



FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER ENGINEERING AND INFORMATICS

FINAL YEAR PROJECT REPORT
AI-POWERED BONE X-RAY INTERPRETATION APPLICATION

By

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**This Final Year Project Report submitted to the Department of
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the requirement for the award of the degree of Bachelor of Science
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DECLARATION

We, **OMONGOLE FRED** and **AJAMBO DAPHINE BARASA** do hereby declare that this project report was done by us and has never been submitted to any Academic Institution of Higher Learning for an academic award.

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APPROVAL

This is to certify that this project report was carried out under our supervision. It is now ready for submission to the Board of Examiners of Busitema University with our due approval.

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DEDICATION

We dedicate this report to our parents Mr. Omongole Alfred and Dr. Barasa John for the unrelenting financial, material and emotional support and our excellent supervisors Dr. Barbara Asingwire Kabwiga and Ms. Rosemary Nalwanga

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ABSTRACT

The persistent shortage of radiologists in Uganda, particularly in rural and underserved regions, has led to significant delays and inaccuracies in the diagnosis of trauma-related injuries and musculoskeletal conditions. This project presents the design and implementation of an AI-powered mobile application for interpreting bone X-ray images, specifically targeting the detection of fractures, joint dislocations, and effusions. Leveraging a fine-tuned YOLOv8 convolutional neural network, the system is optimized for deployment on low-end Android devices and supports both online and offline operation, making it suitable for resource-constrained environments. The model was trained and validated on a large, annotated dataset of X-ray images, achieving a precision of 91.2% and a recall of 89.7%. The application provides real-time analysis by highlighting detected abnormalities with bounding boxes and confidence scores, thereby supporting frontline healthcare workers in making timely and informed clinical decisions. Usability testing demonstrated that the tool is accessible to non-specialists and can significantly reduce diagnostic delays. The project aligns with national digital health strategies and global efforts to leverage artificial intelligence for equitable healthcare delivery. It also offers a scalable blueprint for AI integration in medical diagnostics across other low- and middle-income countries.

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