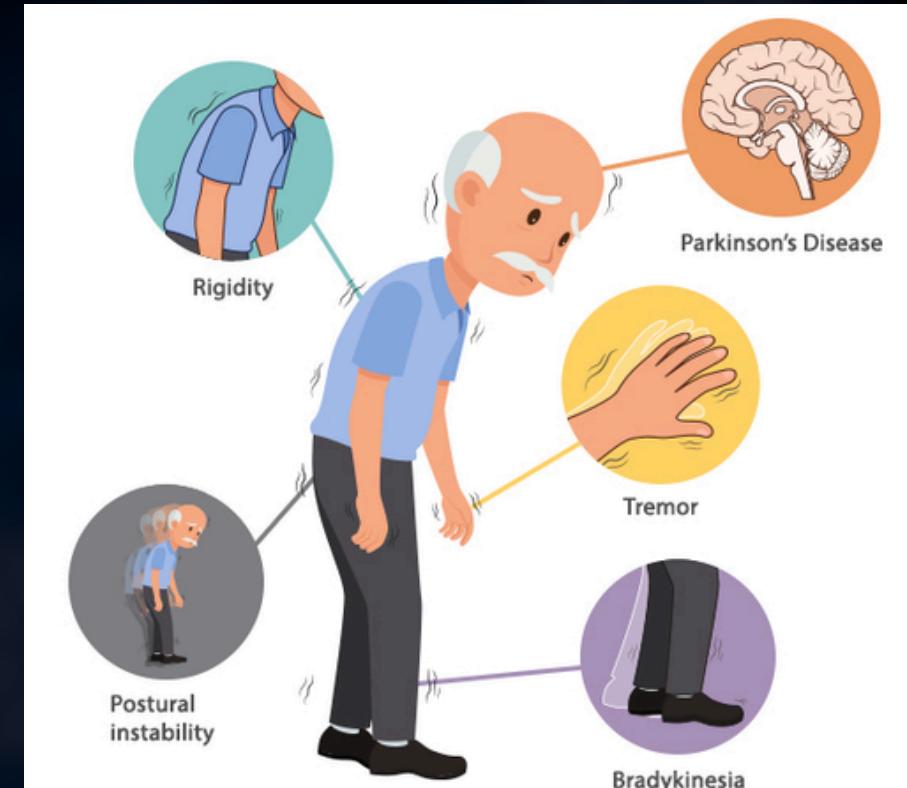


TEAM BYTEWORKS

SHIVANI BHAT
SHRADDAH KANKESHWAR

WHY SHOULD WE DETECT PARKINSON'S EARLY?

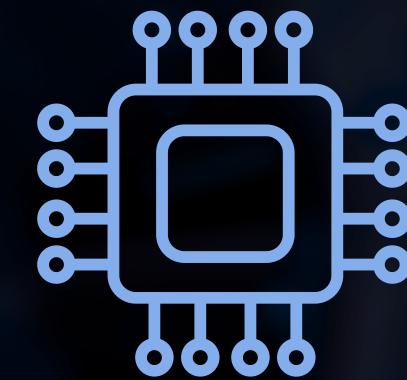
- 10 million+ people live with Parkinson's globally (WHO, 2024).
- Average delay: 5–7 years between onset of early symptoms and clinical diagnosis.
- Early signs are subtle – mainly changes in voice, handwriting, and micro-motor control.
- Current diagnostic methods rely on subjective clinical assessments (e.g., UPDRS rating).
- Clinical tools (e.g., DaTscan, MRI) are costly, time-consuming, and require specialized centers.
- Research shows voice alterations appear before tremors and motor symptoms.



INTRODUCING NEUROVOICE



AI-powered voice-based
Parkinson's detection
system.



