

# ***AUTOMATED FACIAL PALSY SEVERITY CLASSIFICATION USING GEOMETRIC ANGLE FEATURES AND RANDOM FOREST***

TEAM MEMBERS

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# MOTIVATION/PROBLEM STATEMENT

Problem: Facial Palsy causes facial muscle paralysis, but current diagnosis relies on subjective clinical scales, leading to inconsistency.

Challenge: Complex AI solutions are not suitable for quick, resource-light clinical use.

Our Goal: To create a simple, accurate, and automated system for objective palsy severity classification.

# BASE PAPER & OUR IMPROVEMENT



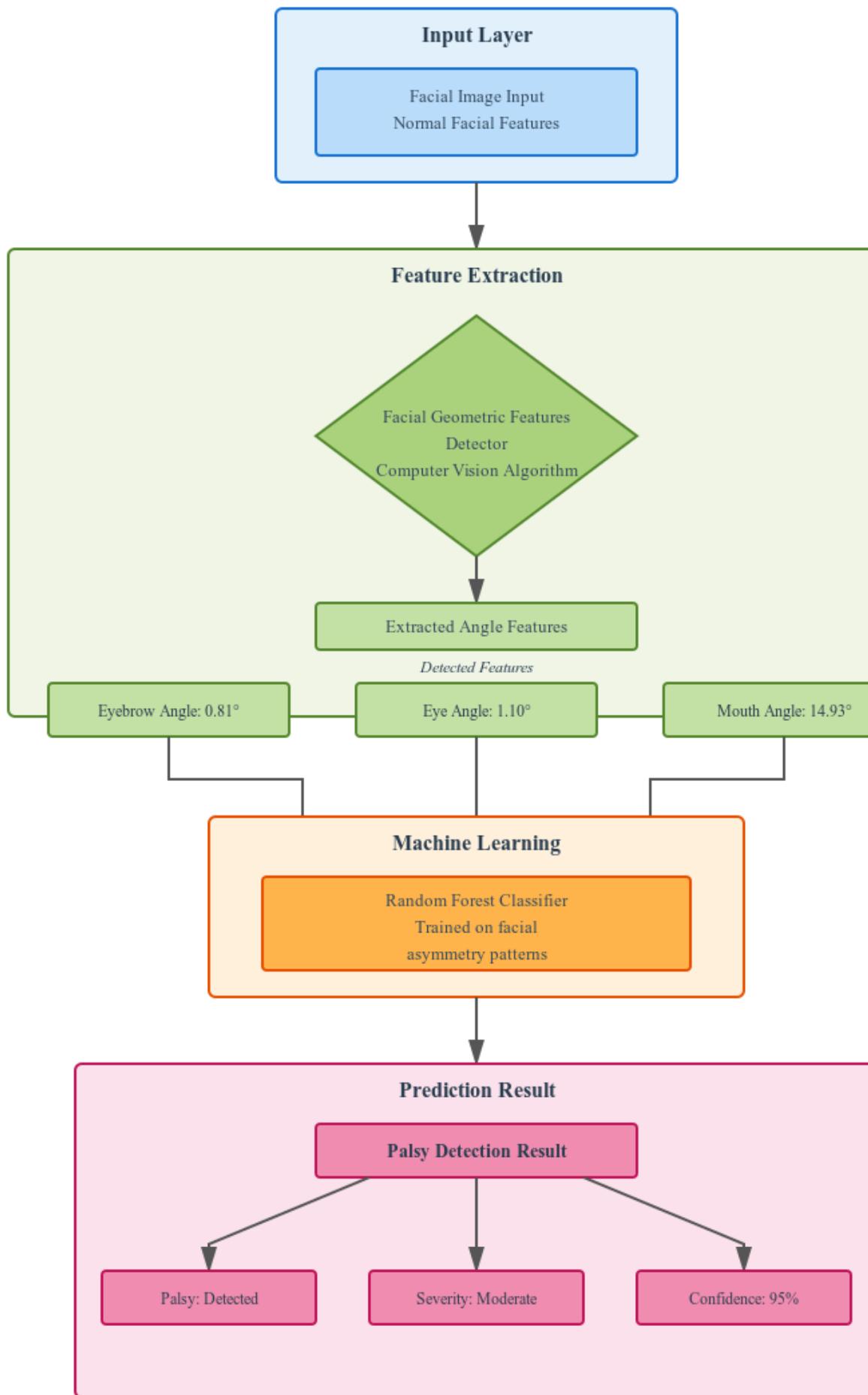
Base Paper (DGNN for Emotion Recognition):

