PARKINSON-PLUS DISEASE PREDICTION SYSTEM

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Abstract

Parkinson-Plus syndromes are a group of neurodegenerative disorders that show symptoms similar to Parkinson's disease but progress more rapidly and respond poorly to standard treatments. Early identification of Parkinson-Plus disease is challenging due to overlapping symptoms with classical Parkinson's disease.

This project proposes a web-based Parkinson-Plus Disease Prediction System using a symptom-based approach. The system collects patient symptoms through an interactive HTML form and processes them using Java Servlet logic deployed on an Apache Tomcat server. Based on predefined medical rules and scoring logic, the system predicts whether the user shows low risk, Parkinson's disease symptoms, or Parkinson-Plus disease symptoms.

The project aims to provide an awareness and preliminary assessment tool, not a medical diagnosis, which can assist users and healthcare providers in understanding symptom severity and disease progression.

I. Introduction

Parkinson-Plus disease refers to a group of disorders such as Multiple System Atrophy (MSA), Progressive Supranuclear Palsy (PSP), and Corticobasal Degeneration (CBD). These conditions exhibit motor symptoms like tremor, rigidity, and slow movement, along with severe non-motor symptoms such as cognitive decline, balance problems, and autonomic dysfunction.

Traditional diagnosis relies heavily on clinical observation, medical history, and neurological tests, which may delay early detection. With the growth of web technologies, computer-based decision support systems can assist in early symptom analysis.

This project focuses on developing a simple, efficient, and user-friendly web application using Java Servlets that allows users to input symptoms and receive an instant assessment. The system is designed for educational and awareness purposes, especially in areas with limited access to neurological specialists.

II. Related Work

Several research studies have explored Parkinson's disease detection using machine learning techniques such as Support Vector Machines (SVM), Convolutional Neural Networks (CNN), and Deep Learning models based on MRI scans, voice analysis, and handwriting patterns.

However, many of these systems:

- Require complex datasets
- Depend on Python and advanced ML frameworks
- Are computationally expensive
- Are difficult to deploy in low-resource environments

In contrast, this project adopts a rule-based symptom evaluation approach using Java Servlets, which:

- Does not require large datasets
- Is easy to deploy on web servers
- Works efficiently for awareness-based applications

Thus, the proposed system offers a lightweight alternative suitable for academic and real-world demonstration purposes.

III. System Architecture

The system follows a three-tier architecture:

Presentation Layer

- HTML, CSS for user interface
- JavaScript for form validation

Application Layer

- Java Servlet for business logic
- Symptom scoring and decision rules

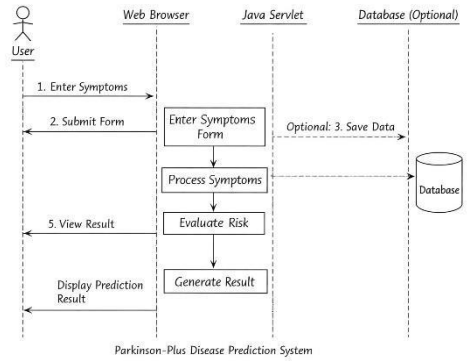
Server Layer

- Apache Tomcat Web Server
- Database for storing user inputs (Optional)

Components: frontend, backend, and cloud processing.

Architecture Flow:

User → HTML Form → JavaScript Validation
→ Java Servlet (Symptom Logic)
→ Result Generation
→ Response to User



This modular architecture ensures scalability, maintainability, and ease of enhancement.

IV. Implementation

The implementation is carried out using the following technologies:

Tools & Technologies:

- Frontend: HTML, CSS, JavaScript
- Backend: Java Servlet
- Server: Apache Tomcat
- IDE: Visual Studio Code
- Database (optional): MySQL

Implementation Steps:

- Design a symptom input form with multiple questions related to Parkinson-Plus disease.
- Validate user input using JavaScript.

- Send form data to Java Servlet using POST method.
- Servlet processes symptoms using conditional logic and scoring rules.
- Based on the score, the system categorizes the result.
- Display prediction result on the browser.

V. Results

The system successfully analyzes user-entered symptoms and provides instant results. Based on the total score, the output is classified into:

- Low Risk
- Possible Parkinson's Disease
- Possible Parkinson-Plus Disease

The results are displayed in a clear and understandable format. Testing shows that the system works efficiently with minimal response time and is suitable for real-time use.

VI. Future Work

The current system can be enhanced in the following ways:

- Integration of machine learning algorithms
- Adding voice and handwriting analysis Connecting with hospital databases
- Developing mobile application support
- Improving accuracy using medical datasets
- Adding doctor and patient login modules

These enhancements can make the system more accurate and clinically useful.

VII. Conclusion

The Parkinson-Plus Disease Prediction System provides a simple and effective web-based solution for early symptom analysis and awareness. By using Java Servlet technology, the system avoids the complexity of advanced machine learning models while still delivering meaningful results.

This project demonstrates how web technologies can be applied in the healthcare domain to support early identification and education regarding neurological disorders. Although not a replacement for professional diagnosis, the system can act as a supportive tool for patients and caregivers.

VIII. References

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