Bridging the Artificial Intelligence Knowledge and Skill Gaps in Africa: a Case of the 3rd Google Tensorflow Bootcamp and FEDGEN Mini-Workshop

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Abstract:
In transiting from one civilization to another, technology has played a vital and positive role. In the 21 st century, one of the digital developments that is paving ways for human life improvement is machine-assisted technology using Artificial Intelligence (AI). Artificial Intelligence has successfully enhanced man's capacity in solving complex problems and processes. However, as developed nations continue to reap from the adoption of AI in various fields of human endeavors, the continent of Africa has remained behind, especially in AI-based skills and research. Various governments in developing nations have encouraged the adoption of AI, especially in institutions of learning. However, theoretical adoption without practical experience has remained an ineffective way of bridging the digital divide. In this paper we present the outcome of a practical approach to bridging the AI divide among students and researchers in Africa through funding support from the Google TensorFlow College Outreach Award. A 3-day hybrid bootcamp was organized (11 th to

13 th December, 2023) using the Google funding in order to equip postgraduate students and researchers with AI and collaborative research skills. A pre-survey method was employed to ascertain the knowledge level of the bootcamp participants. From the pre-surveyed feedback, training sessions on various AI domains were presented, and participant equipped with practical AI skills using a deployed AI-based cloud programming platform running on the private Federated Genomic Cloud (FEDGEN) infrastructure at Covenant University. A post-survey feedback was used to ascertain the effectiveness of this approach. A comparative analysis of the pre-survey and post-survey reveals a 70% improvement of AI skills among participants. This shows that having continuous training session for students and researchers is an effective method in closing the AI skills gap between developed and developing nations.

I. Introduction

In the 21st century, the development of machine-assisted activities through the application of Artificial Intelligence (AI) has increased. This development in AI and its applications have gained the keen attention of researchers in the academia, industry, government and the global society at large. [1]. It has dramatically enhanced man's capabilities in handling complex tasks or processes across different fields of learning, such as education, healthcare, agriculture, economy, telecommunication, and conservation of the environment and wildlife to mention just a few. As a tool and mechanism that provides opportunities for effective and productive approaches to solving man's day-to-day challenges [2], AI has become embedded in the life of the global citizenry [3]. Identified by Machine Learning (ML) algorithms, neural networks, and high computing needs, AI has emanated from a niche domain to a reckoned force driving innovation and development across different sectors thereby birthing the 4th Industrial Revolution (4IR) or Society 5.0. As developed nations continue to forge forward in the development and application of AI, most developing countries, especially in Africa, need to catch up regarding AI research, application, and integration in the learning environments as well as other sectors [4]. Thus, developing nations must evolve unique and practical strategies to overcome all challenges in order to close the AI gap between theory and practical implementation. Thus, this paper presents an effort in bridging the AI gap in Africa through a hybrid bootcamp/mini-workshop, starting with STEM postgraduate students. The students were drawn from the Advanced Signal Processing and Machine Intelligence Research (ASPMIR) group and the FEDGEN research group of the Covenant Applied Informatics and Communications African Center of Excellence (CApIC-ACE) - funded by World Bank at Covenant University, Ota, Nigeria. The

rest of the paper is arranged as follows: section II presents an overview of AI. section III presents the methodology employed in the capacity building training, while section IV presents the results and discussion. The conclusion and future works are presented in section IV.

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