Dermatology AI

Identifying and Determining Burn Degrees using Deep Learning

GROUP MEMBERS
Abdullaziz Alosayl
Mohammed Alrushud
Anas Alarbied
Abdullah Alhuthlul

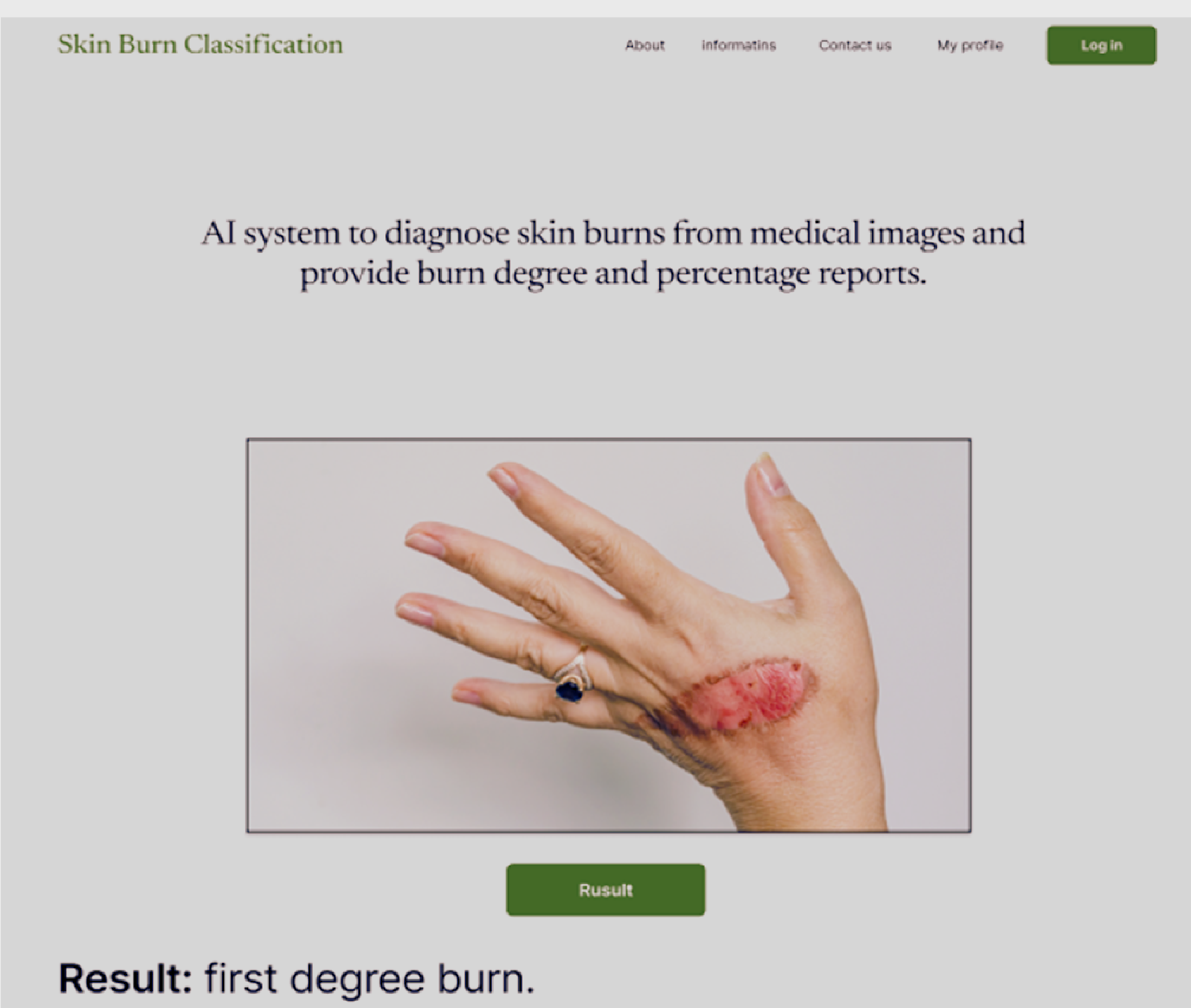
SUPERVISOR
Mohammed Alsuhaibani

Qassim University جامعة القصيم
College of Computer | كلية الحاسب

العثيم للتنمية
Othaim Development
شركة عبدالله العثيم للتنمية
Abdullah Al Othaim Development Co.

