquito populations and provide real-time data.



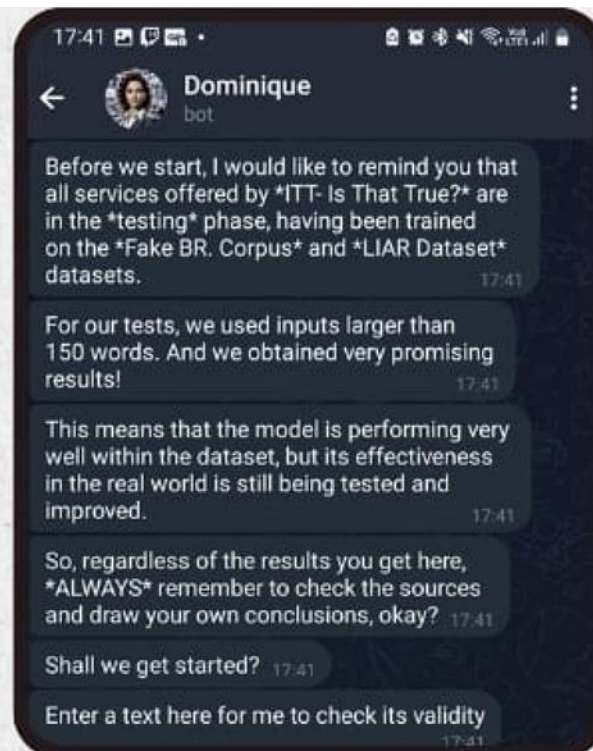
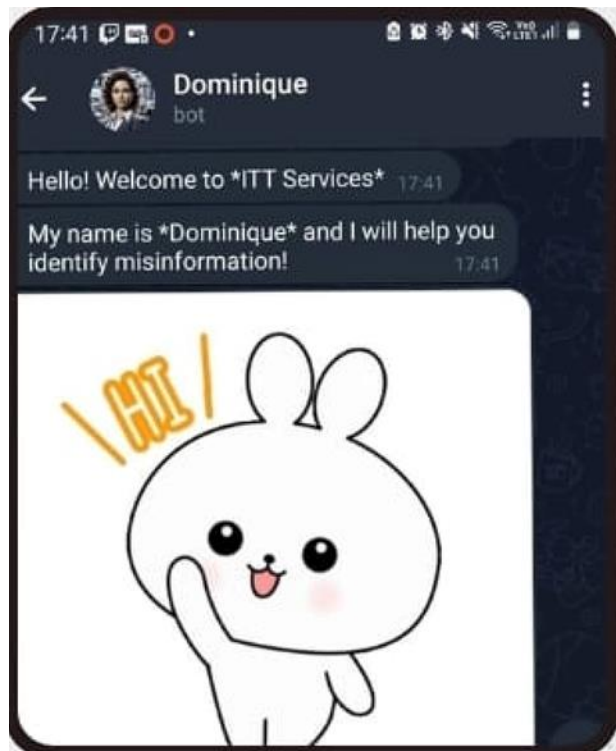
TUNISIA

AI-driven Wastewater surveillance of water-borne pathogens. "Responsible Artificial Intelligence-driven Initiative for Tackling Waterborne Pathogen (re)Emergence in Tunisia (INTERACT)" based at the Pasteur Institute de Tunisia had established a wastewater infectious disease surveillance system. A data dashboard and portal have been developed to display trends in pathogens and help map out waterborne disease risk hotspots and pathogen loads according to geographic location and environmental conditions across TUNISIA.



BRAZIL

Fake News Detection Solution, “Dominique” Chatbot in BRAZIL to combat public health related misinformation. Developed by AI4PEP researchers at Universidade de São Paulo, São Carlos, BRAZIL.



the PHILIPPINES

In the Philippines, ATIPAN+, an AI-driven Telehealth project at the University of San Agustin have made healthcare more accessible for remote and indigenous communities.





