About GRIC Industry Brief Session

The goal of the GRIC Industry Brief Session is to bridge the gap between research and industry stakeholders, enhance research uptake, promote practical applications, and facilitate financing by summarising high-quality research outputs and innovations into industry-friendly formats.

This session will host the research on *Automating Glaucoma Diagnosis using Artificial Intelligence* presented by **Dr. Andrew Owusu-Ansah** (Lecturer, Clinical Optometry) and **Dr. Emmanuel Adator** (Research Associate) at the School of Optometry and Vision Sciences, University of Cape Coast.

Meeting type: Zoom **Register via this link**

Title: Automating Glaucoma Diagnosis using Artificial Intelligence

Original title:*MLCs for Advanced Glaucoma Diagnosis: A Study within the Ghanaian Healthcare Context*

Abstract (translated)

This study focuses on automating the diagnosis of glaucoma, a leading cause of irreversible vision loss, through machine learning classifiers (MLCs). Using data from 605 patients in Ghana, the research integrated Optical Coherence Tomography (OCT) and Visual Field Test (VFT) parameters to predict glaucoma status. Ten machine learning algorithms were tested, with Naïve Bayes achieving the highest diagnostic accuracy (AUROC 0.92). The findings suggest that machine learning can significantly improve diagnostic efficiency and accuracy, particularly in resource-constrained settings.

Key Takeaways:

- **Efficient Diagnosis**: Machine learning algorithms (MLCs) trained on OCT and VFT data provided high diagnostic accuracy (AUROC ≥ 0.90).
- **Key Parameters Identified**: Age, intraocular pressure (IOP), and ganglion cell complex (GCC) values were crucial in improving model efficiency.
- **Technological Integration**: A web-based application was developed to facilitate fast, reproducible, and objective glaucoma diagnosis.

Gap addressed

Traditional glaucoma diagnosis in Ghana faces challenges due to a high patient-to-clinician ratio, leading to long wait times and potential diagnostic delays. This study addresses the need for efficient, automated diagnostic tools to complement clinicians' efforts, improving early detection and patient management.

Sector/industry focus

The research primarily targets the **healthcare sector**, particularly **ophthalmology** and **diagnostic technology** industries. The findings are applicable to hospitals, eye clinics, and health systems aiming to enhance their diagnostic capabilities, especially in regions with high glaucoma prevalence.

Potential uptake or practical application

The web application developed from this study offers potential for integration into existing hospital electronic medical records (EMR) systems. It can support faster patient processing, reduce diagnostic errors, and ensure consistent classification of glaucoma severity. This makes it a viable solution for healthcare facilities in Ghana and similar settings, improving operational efficiency and patient outcomes.

Customer Point of View

- **User**: Ophthalmologists, optometrists, and healthcare facilities
- **Need**: An efficient, accurate, and scalable tool for diagnosing glaucoma, particularly in settings with limited healthcare professionals and high patient volume.
- **Market Insight**: With a high glaucoma prevalence and limited trained clinicians in Ghana, there is a demand for innovative diagnostic solutions. Automated diagnosis aligns with global trends in digital health, driving operational efficiency and better patient care.

Key recommendations

- **Adopt the Web Application**: Integrate the developed diagnostic tool into hospital EMR systems for faster, more objective glaucoma diagnosis.
- **Further Development and Partnerships**: Collaborate with technology developers and healthcare stakeholders to enhance features, including remote diagnosis and real-time data analysis.
- **Clinician Training**: Develop training programs for clinicians on the effective use of AI-based diagnostic tools.
- **Validation and Scaling**: Validate the tool with larger datasets and diverse populations to ensure reliability. Expand its use to other regions within Africa with similar glaucoma burdens.

[Profile of Dr. Andrew Owusu-Ansah](#)

[Profile of Dr. Emmanuel Adator](#)