

Department of Computer Science, University of Buea  
Workshop on

**AI4PEP Grant Award  
&  
Preparation for MIST End-of-Course Projects**

Thursday, 27<sup>th</sup> July 2023



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# Outline

- About AI4PEP
- About Digi-CARE
- Digi-CARE at Faculty of Science
- Student Projects

# About AI4PEP

- Global South **Artificial Intelligence for Pandemic and Epidemic Preparedness** and Response Network
  - <https://ai4pep.org/>
  - Has as objective
    - To strengthen equitable and responsive public health systems that leverage Southern-led responsible AI solutions to improve prevention, preparedness, and response to emerging and re-emerging infectious disease outbreaks

# About AI4PEP

- AI4PEP's Call for Proposal
  - Proposals to address AI4PEP's objective
  - 221 submissions were received from around the Global South
  - 3 submissions from Cameroon were found to be encouraging, and the 3 teams involved were invited to form a consortium
    - Interuniversity network for the control of reemerging and emerging infectious diseases using AI in Cameroon (Digi-CARE)
    - Digi-CARE is one of the 16 proposals that were successful in AI4PEP's call for proposal



# About Digi-CARE

- Interuniversity network for the control of reemerging and emerging infectious diseases using AI in Cameroon
  - Consortium comprising 3 teams
    - One based at Faculty of Science, University of Buea
    - One based at Faculty of Health Sciences, University of Buea
    - One based at School of Veterinary Medicine, University of Ngaoundere
  - Consortium headquarters: University of Buea
- Project
  - Controlling re-emerging and emerging infectious diseases using a digital one-health approach in Cameroon

# Digi-CARE at UB Faculty of Science

- Project Objective

- To leverage opportunities resulting from successes in AI, the widespread deployment of mobile telecommunication networks in Cameroon, availability of affordable mobile devices, and data visualization tools to
  - Develop innovative solutions to support and strengthen the country's public health infrastructure, with focus on the prevention, preparedness, and response to emerging and re-emerging infectious disease outbreaks
- The project stands on three pillars
  - Development of Consumer Health Informatics (CHI) solutions centred around mHealth technologies
  - Collection of quality health data for quality health outcomes
  - Development of searchable databases and corresponding dashboards for visualization of health statistics

# Digi-CARE at UB Faculty of Science

- CHI solutions
  - Two forms
    - WhatsApp conversational interfaces to provide health educational information and advisories on various health concerns
    - Mobile applications that provide **personalized** health information to people, based on their health profiles