- Used a complex Directed Graph Neural Network with 51 landmarks.
- High accuracy but computationally heavy.

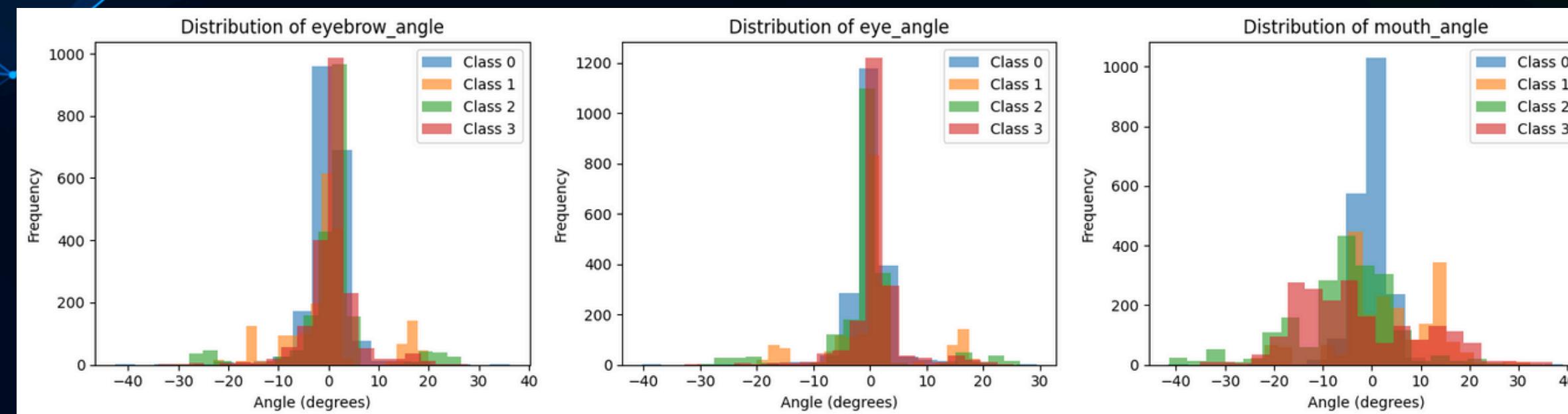
