FINAL YEAR PROJECT REPORT

BONEGUARD: AN AI-DRIVEN PREDICTIVE AND DIAGNOSTIC PLATFORM FOR ARM FRACTURES

In fulfillment of the requirement
For degree of
BS (COMPUTER SCIENCES)

By

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SUPERVISED

BY
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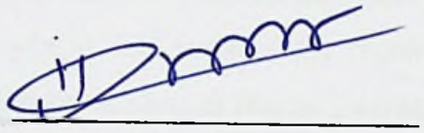
BAHRIA UNIVERSITY (KARACHI CAMPUS)

SPRING-2025

DECLARATION

We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

Signature : 

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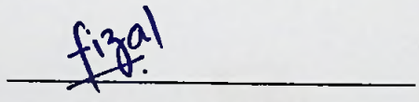
Signature : 

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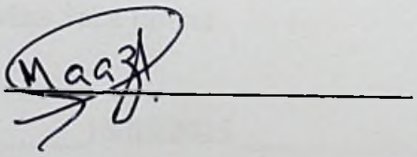
Signature : 

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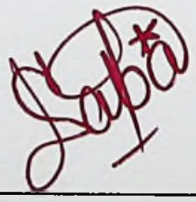
APPROVAL FOR SUBMISSION

We certify that this project report entitled **"BONEGUARD: AN AI-DRIVEN PREDICTIVE AND DIAGNOSTIC PLATFORM FOR ARM FRACTURES"** was prepared by **Bisma Fahim,Fiza,Maaz** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Science in Computer Science at Bahria University, Karachi.

Approved by,

Signature : 

Supervisor: Miss Saba Imtiaz

Date : 15/05/2025

Specially dedicated to

My beloved grandmother, mother and father

Bisma Fahim

My beloved grandmother, mother and father

Fiza

My beloved grandmother, mother and father

Maaz

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We would like to thank everyone who had contributed to the successful completion of this project. We would like to express my gratitude to my project supervisor, Miss Saba Imtiaz for her invaluable advice, guidance and her enormous patience throughout the development of the research.

In addition, we would also like to express our gratitude to our loving parents and friends who have helped and given us encouragement.

BONEGUARD: AN AI-DRIVEN PREDICTIVE AND DIAGNOSTIC PLATFORM FOR ARM FRACTURES

ABSTRACT

Bone fractures of the arm are difficult to diagnose with precision and speed in the field of radiology, which greatly impacts the healthcare system considering the available treatment options. This problem was approached by building an AI system called Boneguard, an arm fracture detection system that autonomously detects and classifies fractures through radiographic images. We utilized the MURA dataset containing multiple musculoskeletal X-ray images to train and evaluate our models for precision and diagnosis dependability with the set aim of achieving accuracy. To ensure the models would perform on different classes of images, we designed a pre-processing pipeline that incorporated image resizing, normalization, and advanced data augmentation techniques such as rotation, flipping, and zooming. These steps improved the uniformity of the dataset and allowed the models to generalize to variations in real-life. According to the findings that were achieved during the test phase, Boneguard could improve the accuracy and efficiency of radiology workflows to the benefit of clinicians and patients. To make the platform scalable and reliable in actual clinical situations, we need to continue testing the models with fresh data, add explain ability, and enhance the models to test them.

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