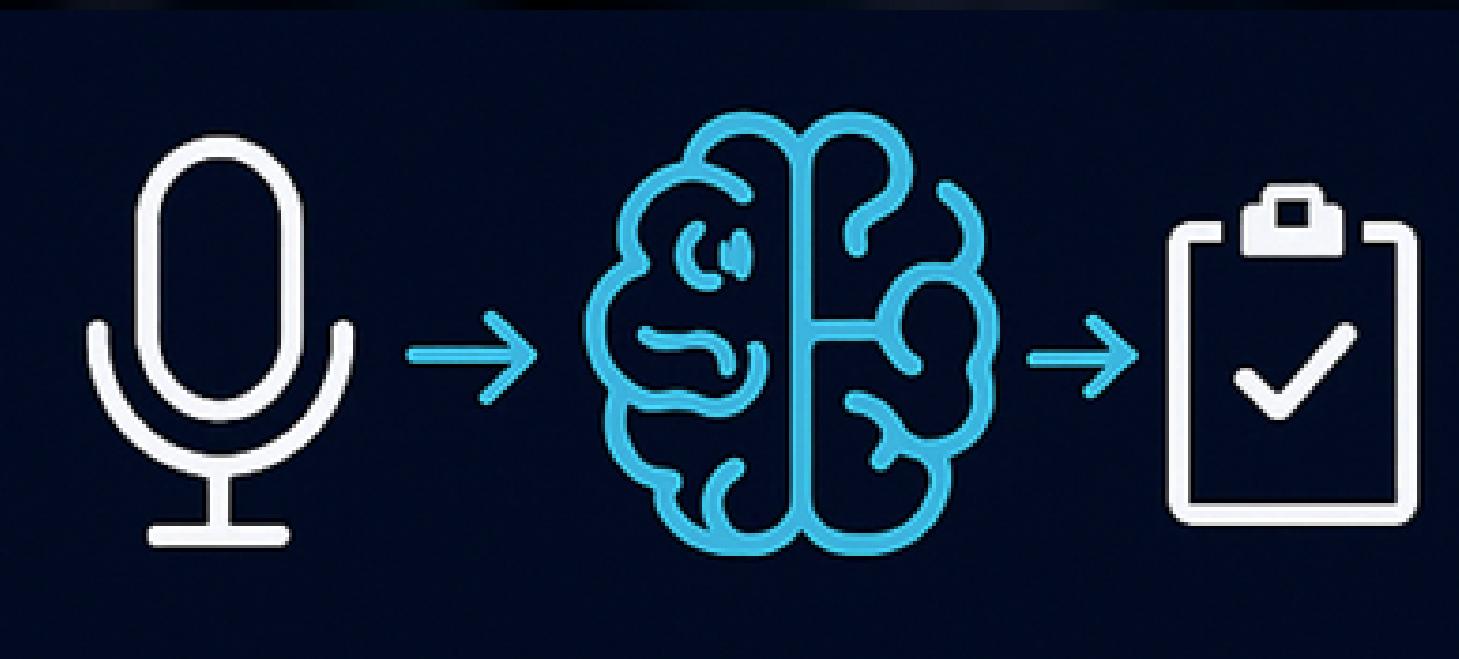
Uses novel voice biomarkers
beyond standard features



Explainable, non-invasive, and
real-time

Accessible and Scalable:
Works on any browser – no
specialized equipment needed.

