LingoApp

1. Introduction
App Purpose: Empower language learners to enhance their speaking skills by practicing pronunciation through interactive exercises, receiving real-time auditory and visual feedback, and monitoring improvement over time.

2. Product Objectives

Interactive Practice	Offer an engaging environment for pronunciation exercises.
Immediate Feedback	Provide real-time and detailed analysis of user recordings.
Multi-Language Support	Cater to various languages and proficiency levels.

3. Functional Requirements

ID	Title	Description	Scene
RF01	Language Selection	User selects a language from a predefined list (e.g., English, Spanish, French).	Scene 3
RF02	Phrase Set Selection	User chooses a proficiency level (Beginner, Intermediate, Advanced) to load corresponding phrases.	Scene 4
RF03	Audio Recording	User records their voice repeating the target phrase; live waveform indicator displays during recording.	Scene 5
RF04	Pronunciation Analysis	App sends the recording to the backend; backend returns metrics on pitch, rhythm, and stress.	Scene 6
RF05	Real-Time Indicator	During recording, a live waveform guides the user.	Scene 5
RF06	Feedback Report	Displays overall score (0–100), highlights strengths and weaknesses.	Scene 7
RF07	Improvement Suggestions	Suggests targeted actions (e.g., 'Lengthen final vowels').	Scene 7
RF08	Training History	Lists past sessions with date, score, and playback links.	Scene 9
RF09	Audio Comparison	Allows alternating or simultaneous playback of original and user recordings.	Scene 8
RF10	Sensitivity Adjustment	User can adjust analysis rigor via a slider in Settings.	Scene 10
RF11	Authentication & Profile	Email/password or OAuth login; profile displays progress and badges.	Scene 1 & 2
RF12	Achievements & Gamification	Badge system and notifications for milestones.	Scene 11
RF13	Offline Access	Download phrase sets for offline practice.	Scene 12
RF14	Sharing Results	Export or share recordings and scores (e.g., WhatsApp, social media, MP3).	Scene 13
RF15	Platform Compatibility	Support for Android (API 21+) and iOS (12+).	Scene 14

4. Non-Functional Requirements

Category	Requirement
Performance	Audio analysis completes in < 3 seconds on mid-range devices.
Reliability	Backend service uptime ≥ 99.5% per month.
Usability	Conform to Material Design (Android) and Human Interface Guidelines (iOS).
Scalability	Handle 10,000 concurrent users without degradation.
Security	All client-server communication over HTTPS; encryption of data at rest and in transit.
Maintainability	Modular codebase (MVI for Android, MVVM for iOS); ≥ 80% unit test coverage.
Internationalization	All UI text externalized for translation.
Accessibility	Screen reader support; adjustable font sizes; sufficient color contrast.
Portability	Use permissively licensed libraries (Apache, MIT).
Privacy	Explicit user consent for audio recording; transparent data policy.

5. Acceptance Criteria

- Every functional requirement must have an automated acceptance test.
- UX flows validated by at least three representative users.
- Performance tests confirm analysis latency < 3 s.
- Security audit ensures compliance with encryption and data-handling policies.

6. Glossary

Pitch	Perceived highness or lowness of sound (frequency).
Rhythm	Timing and duration patterns in speech.
Stress (Accent)	Emphasis placed on a syllable or word.
FFT	Fast Fourier Transform: algorithm to analyze frequency components of audio.
MVI/MVVM	Architectural patterns for Android/iOS, respectively.