Eye Movement Based Parkinson’s Screening Using AI

A pioneering camera-based web application designed for the early detection of Parkinson’s disease indicators through precise eye-tracking technology. This tool enables accessible, non-invasive screening to support timely clinical interventions in neurology practice.

Motivation for AI-Driven Eye Screening

Impact on Eye Movements

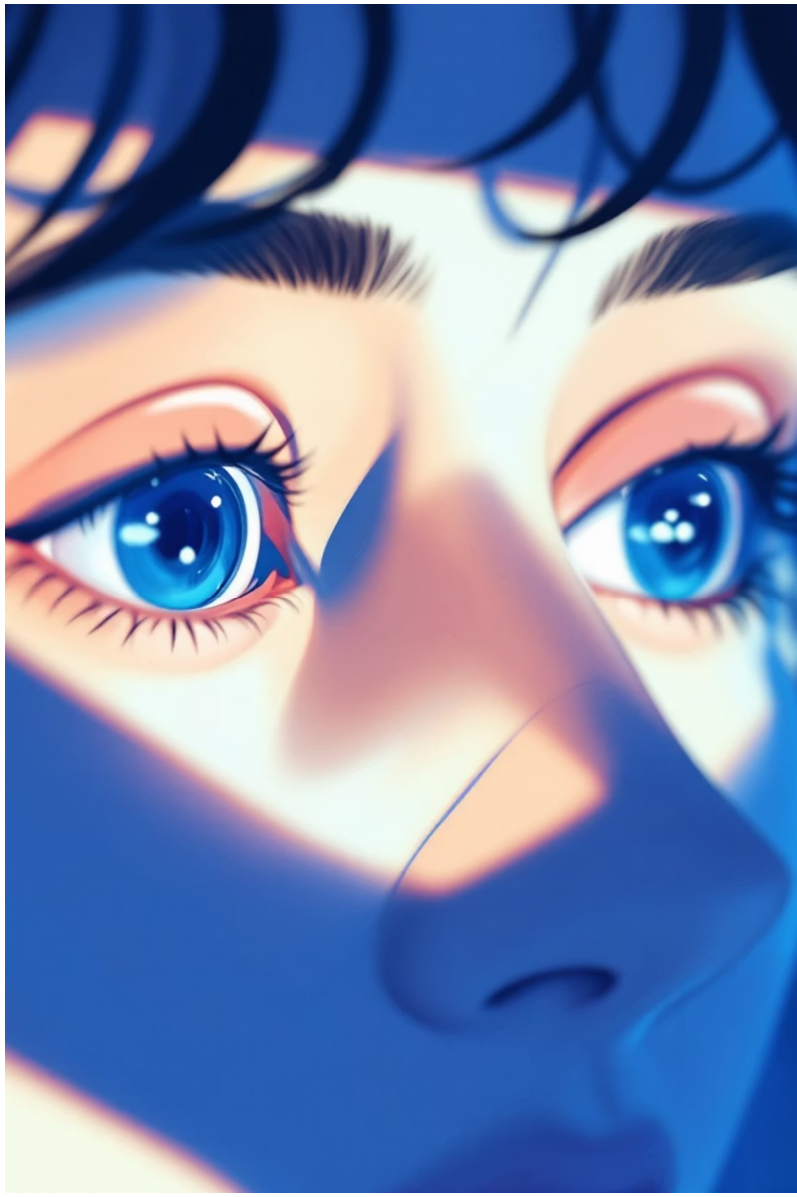
Parkinson’s disease disrupts saccadic and smooth pursuit movements, manifesting as involuntary tremors or delayed responses. Early identification of these subtle anomalies can transform patient outcomes.

Clinical Benefits

Detecting traces at onset facilitates prompt therapeutic interventions, slowing disease progression and improving quality of life for affected individuals.