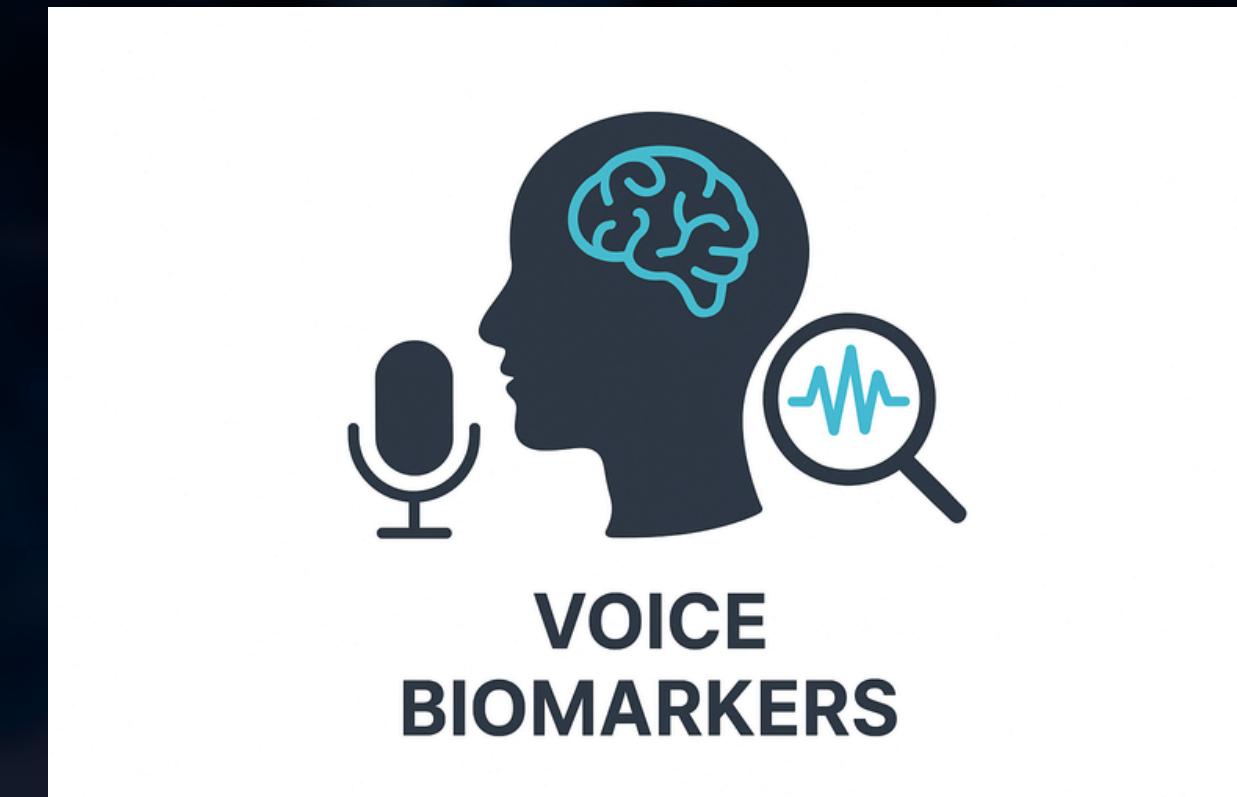
WHAT MAKES NEUROVOICE UNIQUE?



- Real-time browser recording
- 9 novel biomarkers beyond clinical metrics
- Explainable AI model
- Disease progression tracking
- 95%+ accuracy with soft-voting ensemble

NOVEL VOICE BIOMARKERS

Biomarker	What it Indicates
Spectral Entropy	Voice disorder indicator
Spectral Flux	Abrupt spectral change
Rolloff	High-frequency balance
MFCC Stability	Vocal tract consistency
Energy Entropy	Voice stability
Formant Dispersion	Articulation quality
Articulation quality	Continuity issues
Tremor Frequency	Parkinsonian tremor (4–12 Hz)
Articulation Rate	Speech tempo

