

SPECIMEN FORMAT FOR THESES OF MONTH

Faculty : Computer Science

Department : Computer Science

Branch/ Area: : Data Mining

Sub Subject Heading: : -

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Title of the thesis : An Integrated Framework for COVID and Pneumonia
Disease Prediction using Optimized Deep Learning
Models

(i) In Roman Script -

(ii) In roman Script -

Nomenclature of Degree: : Ph.D

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Month & Year of Award : October 2025

Name of Supervisor : Dr. R. Vijayabhanu

Designation of Supervisor : Associate Professor

Centre/department/school in which research was conducted : Department of Computer Science, Avinashilingam
Institute for Home Science and Higher Education for
Women

University's Name & Address : Avinashilingam Institute for Home Science and
Higher Education for Women

Abstract within 300 words:

Coronavirus disease 2019 (COVID-19) is a new global health emergency with several infected cases and deaths recorded all over countries. On the other side Pneumonia, which affect respiratory organs and affects its function. In the initial phase of research work, two novel preprocessing techniques are introduced for preprocessing the COVID-19 coronavirus and RSNA Pneumonia datasets, achieving superior accuracy and reduced time. Initially, the Additive Log Ratio Transformed One Hot Encoding (ALRTOHE) Technique is proposed to improve the accuracy of preprocessing with minimum complexity. After that, the Zero Mean Feature Normalized Encoding (ZMFNE) technique is designed to preprocess the coronavirus data with maximum accuracy. Zero Mean Feature scaling is applied to normalize input information. Then, the data transformation process is accomplished by encoding the data into a binary representation using one-hot encoding to reduce complexity.

The proposed feature selection techniques are, First, the Non-Linear Sammon Projective Pattern Selection (NSPPS) Model is designed to select pertinent features for disease forecasting. Secondly, the Tversky Similarity Indexed Distributive Feature Embedding Technique (TSIDFE) method is developed to select the most relevant features with maximum accuracy for predicting the disease. Third, the Statistical Correlative Targeted Projection Pursuit-Based Feature Selection (SCTPP-FS) method is proposed to extract pertinent features from the dataset for improved pulmonary disease diagnosis.

To achieve efficient classification, Machine Learning (ML) and Deep Learning (DL)- based methods are introduced in the third research work for accurate COVID-19 and Pneumonia disease forecasting. In the primary process, the Emphasis Perceptron Boosting Classification (EPBC) technique is developed to perform robust disease prediction with improved accuracy and reduced time. The time-dependent Cox regressive Levenberg-Marquardt Convolutional Neural Learning (TCLMCNL) Technique is designed to categorize patient data for robust disease prediction. A Memetic Optimized U-Net Deep Learning (MO-UNetDL) classifier method is proposed for precise disease forecasting through improved precision and recall.

i) Major objectives :

