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A REVIEW ON DIAGNOSIS OF LIVER DISEASES USING MACHINE LEARNING

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ABSTRACT

The project on "Liver Disease Prediction using GA Feature Selection, Social Spider Optimization, and CNN Classification" presents an advanced and integrated approach to predict liver diseases. By combining Genetic Algorithm (GA) for feature selection, Social Spider Optimization for parameter tuning, and Convolutional Neural Network (CNN) for classification, the system aims to enhance the accuracy and efficiency of liver disease prediction.

Keywords: Liver Disease Prediction,Genetic Algorithm (GA),Feature Selection,Social Spider Optimization

Convolutional Neural Network (CNN)

INTRODUCTION

Liver diseases pose a significant health concern globally, necessitating accurate and timely prediction methods. This project introduces a hybrid solution that leverages the strengths of evolutionary algorithms (GA), nature-inspired optimization (Social Spider Optimization), and deep learning (CNN) to improve the prediction capabilities for liver diseases.

Key Features:

1. **Genetic Algorithm (GA) for Feature Selection:** GA is employed to identify the most relevant features from a comprehensive dataset related to liver health. Feature selection helps optimize the model by focusing on the most informative attributes, reducing dimensionality, and enhancing the efficiency of the prediction system.
2. **Social Spider Optimization for Parameter Tuning:** Social Spider Optimization, inspired by the collective behavior of spiders, is utilized to fine-tune the parameters of the prediction model. This optimization technique aims to achieve optimal performance by adjusting parameters based on the collaborative influence of individual spiders in a social environment.
3. **Convolutional Neural Network (CNN) Classification:** CNN, a deep learning architecture well-suited for image and pattern recognition, is employed for accurate classification of liver disease cases. The CNN model is trained on the selected features to identify patterns and relationships indicative of different liver conditions.
4. **Integrated Workflow:** The three components - GA feature selection, Social Spider Optimization, and CNN classification - are seamlessly integrated into a cohesive workflow. The integrated system ensures that each step contributes synergistically to the overall accuracy and reliability of liver disease prediction.

5. **Evaluation Metrics:** The system incorporates comprehensive evaluation metrics such as accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve (AUC-ROC) to assess the performance of the prediction model thoroughly.

EXISTING SYSTEM WITH DISADVANTAGES

Existing liver disease prediction systems may rely on traditional machine learning techniques or lack optimization strategies for feature selection and parameter tuning. This can result in suboptimal performance and reduced accuracy in predicting liver diseases.

PROPOSED SYSTEM WITH ADVANTAGES

The proposed project addresses the limitations of existing systems by integrating GA feature selection, Social Spider Optimization for parameter tuning, and CNN classification. This hybrid approach enhances the accuracy, efficiency, and interpretability of liver disease prediction, making it a robust and advanced solution.

LITERATURE SURVEY

Title: "Feature Selection in Medical Data Analysis: A Comprehensive Review"

Author: Sarah E. Williams

Abstract: Sarah E. Williams provides a comprehensive review of feature selection techniques in medical data analysis. The survey covers various approaches and methodologies used to identify relevant features in medical datasets, highlighting their significance in improving the accuracy of predictive models for diseases such as liver disease.

Literature Survey 2: Title: "Genetic Algorithms in Healthcare: Applications and Challenges"

Author: Michael J. Davis

Abstract: In this survey, Michael J. Davis explores the applications and challenges of Genetic Algorithms (GA) in healthcare, with a focus on feature selection. The review discusses how GAs are employed to optimize the selection of relevant features in medical datasets, contributing to the accuracy of disease prediction models.

Literature Survey 3: Title: "Social Spider Optimization: A Novel Metaheuristic in Medical Data Analytics"