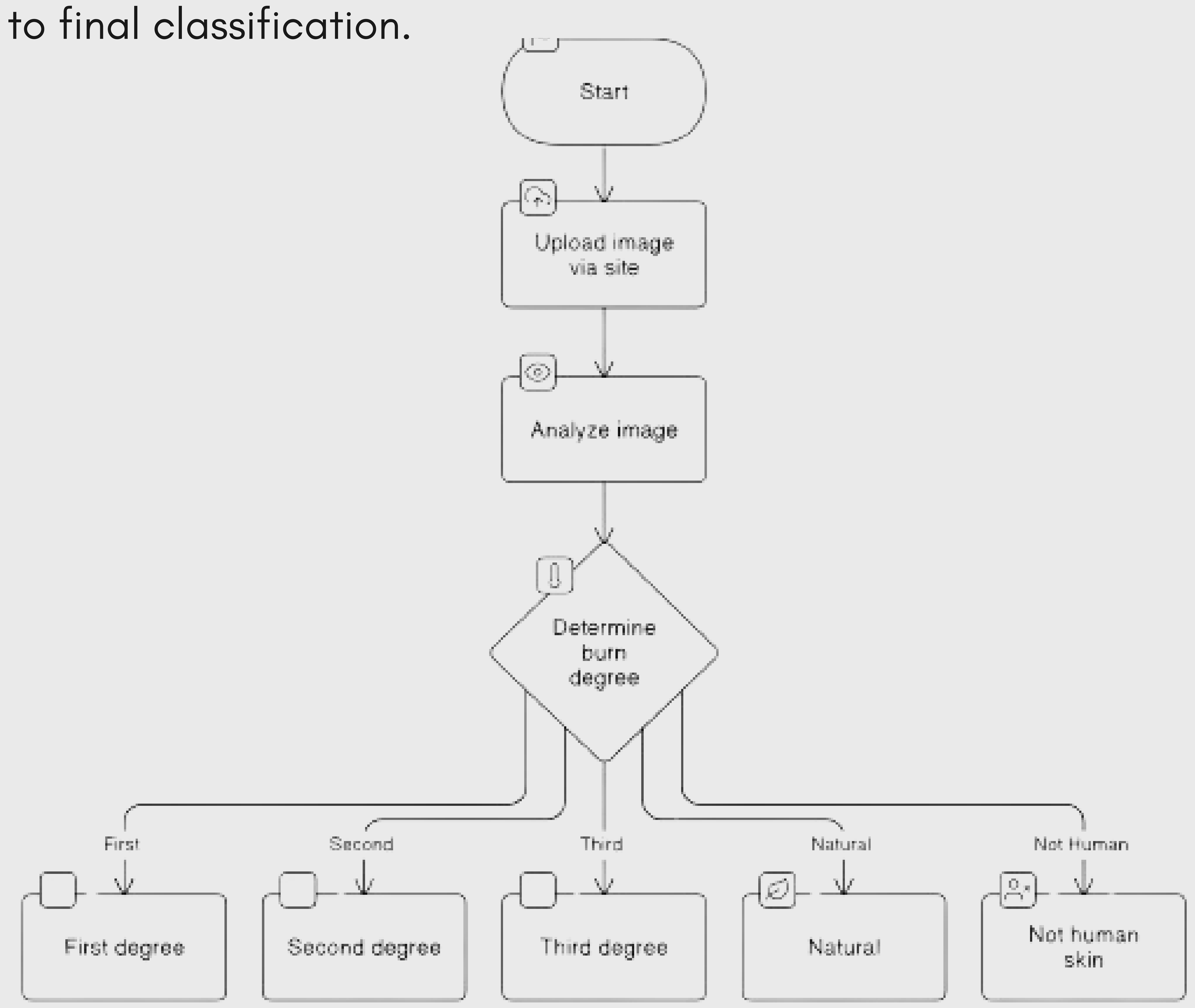
ABSTRACT

Burn injuries are a significant global health challenge, especially in areas with limited access to specialized medical care. Our project develops a powerful deep learning system aimed at making the diagnosis of skin burns more standardized and accessible everywhere, particularly focusing on underserved areas. We employ the YOLO (You Only Look Once) algorithm within a CNN (Convolutional Neural Network) to help our model accurately identify burns as first, second, or third degree. The model is trained on a diverse dataset to ensure effectiveness in various settings, from remote villages to urban centers. By deploying this AI-powered diagnostic tool, we aim to provide consistent, high-quality burn care and make accurate diagnoses as common in rural areas as in big cities, improving outcomes where it's most needed.



METHODOLOGY

Our Project employs a systematic approach to classify burns using artificial intelligence. The process initiates with users uploading a image of the burn injury through our website's interface. Upon receipt of the image, our AI-powered system, leveraging a state-of-the-art Convolutional Neural Network with the YOLO algorithm, commences the analysis. The system first discerns whether the image depicts human skin. If the result is negative, the system promptly classifies the image as 'Not human skin.' Conversely, if the image is recognized as human skin, the AI then meticulously evaluates it to ascertain the presence and degree of burn injury, categorizing it into one of four possible outcomes: natural (unburned) skin, first-degree burn, second-degree burn, or third-degree burn. The accompanying flowchart on our poster elucidates this process, demonstrating the decision-making pathway from image upload to final classification.



RESULTS

Our team has meticulously trained a deep learning model on a comprehensive dataset of 2,700 images, systematically categorized into three degrees of burn severity. The model underwent rigorous training and testing phases, and we are proud to report that it has achieved a remarkable accuracy of 93%. In conjunction with this high accuracy rate, our model also demonstrated a validation loss of just 0.60. These metrics not only highlight the model's robustness in accurately classifying burn injuries but also its effectiveness in generalizing to new, unseen data. This balance of precision and reliability underscores our commitment to advancing medical diagnostic tools in the field of burn care.

CONCLUSION

Our AI-based burn diagnosis system has shown exceptional promise, achieving a 93% accuracy in classifying burn severity through the training on a diverse set of 2,700 images. This performance showcases our system's potential to equalize the quality of burn care between underserved areas and advanced medical facilities. The results suggest that expanding our image dataset could lead to further improvements in accuracy, reinforcing our commitment to enhancing burn diagnosis and care on a global scale.