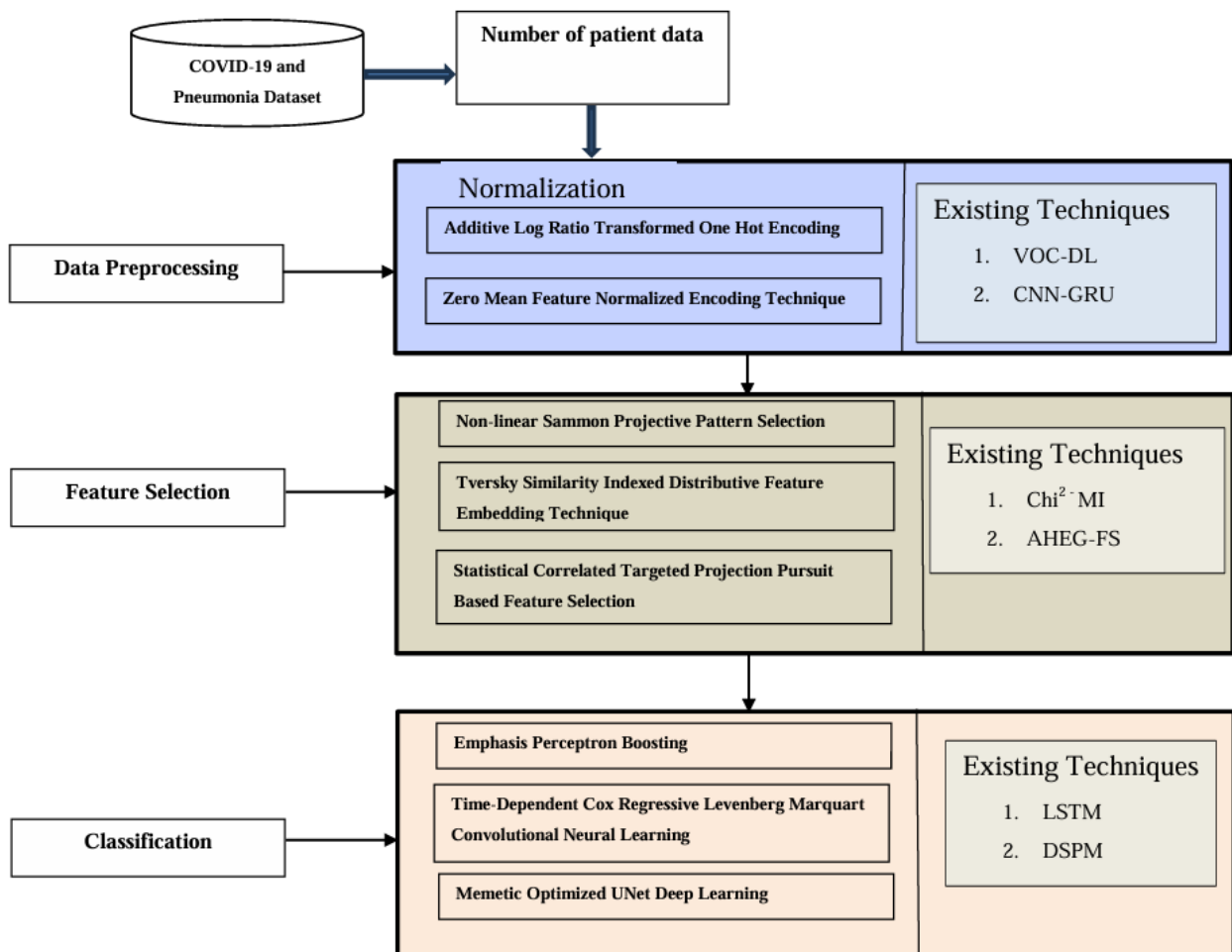
Primary Objective

To improve the performance of the disease prediction model for COVID-19 and Pneumonia using optimized Machine Learning and Deep Learning techniques.

Secondary Objectives

- To enhance data pre-processing through techniques that effectively transform and standardize data, thereby improving model performance.
- To identify relevant features using the proposed feature selection approaches to improve prediction accuracy .
- To enhance prediction model’s accuracy and reduce the error rate using optimized Machine Learning and Deep Learning methods.

ii) Methodology :



iii) Findings:

This research work covers the development of techniques such as Preprocessing, Feature Selection and Classification. Experimental evaluation is conducted using COVID dataset as well as Pneumonia dataset. Preprocessing is carried out by Additive Log Ratio Transformed One Hot Encoding and Zero Mean Feature Normalized Encoding technique, ZMFNE achieves 14.7% reduction in pre-processing time and 13.42% reduction in space complexity when comparing to the CNN-GRU. Following this, feature selection process is performed to minimize the dimensionality of the dataset using machine learning techniques such as NSPPS, TSIDFE and SCTPP- FS, SCTPP-FS achieves 22.9% reduction time compared to the CNN-GRU. Finally Deep learning classifier is used to predict the output with minimum loss with the help of EPBC, TCLMCNN and MO-UNet DL. As compared to existing methods, observed outcomes indicate that MO-UNet DL improves accuracy (97.9%), precision(98.8%), recall (99%), Kappa statistics(0.9) and high score in ROC , as well as AUC. This model can benefit healthcare professionals and researchers by providing accurate and efficient prediction of COVID-19 and Pneumonia cases, supporting timely decision-making and intervention.

Examiners

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