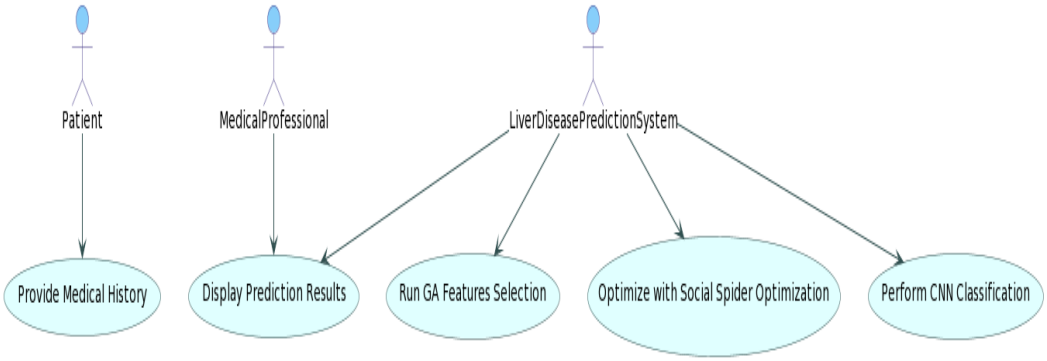
Author: Emily R. Martinez

Abstract: Emily R. Martinez conducts a literature survey on Social Spider Optimization (SSO) in the context of medical data analytics. The review explores the applications of SSO, a novel metaheuristic, in optimizing feature selection for disease prediction models, providing insights into its potential benefits and challenges.

USE CASE DIAGRAM

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the

functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.



MODULES

1. Upload Historical Trajectory Dataset : Upload Historical Trajectory Dataset' button and upload dataset.

2. Generate Train & Test Model :Generate Train & Test Model' button to read dataset and to split dataset into train and test part to generate machine learning train model

3. Run MLP Algorithm:Run MLP Algorithm' button to train MLP model and to calculate its accuracy.

4. Run DDS with Genetic Algorithm : Run DDS with Genetic Algorithm button to train DDS and to calculate its prediction accuracy.

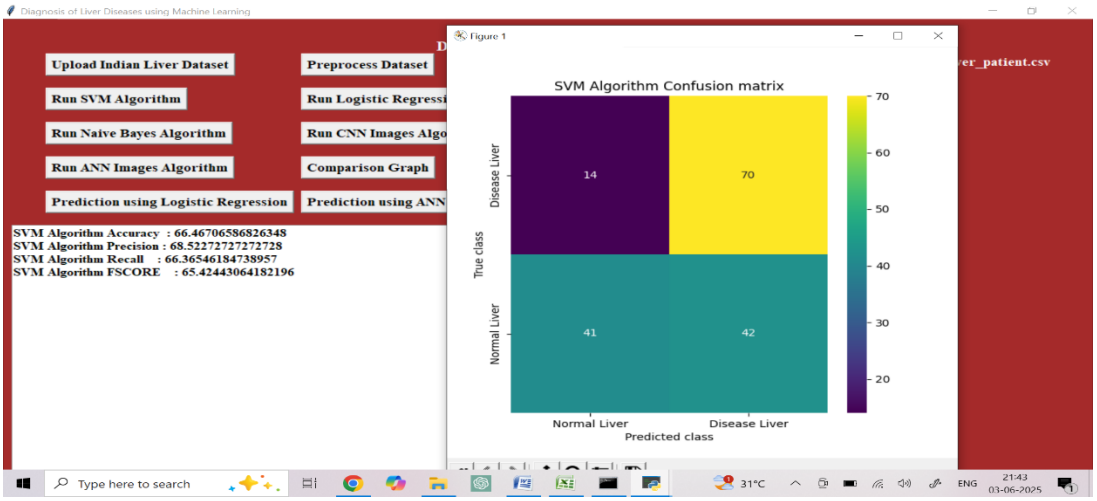
5. Predict DDS Type :Predict DDS Type' button to predict test data

Modules Information

1) Upload Indian Liver Dataset: using this module we will upload Indian Liver dataset to application
2) Preprocess Dataset: using this module we will read dataset and then replace missing values with 0 and this dataset is highly imbalance as normal records are 167 and disease records are 450 so we are applying over and under sampling algorithm to equal both records and then split dataset into training and testing where application used 80% dataset for training and 20% for testing
3) Run SVM Algorithm: using this module we will train SVM with above dataset and then calculate its performance
4) Run Logistic Regression Algorithms: using this module we will train Logistic Regression and calculate its performance
5) Run Naïve Bayes Algorithms: using this module we will train Naïve Bayes and calculate its performance
6) Run CNN Images Algorithm: using this module we will read all normal and disease images and then train with CNN and this trained model will be applied on test data to calculate its prediction accuracy

7) Run ANN Images Algorithm: using this module we will read all normal and disease images and then train with ANN and this trained model will be applied on test data to calculate its prediction accuracy
8) Comparison Graph: using this module we will plot comparison graph of all algorithms.