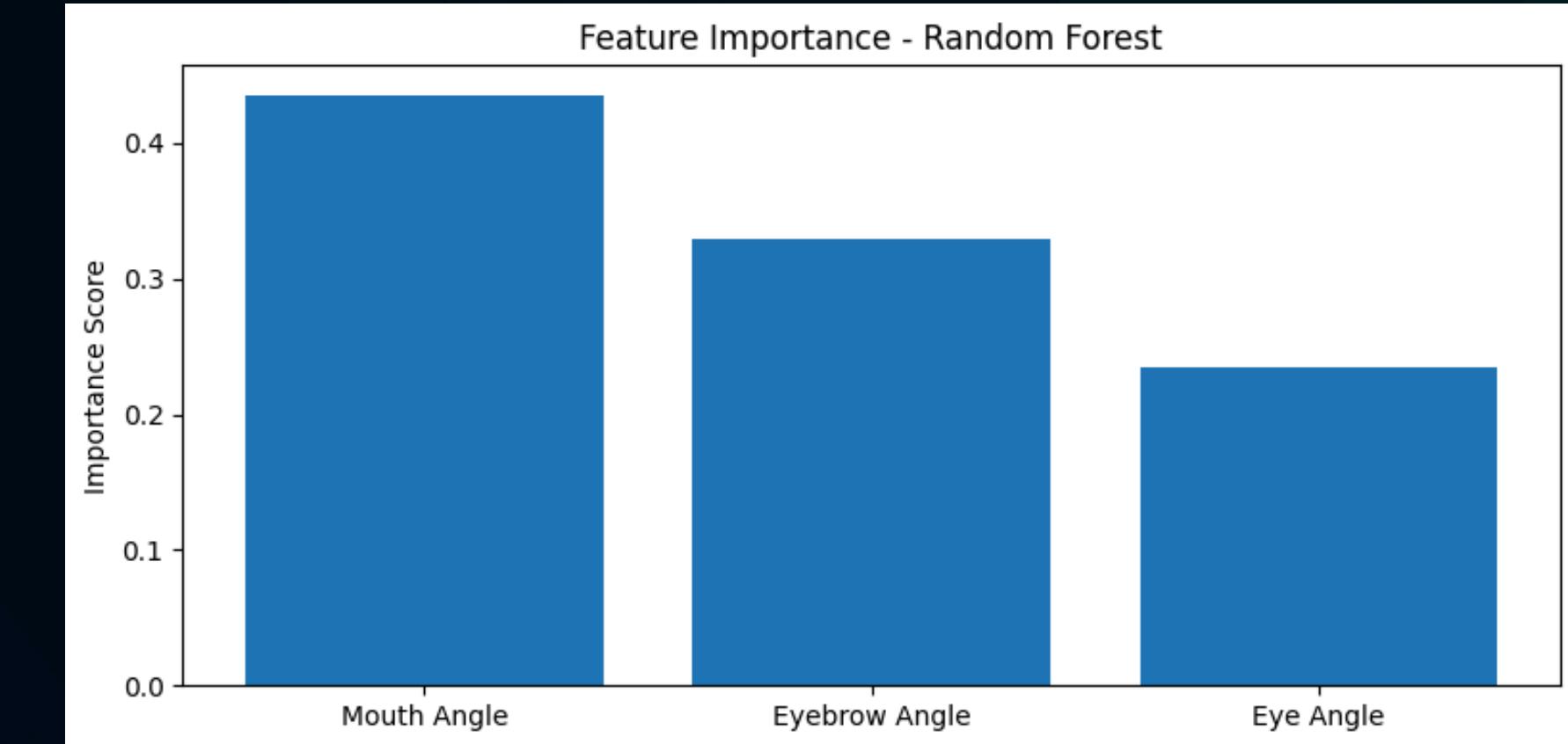
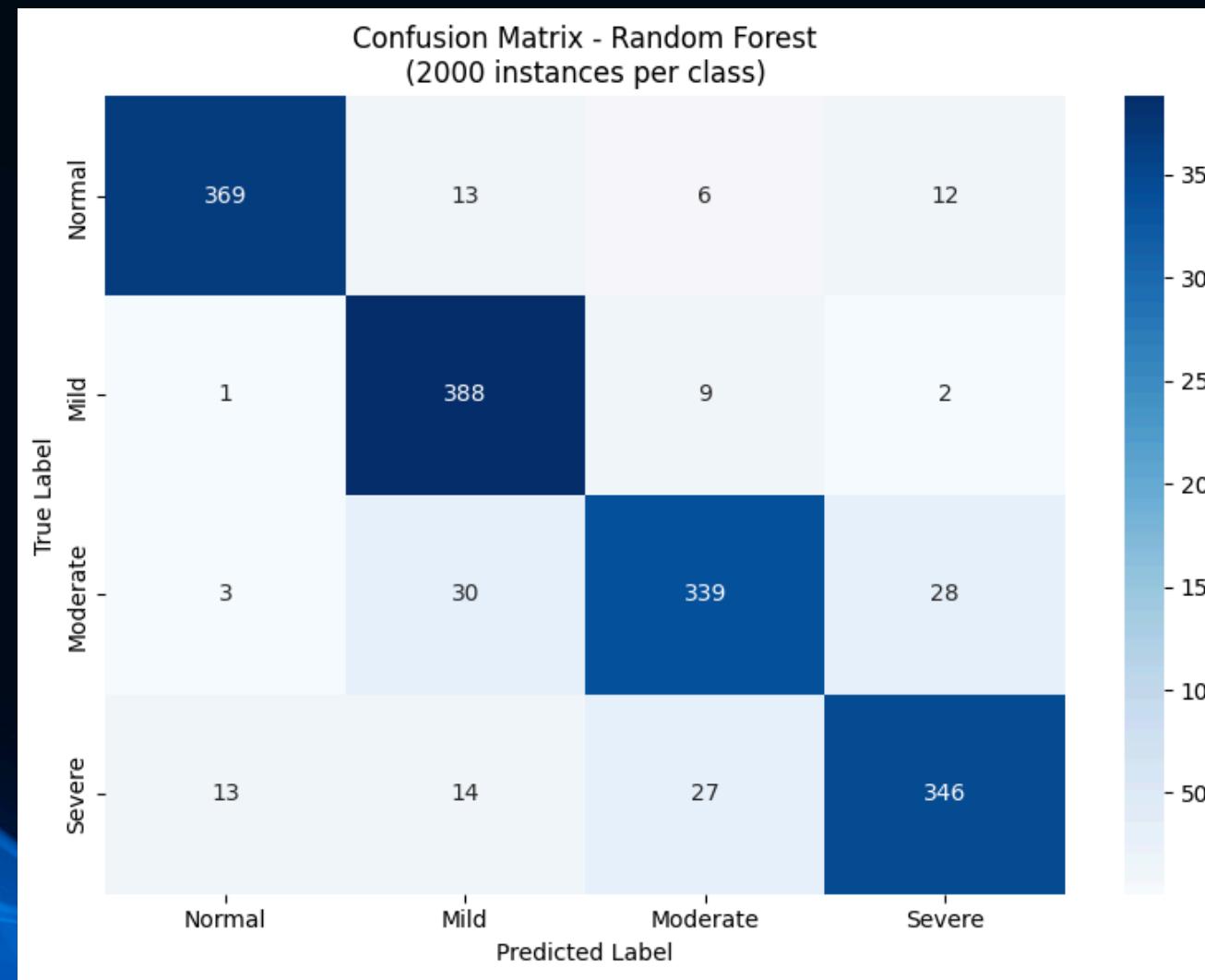
Our Improvement:

