FINAL YEAR PROJECT REPORT

A DEEP-LEARNING AND IOT-BASED AUTOMATED CLASSIFICATION OF LUNG DISEASES

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.

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Date : 5^{th} May, 2025

APPROVAL FOR SUBMISSION

We certify that this project report entitled **"A DEEP LEARNING AND IOT-BASED AUTOMATED CLASSIFICATION OF LUNG DISEASES"** was prepared by **Muznah Adnan and Abdul Hadi Waseem** has met the required standard for submission in partial fulfilment of the requirements for the award of **Bachelor of Computer Science** at Bahria University.

Approved by,

Signature : ______________________

Supervisor : Dr. Taha Jilani

Date : 27th May 2025

A DEEP-LEARNING AND IOT BASED AUTOMATED CLASSIFICATION OF LUNG DISEASES

ABSTRACT

In 2020, respiratory diseases caused over 86 thousand deaths in Pakistan, ranking the country 8th in the world for this health hazard. The majority of the population does not have access to adequate healthcare facilities, including the 61.8% of Pakistanis who live in rural areas. The combination of a lack of infrastructure, trained personnel, and health literacy severely limits the healthcare options for most citizens. This situation necessitates the development of intelligent systems that are able to restructure responsive and timely healthcare approaches for rural communities, aiding in the alleviation of respiratory diseases.

To develop improved healthcare facilities, we propose the integration of deep learning and the Internet for advanced remote caregiving solutions.
Our proposed solution achieved exceptional performance with 95.05% accuracy on the Asthma Detection Dataset Version 2[10], comprising 1,211 lung sound samples across 5 respiratory conditions. The system is based around three components:
The IoT smart stethoscope, the deep learning-model-based data classification achieving clinical-grade performance, and the analysis and visualization web application.

With the inclusion of these components, the goal of our system is to transform respiratory healthcare in Pakistan, especially for the rural population. This transformation requires the responsible development of sophisticated diagnostic devices while concurrently enhancing individual health management capabilities. We seek to mitigate the accessibility and knowledge gap between patients and health practitioners using modern technologies combined with simple-to-use applications.

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