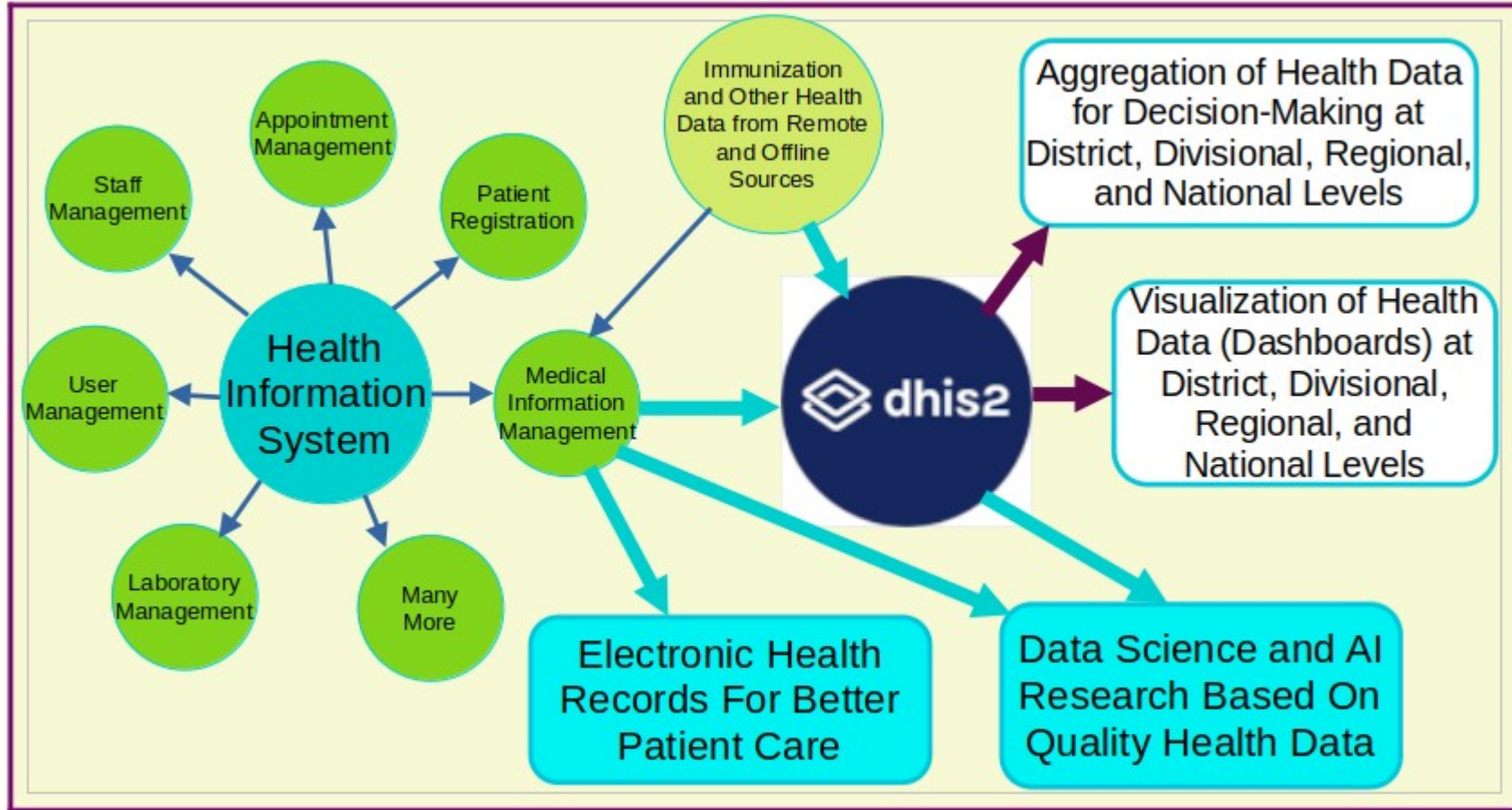
# Digi-CARE at UB Faculty of Science

- Collection of quality health data for quality health outcomes
  - Involves deployment and use Health Information Systems in health facilities
  - This addresses two concerns
    - The need to collect quality patient-level data electronically to enable more effective patient monitoring and better health outcomes
      - In essence, an electronic health records system
      - Additional benefits to the hospital: Management
    - Use of these data in the construction of intelligent models for AI-based solutions and other research requiring these data

# Digi-CARE at UB Faculty of Science

- Development of searchable databases and corresponding dashboards for visualization of health statistics
  - Idea
    - Ministry of Public Health currently collects and visualizes health-related data in a systematic way from all health districts in the country
    - But these resources are not currently easily accessible publicly
    - Plan is to develop online searchable databases and dashboards for visualization of these health statistics.

# Digi-CARE at UB Faculty of Science



# Digi-CARE at UB Faculty of Science

## *Design and implementation of systems*

System	Deliverables	Timeline
Acquisition, design, deployment of health information systems in 3 Health Centres	Functional health information systems	Month 6 to Month 18
WhatsApp conversational interfaces on maternal health	Hosting of interface on ManyChat platform	Month 6 to Month 18
WhatsApp conversational interfaces on a disease – HIV/AIDS	Hosting of interface on ManyChat platform	Month 6 to Month 24
The following related projects are previewed, but can only be carried out if and when additional funding can be found		
Mobile application that provides personalized health information to people, based on their health profiles – Domain: maternal health	Publication of app on Google Play	Month 6 to Month 24
Mobile application that provides personalized health information to people, based on their health profiles – Domain: HIV/AIDS	Publication of app on Google Play	Month 12 to Month 30