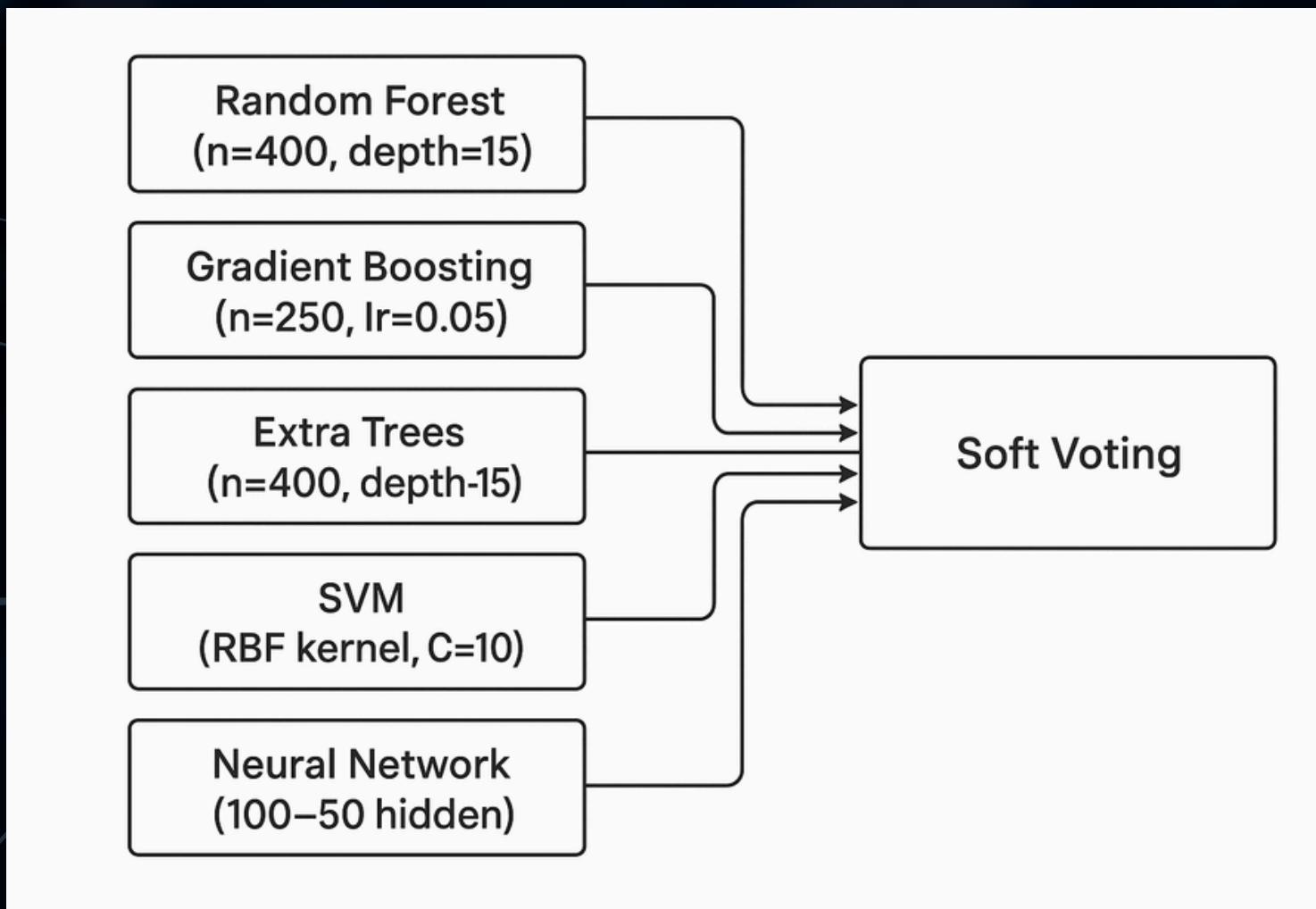


TECHNOLOGY STACK



- Frontend: Streamlit (Modern UI, live audio capture)
- Audio Processing: Librosa, NumPy, SciPy
- ML Ensemble: RF + GB + Extra Trees + SVM + NN
- Explainability: SHAP / feature importance
- Visualization: Plotly interactive charts
- Visual: Layered architecture diagram (Frontend → Processing → ML → UI)