- Simplified for Clinical Use: We use only 3 key geometric angles (eyebrow, eye, mouth) from 68 landmarks.
- Efficient Model: Replaced complex DGNN with a lightweight Random Forest classifier.
- New Focus: Shifted from emotion recognition to clinical palsy severity assessment.

# METHODOLOGY FLOWCHART



# RESULTS AND METRICS

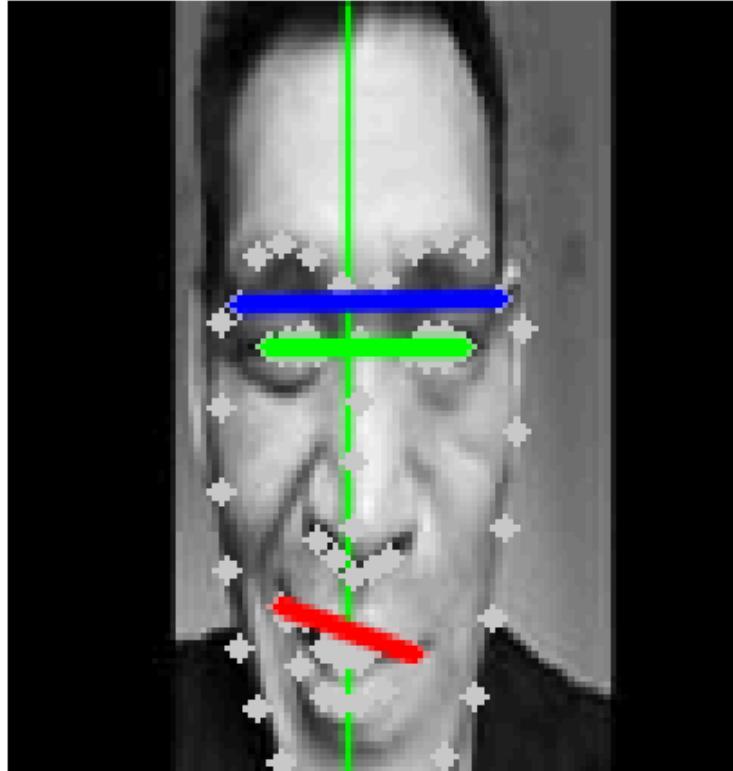


# SAMPLE RESULTS

Original: 6\_Mi\_mouth10.jpg  
Folder: Mild mouth



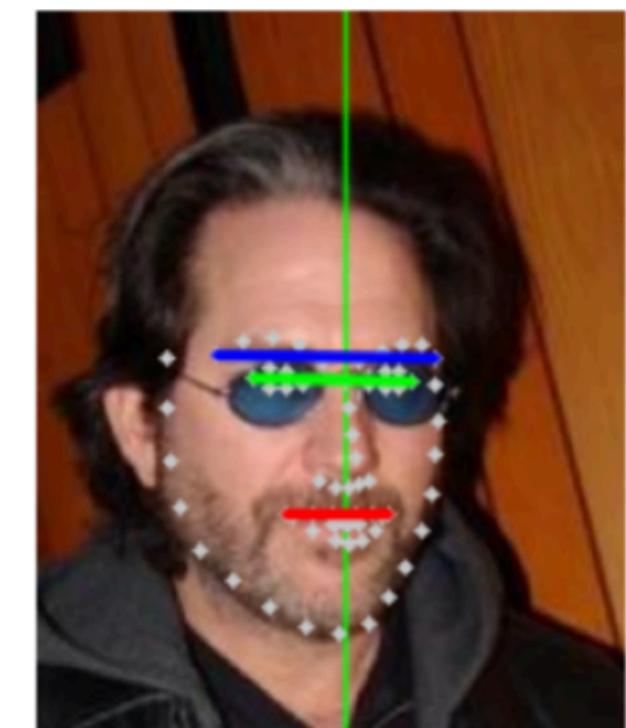
Prediction: Mild (86.2%)