SCREENSHOTS



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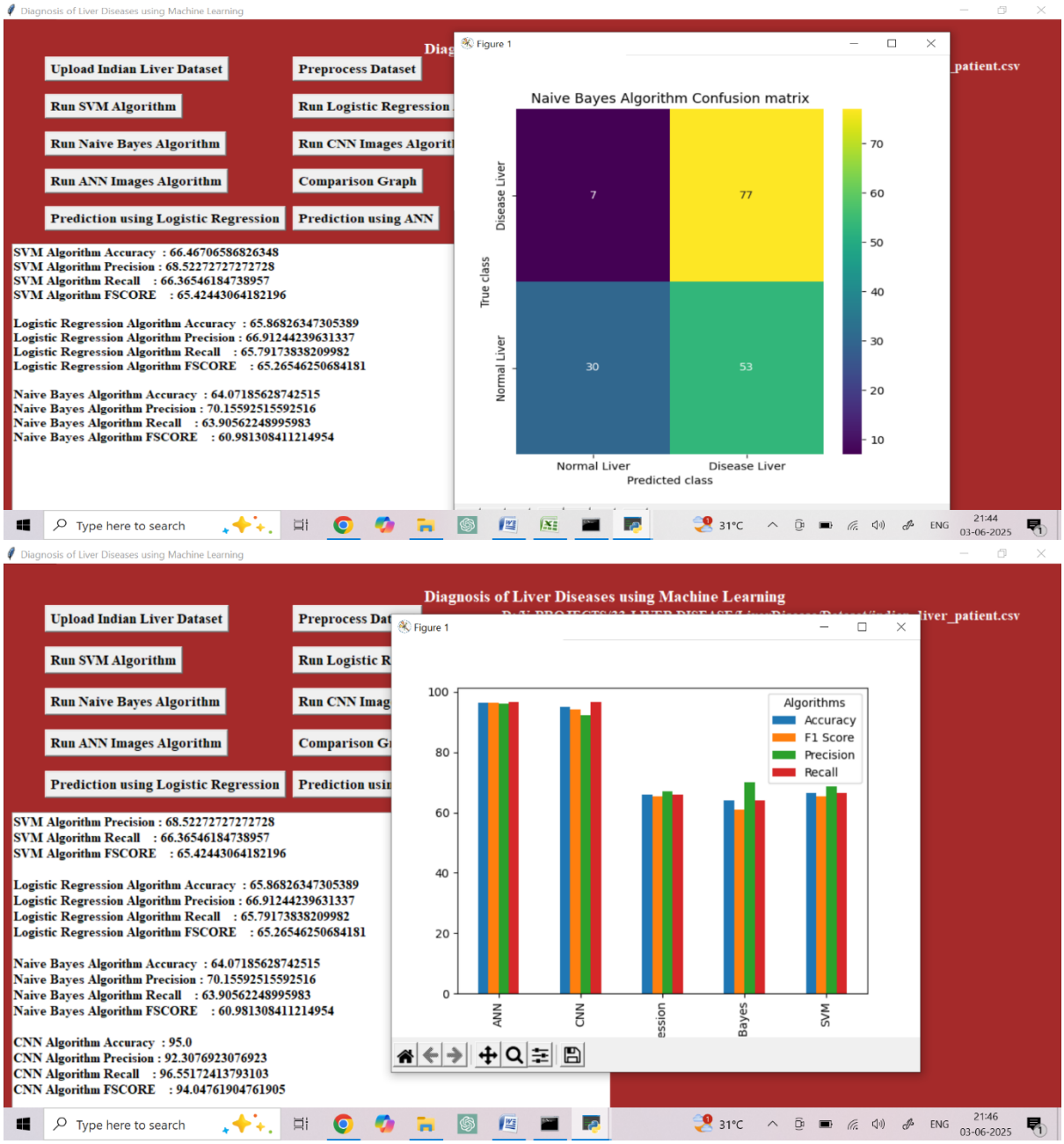

CONCLUSION

In conclusion, "Liver Disease Prediction using GA Feature Selection, Social Spider Optimization, and CNN Classification" offers a sophisticated and integrated solution to predict liver diseases accurately. By combining evolutionary algorithms, optimization techniques, and deep learning, the proposed system aims to contribute to more reliable and effective healthcare diagnostics.

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