

TECHNICAL PROPOSAL & SCOPE DOCUMENT

Persona **AI**

An AI-Powered Adaptive Social Skills Training Platform — Personalized Coaching Through Intelligent Voice Characters, Gamified Learning Pathways & Enterprise Team Development

PREPARED BY

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1.0 — Final

CLASSIFICATION

Confidential

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Document Purpose

This document serves as the comprehensive technical proposal and scope definition for the design, development, and deployment of the Persona AI platform. It details the system architecture, AI/ML pipeline, feature specifications, development timelines, and commercial framework for building an enterprise-grade, AI-powered social skills training platform.

01

Executive Summary

THE OPPORTUNITY AT A GLANCE

Persona AI is a next-generation, AI-powered social skills training platform that delivers hyper-personalized coaching through adaptive voice-based AI characters. Users describe their real-world interpersonal challenges — managing up, public speaking, conflict resolution, networking — and the platform constructs a tailored learning pathway powered by conversational AI agents whose personalities, communication styles, and difficulty levels dynamically adapt to the learner's needs.

The platform combines **large language model orchestration**, **real-time text-to-speech synthesis**, **behavioral analytics**, and **gamification mechanics** into a unified experience that makes social skills training as engaging and measurable as fitness tracking.

\$38B

CORPORATE TRAINING MARKET (2026)

72%

EMPLOYERS CITE SOFT SKILLS GAPS

4.2x

ROI ON COMMUNICATION TRAINING

02

Market Opportunity

PROBLEM & DEMAND LANDSCAPE

The Problem

Traditional social skills training relies on expensive executive coaches (\$300-\$500/hr), generic e-learning modules with no interactivity, or roleplay workshops that are logistically difficult to scale. The result: 85% of professionals report receiving no structured social skills development despite it being the #1 predictor of career advancement.

Current Market Gaps

- **No personalization** — one-size-fits-all content ignores individual contexts
- **No practice environment** — learners read theory but never practice in realistic scenarios
- **No measurement** — no data-driven tracking of soft skill improvement
- **No scalability** — coaching is expensive and doesn't scale for enterprise teams

Persona AI's Differentiators

- **Adaptive AI Characters** — realistic practice partners that mirror real-world dynamics
- **Personality Tuning** — dial an AI character to match a tough manager or colleague
- **Voice-First Interaction** — natural spoken conversation, not text quizzes
- **Gamified Progression** — leaderboards, XP, streaks, and skill badges

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Platform Vision & Core Features

WHAT WE'RE BUILDING

User Journey Overview

A user signs up, completes a brief diagnostic assessment (5 min), describes their social skills challenge in natural language, and immediately receives a personalized learning pathway. They then engage in voice-based roleplay sessions with AI characters that adapt in real-time, receive post-session analytics, earn XP and badges, and track their progression on leaderboards.

1. Onboarding & Diagnostic Engine

NLP-driven intake assessment analyzes user-described challenges. Maps to skill taxonomy (assertiveness, empathy, negotiation, etc.). Generates initial skill profile and recommends learning pathway.

2. Personalized Learning Pathways

Adaptive curriculum engine powered by spaced repetition and mastery-based progression. Dynamically adjusts difficulty, session frequency, and content mix based on performance analytics.

3. AI Character Interactions

Library of AI personas (supportive mentor, tough manager, demanding client, etc.). Users select or customize characters. Voice-first conversations with real-time personality modulation.

4. Personality Tuning System

Slider-based interface to adjust AI character traits: aggression, empathy, formality, patience, directness. Users recreate challenging interpersonal dynamics for targeted practice.

5. Gamification Engine

XP points, skill badges, daily streaks, weekly challenges, and global/team leaderboards. Achievement system tied to measurable skill milestones, not just completion.

6. Post-Session Analytics

AI-generated session debrief: communication score, empathy rating, assertiveness index, areas of improvement, and comparison to previous sessions. Longitudinal progress tracking.

Key Innovation: Contextual Personality Tuning

Unlike generic chatbot interactions, Persona AI allows users to describe a specific real-world person (e.g., "my manager who is passive-aggressive and avoids direct feedback") and the system constructs a behaviorally accurate AI character for targeted practice. This is achieved through a combination of personality trait vectorization, behavioral prompt engineering, and dynamic TTS voice modulation.