Original  
normal\_0096.jpg



TRUE NEGATIVE  
Pred: Normal | Actual: Normal  
Correctly NOT Mild



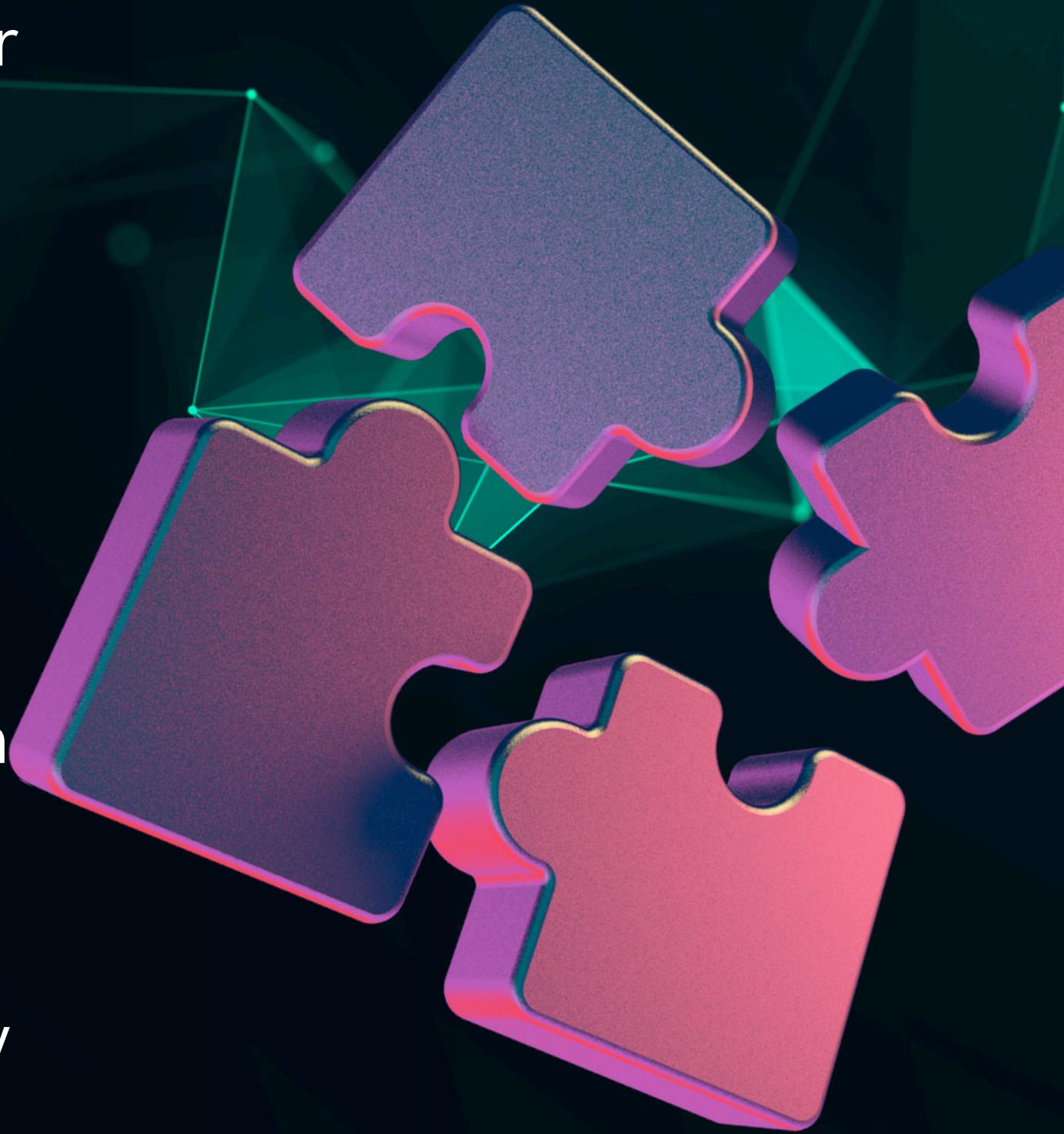
# KEY FINDINGS & ADVANTAGES

Simplicity & Power: Just three angle features are enough for high-accuracy classification.

Clinical Interpretability: Doctors can easily understand the "angle-based" reasoning, unlike black-box deep learning models.

Computational Efficiency: The system is fast and can run on standard hardware, making it ideal for clinics.

Robust & Balanced: Performs consistently across all severity levels due to a balanced dataset



# FUTURE ENHANCEMENT

Video Analysis - Add synkinesis detection through muscle movement tracking

Clinical App - Develop real-time decision support tool with progress tracking

Pose-Robust Features - Ensure accuracy across different head positions

Enhanced Feature Set - Add eye closure metrics and facial fold depth analysis



# CONCLUSION