



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)**

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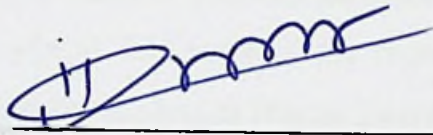
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SPRING-2025

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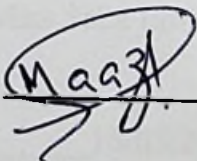
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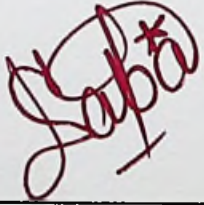
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Specially dedicated to
My beloved grandmother, mother and father
Bisma Fahim
My beloved grandmother, mother and father
Fiza
My beloved grandmother, mother and father
Maaz

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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.

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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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