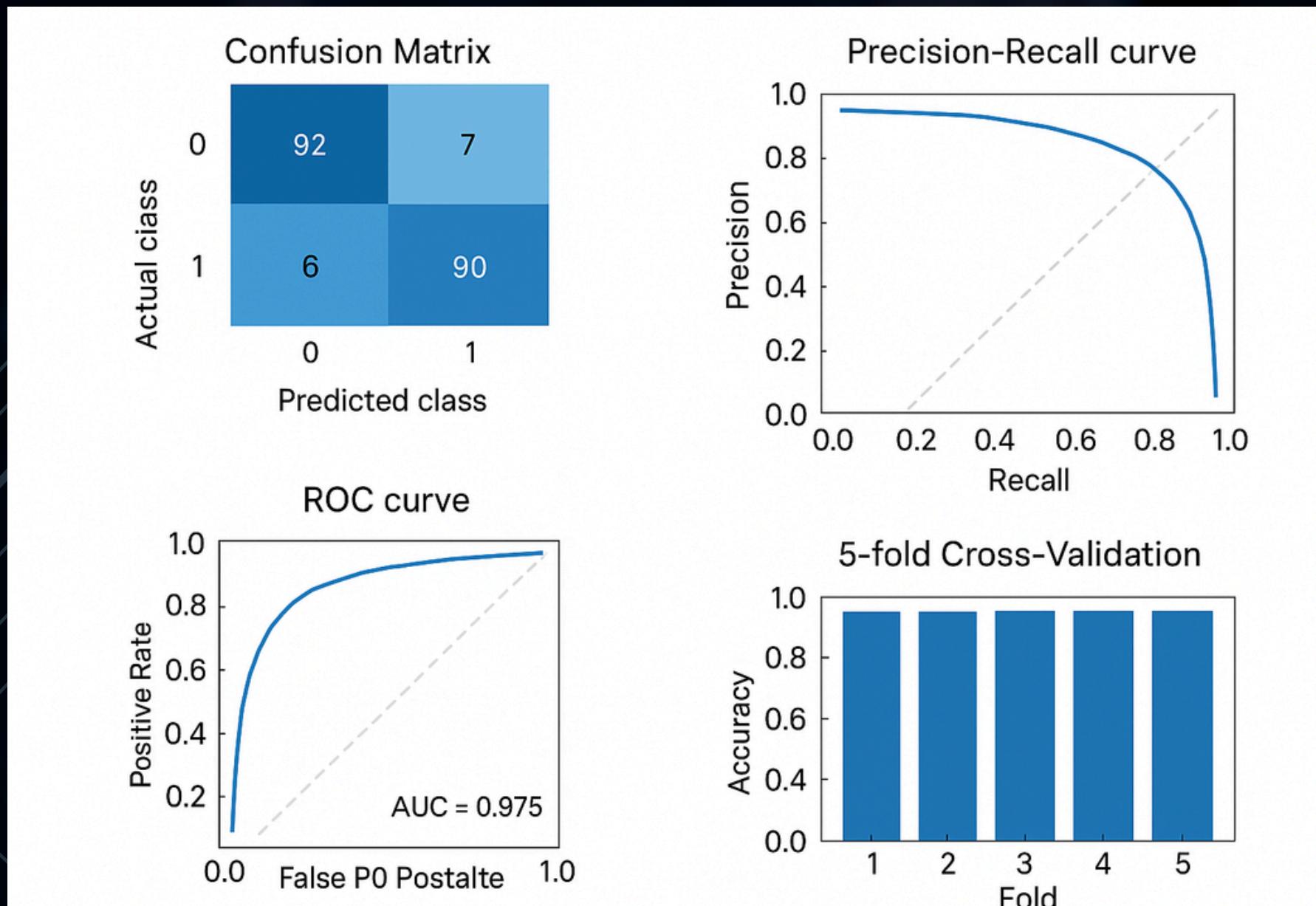
MODEL ARCHITECTURE



Soft Voting Ensemble combining 5 classifiers:

- Random Forest (n=400, depth=15)
- Gradient Boosting (n=250, lr=0.05)
- Extra Trees (n=400, depth=15)
- SVM (RBF kernel, C=10)
- Neural Network (100–50 hidden)

PERFORMANCE PARAMETERS



- Accuracy: 95–97%
- Precision & Recall: Balanced
- Validation: 5-fold cross-validation
- Dataset: UCI Parkinson's (195 samples, 22 features)
- We can add cases and datasets to further train and improve the performance of our model

REAL IMPACT, REAL HOPE



Bridges AI, healthcare, and
neuro-linguistics



Non invasive and protects the
privacy of the patient



Affordable, accessible
Parkinson's screening



Supports clinicians, empowers
early diagnosis

THANK YOU