INTERNATIONAL CONFERENCE on
RECENT TRENDS IN COMPUTER SCIENCE, TECHNOLOGY, DATA SCIENCE AND APPLICATIONS

ICRTCTDA-2025
7th February 2025

Organized by

Department of Computer Science,
Department of Computer Applications,
Department of Information Technology,
Department of Data Science &
Department of Mathematics

VIDYASAGAR COLLEGE OF ARTS AND SCIENCE
in association with
SRI AANDAL EDUCATIONAL TRUST

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A Novel Deep Fuzzy Rule-Based System for Early Heart Disease Risk Prediction

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Abstract

Heart disease continues to be a major factor in global deaths, highlighting the necessity for prediction models that maintain both accuracy and interpretability. This study introduces an innovative Deep Fuzzy Rule-Based Framework aimed at predicting heart disease, combining the analytical strengths of deep learning with the clarity provided by fuzzy logic. The framework utilizes deep learning for extracting features and acquiring representations, thus allowing for the detection of intricate patterns within extensive medical datasets. Fuzzy logic contributes to interpretability by producing rules that are understandable to humans, aiding in clinical decision-making. The methodology proposed encompasses preprocessing steps like handling missing values and normalization, fuzzy entropy-based feature selection for reducing dimensionality, and dynamic rule pruning to enhance computational efficiency. The framework performed quite well, achieving 92.1% accuracy, 93.3% sensitivity, 91.2% specificity, and an F1-score of 91.8% when tested on a massive dataset of 10 lakh cases. The findings support its scalability and stability, which makes it a useful clinical decision support tool for early heart disease detection.

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Innovative Approach to Building a Real-Time Speech-to-Text Desktop Application

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