AI POWERED HEART DISEASE PREDICTION

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Introduction

Heart disease is a significant global health issue, prompting the need for innovative diagnostic tools that combine accuracy and computational efficiency. This project builds upon the methodologies described in Polat, Güneş, and Tosun (2006), which utilize an Artificial Immune Recognition System (AIRS) and fuzzy weighted pre-processing techniques.

The goal of this project is to develop a diagnostic system for heart disease that leverages artificial intelligence (AI) and fuzzy logic principles to enhance prediction accuracy and robustness. By integrating patient health data and applying advanced machine learning techniques, this system seeks to provide timely and reliable insights into heart health.

Methodology

1. Data Preprocessing

- **Data Sources:**
  Clinical datasets containing patient information such as blood pressure, cholesterol levels, age, and lifestyle habits.
- **Fuzzy Weighted Pre-Processing:**
  Inspired by the approach in Polat et al. (2006), fuzzy logic was used to assign weighted importance to key attributes, improving the representation of uncertainty and variability in patient data.

2. Artificial Immune Recognition System (AIRS):

- The AIRS framework, modeled after the human immune system, was employed to classify heart disease cases.
- Key Steps:

- Clonal selection and hypermutation for identifying patterns.
- Memory cell generation to retain significant data representations.

3. Model Evaluation:

- Performance metrics such as accuracy, sensitivity, and specificity were used to evaluate the system.
- Comparative analysis was conducted with other machine learning algorithms, including Support Vector Machines (SVMs) and Decision Trees.

Conclusion

The AI-Powered Heart Disease Diagnosis System demonstrated strong diagnostic capabilities, achieving high accuracy rates comparable to state-of-the-art techniques. The integration of fuzzy weighted pre-processing and AIRS proved effective in handling noisy and uncertain data, resulting in robust predictions.

Future enhancements include expanding the dataset to encompass diverse demographics and refining the fuzzy weighting mechanism to improve scalability and adaptability.