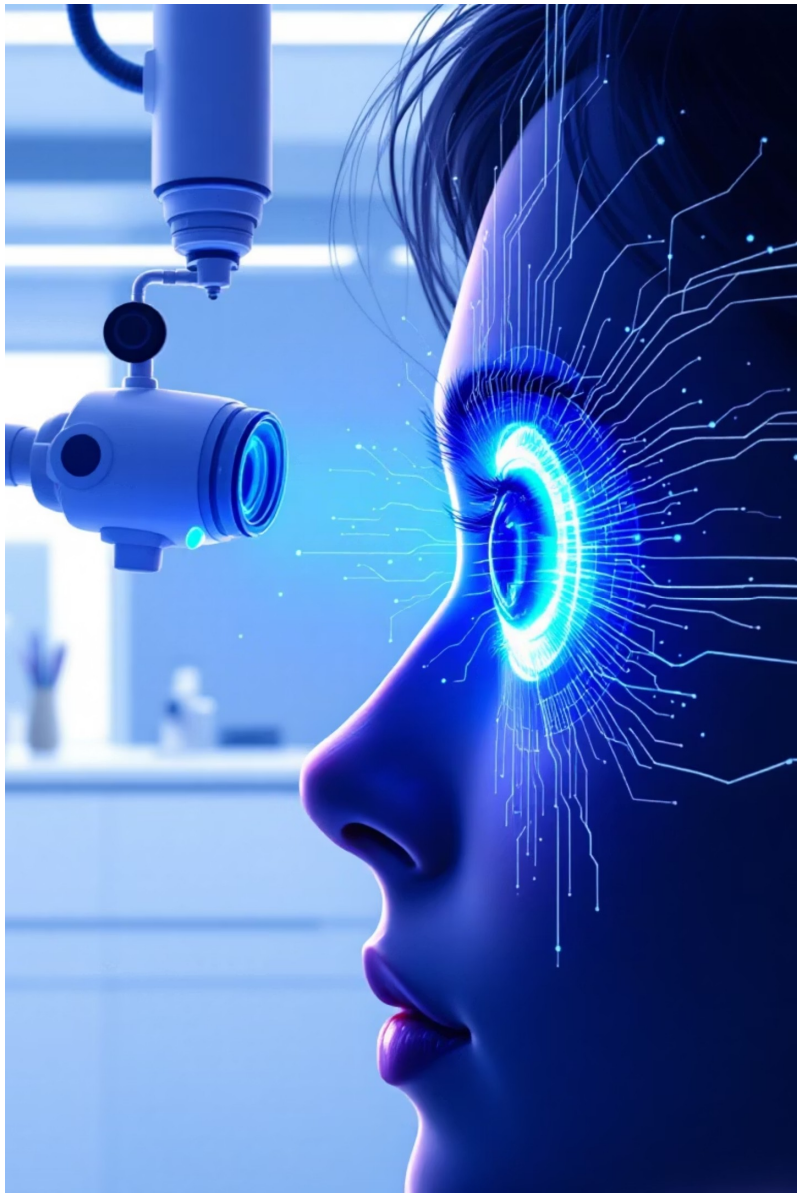
Technological Approach

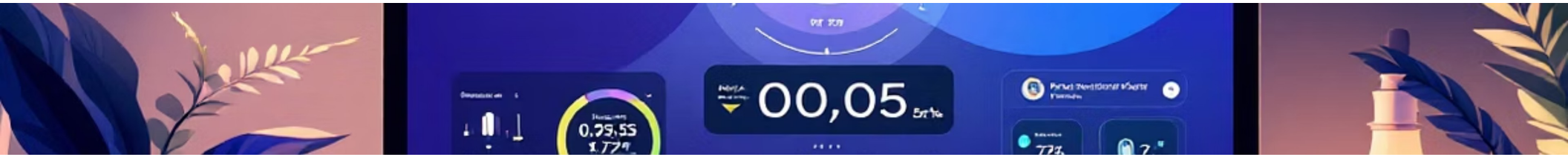
By integrating computer vision and artificial intelligence, this project analyses eye patterns non-invasively, offering a scalable screening solution for neurology clinics worldwide.



System Architecture Overview

The architecture processes real-time video input through advanced eye-tracking algorithms, administers targeted screening tests, applies an AI model to evaluate movement patterns, and delivers actionable diagnostic results—all within a seamless web interface.





Live Demonstration of the Screening Tool

User Authentication

Secure login page ensures patient data privacy, compliant with medical standards, allowing quick access for clinicians and researchers.

Camera and Test Setup

Upon granting camera permissions, the interface guides users through the screening test, capturing eye movements via the Streamlit web app for real-time analysis.

Following the test, an 'Analysis in Progress' screen provides visual feedback, building anticipation for AI-generated insights into potential Parkinson’s indicators.

Future Scope and Expansion

Advanced Parkinson’s Classification

Enhance the AI model for precise classification of Parkinson’s severity, integrating multi-modal data for higher diagnostic accuracy in clinical trials.

Broad Neurological Integration

Extend screening capabilities to other conditions like Alzheimer’s or multiple sclerosis, creating a comprehensive AI toolkit for neurology diagnostics.

Regulatory Compliance Pipeline

Develop a fully validated, FDA-compliant medical screening framework, enabling widespread adoption in hospitals and research institutions.