AI-Driven Adaptive Language Learning App – Scope Document

1. Project Overview

This AI-powered **language-learning application** dynamically **adapts lessons based on user proficiency and engagement**. The system continuously assesses user skills, **adjusts difficulty levels**, and provides **interactive AI-driven conversation practice, pronunciation feedback, and personalized lesson plans**.

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2. Scope of Work

2.1. Core Features & Deliverables (MVP)

2.1.1. AI-Powered Proficiency Assessment

- AI evaluates the user's proficiency level via:
  - A diagnostic test at onboarding.
  - Ongoing performance analysis from lesson interactions.
- Uses speech, text, and grammar evaluation to refine assessment.
- Frontend: UI for test-taking and proficiency display.
- Backend: Stores user proficiency levels and learning history.
- AI Component: Uses NLP + ML models for proficiency detection and scoring.

2.1.2. Adaptive Lesson Planning

- Provides **personalized lesson plans targeting weak areas**.
- AI generates **tailored daily lessons** based on:
  - **User's availability**
  - **Learning goals**
- Dynamically adjusts **difficulty level** based on real-time performance.
- **Frontend:** Displays adaptive lessons in an interactive format.
- **Backend:** Manages lesson data and user progression.
- **AI Component:** Uses **reinforcement learning** for content difficulty optimization.

2.1.3. Conversational AI for Real-Life Dialogues

- AI simulates **real-world conversations** for practical learning.
- Conversational AI can:
  - Understand and correct **grammar mistakes**.
  - Adapt responses based on the user's **proficiency**.
  - Engage in **natural conversations** to improve fluency.
- AI **analyzes pronunciation** and gives real-time feedback.
- Detects **phonetic mistakes** and provides corrections.
- AI **grades pronunciation accuracy** and suggests improvements.
- **Frontend:** Chat-based conversational UI with voice and text support.

- **Backend:** Processes and stores conversation data.
- **AI Component:** Uses **LLMs (GPT-4 / fine-tuned models) for realistic dialogue simulation**. Uses **Whisper API / DeepSpeech for speech-to-text processing**.

2.1.4. Spaced Repetition & Revision Scheduling

- AI suggests **revision schedules** based on spaced repetition techniques.
- Users receive reminders for **timely lesson reviews**.
- Generates **AI-powered summaries** of past lessons for quick revision.
- **Frontend:** Displays recommended revision schedules and lesson summaries.
- **Backend:** Logs past lessons and user progress.
- **AI Component:** Uses **spaced repetition algorithms (SM2)** for retention optimization.

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3. Deliverables

- Fully functional **AI-driven adaptive language-learning app (MVP).**
- AI-based **real-time assessment and adaptive difficulty adjustment.**
- **Conversational AI chatbot for language practice.**
- **Speech recognition & pronunciation feedback module.**
- **Spaced repetition-based revision scheduler.**
- **Secure backend with user progress tracking.**
- **Presentation & demo explaining AI logic & system architecture.**

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4. Acceptance Criteria

- Successful deployment of the MVP with all core AI-driven functionalities.
- AI adjusts lesson difficulty dynamically based on **real-time user performance**.
- Conversational AI **engages naturally and provides contextual corrections**.
- Speech recognition **achieves at least 85% phonetic accuracy**.
- Spaced repetition module **improves recall and learning efficiency.**

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5. Key Points of Evaluation

- AI model **performance in lesson adaptation, pronunciation scoring, and chatbot dialogue quality**.
- **Usability and engagement metrics** (lesson completion rates, interaction frequency, retention).
- **Scalability and efficiency** of AI-powered adaptive learning engine.
- **Security compliance and data protection measures.**
- **Accuracy of AI-generated language explanations vs. human instructors.**

Future Enhancements

AI-Powered Personalized Learning Paths

- AI suggests **learning tracks** based on the user's interests (Business English, Travel, Academic Writing, etc.).
- Generates **custom lesson sequences** for targeted skill-building.

Gamification & Adaptive Rewards

- AI personalizes **streak tracking, badges, and achievements.**
- Uses reinforcement learning for **reward-based motivation.**

Voice Cloning for AI Language Tutors

- AI generates **synthetic voice tutors with custom accents & tones**.
- Users can **select a preferred voice model for learning.**
