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(57) Abstract :
Disclosed herein is a cross-lingual, privacy-preserving voice system for medical diagnostics (100) that captures voice input via a microphone or mobile device using a voice data acquisition module (102). A preprocessing and anonymization module (104) denoises the input, removes silence, and applies GDPR-compliant pitch-shifting to preserve privacy. The feature extraction engine (106) identifies diagnostic markers from the anonymized voice. Dimensionality reduction and feature selection (108) use PCA and genetic algorithms to reduce redundancy. A hybrid machine learning core (110) performs disease classification using the optimized features. To ensure real-world applicability, a noise robustness module (112) introduces varied background noise levels. Fairness and bias mitigation (114) audits the system across demographics. A scalable deployment infrastructure (116) enables secure diagnostics compliant with GDPR and HIPAA. Finally, a clinical validation and feedback module (118) incorporates physician input, monitors performance, and continuously improves the system based on real-world data and outcomes.

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