KEY ACHIEVEMENTS 2

Dr Pia Zamora and Dr Romulo de Castro receive the ODESS Award for ATIPAN about Telehealth for geographically isolated and disadvantaged communities in the PHILIPPINES.



HIGH-IMPACT PUBLICATIONS and VISIBILITY:

- 120 peer-reviewed articles in leading journals.
- 127 Research awards for papers published received
- 1100 people accessed data science books to democratize use of AI tools sold
- 60M accesses to our solutions and articles.
- 216 news published in major national and international media + 60M people directly and indirectly impacted

TOOLS DEVELOPED:

- AI models for disease outbreak forecast, prediction, and response e.g., COVID-19, Mpox, Dengue, and Avian Influenza.

TRAINED 500+ public health professionals in AI applications

INTERNATIONAL RECOGNITION

ATIPAN Project training
workshop at the University of
San Augustin in the
PHILIPPINES.



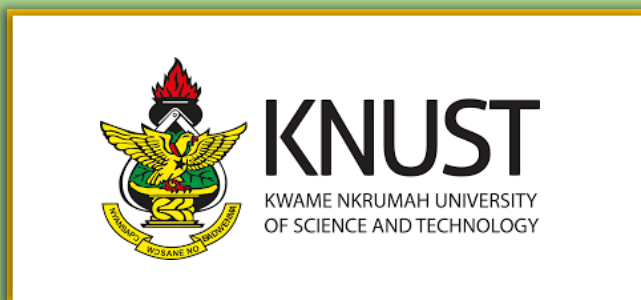
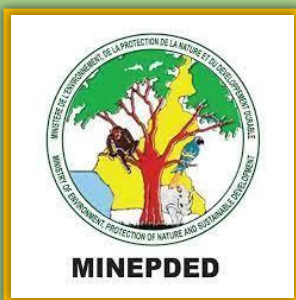
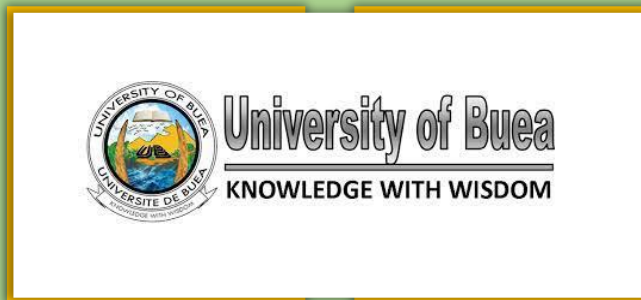
IMPACT AND FUTURE DIRECTIONS



- **POLICY INFLUENCE:**
Informing national and global health policies and governance on AI and healthcare.
- **GLOBAL SOUTH FOCUS:**
Strengthening health systems in Africa, Asia, Latin America, and the Middle East through 'global south voices'.
- **CONTEXTUALIZED and TAILORED SOLUTIONS:**
Responding to the needs and experiences of the communities including underserved and marginalized populations.
- **IMPROVED DETECTION:**
Faster identification of infectious disease outbreaks.
- **ENHANCING RESPONSE:**
Improving rapid and effective public health interventions.
- **CAPACITY STRENGTHENING:**
Contribute to training the next generation of AI and public health experts by engaging local professionals and researchers, enhancing their knowledge and skills for expertise and leadership.
- **INNOVATIVE SOLUTIONS:**
Forging AI-powered solutions for better health outcomes by expanding research, continue developing AI tools for health and increasing the reach of AI tools for underserved populations.
- **INCREASE COLLABORATION:**
Partner with more research and global health organizations.

PARTNERS CORNER

GOVERNMENT COUNTERPARTS, AND
COLLABORATING AGENCIES





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The main secretariats are at Dalla Lana
School of Public Health, University of Toronto, and
York University, CANADA

FUNDING AGENCIES



Canada



Foreign, Commonwealth
& Development Office

HOSTING INSTITUTIONS

YORK
UNIVERSITÉ
UNIVERSITY



Dalla Lana
School of Public Health



UNIVERSITY OF
TORONTO

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