# Digi-CARE at UB Faculty of Science

## Timelines

### *Research Studies*

Research Study	Deliverables	Timeline
Research study on health technology preparedness for prevention, preparedness, and response to emerging and re-emerging infectious disease outbreaks	Conduct survey Publish results Prepare a report	Month 0 to Month 12
Research on attitude towards health technology adoption	Conduct survey Publish results Prepare a report	Month 0 to Month 12
Research on the impact of technology readiness and attitude towards health technologies on health technology adoption	Conduct survey Publish results Prepare a report	Month 24 to Month 36
Satisfaction survey on newly introduced health technologies	Conduct survey Publish results Prepare a report	Month 24 to Month 36
Development of various predictive AI methods based on patient-level data collected data at health institutions	Build data models Publish results Prepare a report	Month 40 to Month 60
In collaboration with the University of Ngaoundere, development of data models on the interrelationship among variables on zoonoses data	Build data models Publish results Prepare a report	Month 40 to Month 60

# Student Projects

- We encourage
  - Research projects
  - Development projects that solve real societal problems
  - Any other interesting project in the IST

# Student Projects

- We encourage (for the future)
  - Students to suggest up to three projects they would like to pursue
    - These will serve as a good indicator of their interests
  - Department can then work with students to develop the project ideas further, if necessary

# Ownership of Work Product

- In general
  - We do not expect students to claim ownership for work that is supervised at the department, hence code that is developed in the course of a project should be made available at the department
  - Several reasons for this
    - To enable future development on the project ideas
    - The student's work may be part of a larger project that should not suffer when the student leaves
    - Many others



# Some Identified Project Ideas

- From Digi-Care Project

- ➔ WhatsApp conversational interfaces to provide health educational information and advisories on various health concerns (domain is maternal health)

- Requires building dialogue structures controlled by natural language processing frameworks
    - Requires working with medical doctors and other health experts to understand the various concerns that should be catered for
    - Doable by students from both MIST specializations

# Some Identified Project Ideas

- From Digi-Care Project

- ➔ Health Information System

- Requires deployment of a Health Information System (HIS) in three pilot health centres, each comprising
      - A small server machine, a notebook, about 2 tablets
      - Installation and configuration of HIS software
    - Concerns only students of the Database and Web Systems specialization
    - Requires working closely with health professionals to understand their how they go about their work
    - Requires database skills and knowledge on good practice vis-a-vis user interface design

# Some Identified Project Ideas

- From Digi-Care Project contd.
  - ➔ Health Information System
    - HIS software to be used is Bhamni
    - This project con
    - **Two students** will work on this project
      - Some core activities will be worked on together
      - Then each student will explore some other features independently

# Some Identified Project Ideas

- From Digi-Care Project contd.
  - ➔ Mobile applications that provide personalized health information to people, based on their health profiles (Domain – Maternal Health)
    - Meant for students of the Database and Web Systems Specialization
    - Requires working with medical doctors and other health experts to understand the various concerns that should be catered for
    - Platform to use: Ionic/Angular

# Some Identified Project Ideas

- Data mining and other machine learning
  - Exploring the relationship between secondary school student background (O and A level scores) and their performance at various university programmes (Ndzo Daniel)
- 2 information retrieval projects
  - Development of a full text information retrieval system
  - Domains: several of several collections can be considered
    - Examples
      - M.Sc. dissertations in a given discipline
      - UB administrative documents

# Some Identified Project Ideas

- Machine Learning Projects
  - Several current and relevant demographic and health surveys datasets are available at <https://dhsprogram.com>
  - Several Domains
    - Anemia, Child Health, Domestic Violence, Education, Environmental Health, Family Planning, Female Genital Mutiliation, Fertility and Fertility Preferences,
    - Gender/Domestic Violence, HIV/AIDS Knowledge, Attitudes, and Behavior, HIV Prevalence, Household and Respondent Characteristics, Infant and Child Mortality, Malaria, Maternal Health, Maternal Mortality, Nutrition, Wealth, Women's Empowerment, etc.
  - Datasets available per country and per year
    - Hence, can conceive several useful projects that make use of these datasets