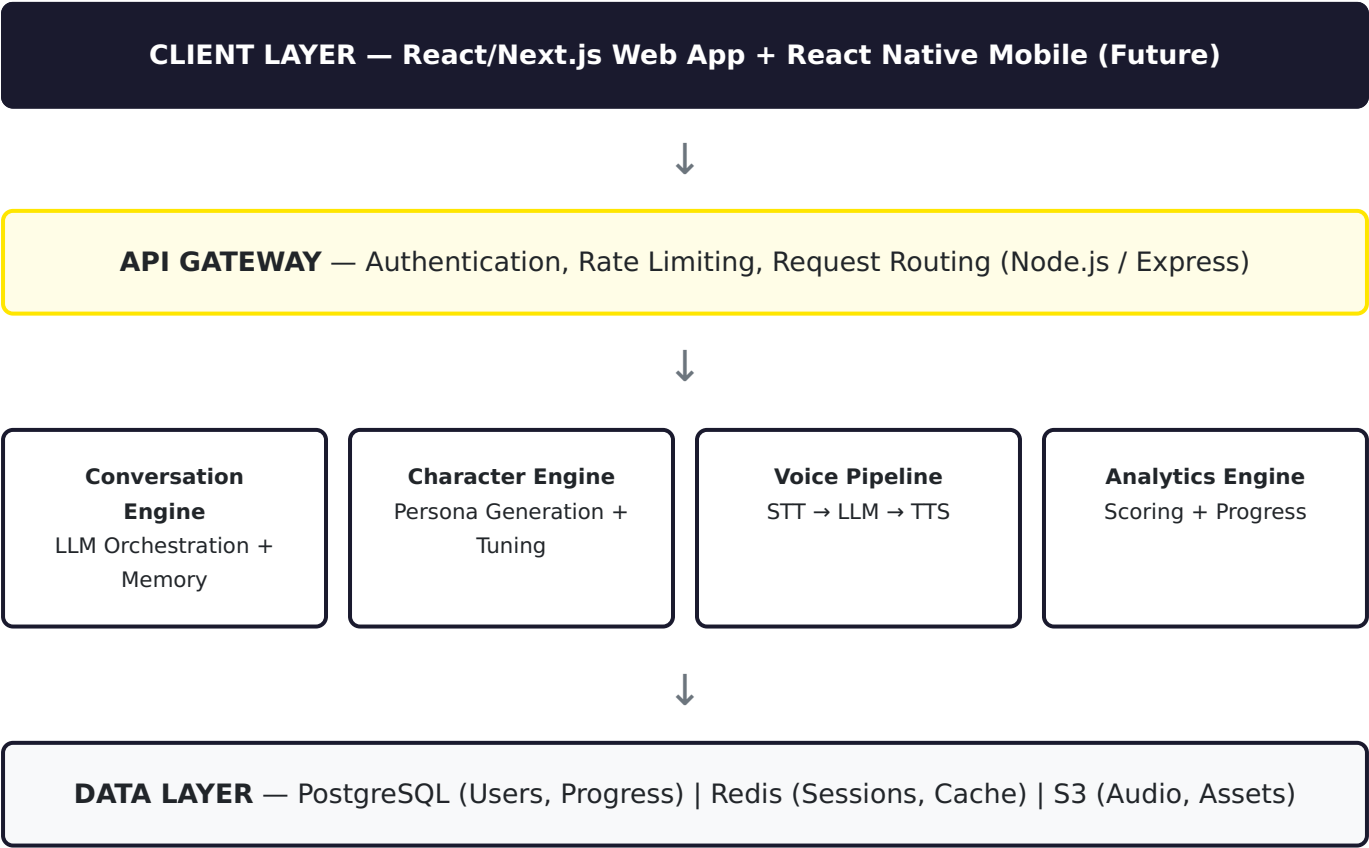
04

Technical Architecture & AI/ML Pipeline

SYSTEM DESIGN DEEP DIVE

High-Level Architecture

The platform follows a microservices-oriented architecture deployed on cloud infrastructure with the following layers:



AI/ML Pipeline — Detailed

1. Natural Language Understanding (NLU)

User input is processed through a multi-stage pipeline: (a) speech-to-text transcription via Whisper (open-source), (b) intent classification and entity extraction, (c) emotional tone analysis using fine-tuned sentiment models, (d) context-aware response generation through LLM with personality-conditioned system prompts.

2. Personality Vectorization

Each AI character is defined by a 12-dimensional personality vector mapped to the Big Five personality model (OCEAN) plus domain-specific traits: directness, patience, formality, humor, assertiveness, empathy, volatility. This vector conditions the LLM's system prompt and modulates TTS voice parameters (pitch, speed, warmth).

3. Conversation Memory & State

Sessions maintain short-term memory (current conversation context) and long-term memory (user history, past sessions, skill progression). Implemented via a sliding window context with retrieval-augmented generation (RAG) for pulling relevant past session insights.

4. Skill Assessment Engine

Post-session, the conversation transcript is analyzed by a dedicated evaluation LLM call that scores across 8 dimensions: clarity, empathy, assertiveness, active listening, conflict resolution, persuasion, emotional regulation, and adaptability. Scores feed into the adaptive learning algorithm.

Open-Source First Approach

We leverage open-source and cost-effective models to maximize the \$25K budget: **Whisper** (STT), **ElevenLabs / Coqui TTS** (voice synthesis), **Llama 3.x / Mistral** (conversation LLM — self-hosted or API), and **open embedding models** for RAG. This eliminates expensive per-API-call costs at scale while maintaining quality.

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AI Character Engine & Voice System

THE HEART OF THE EXPERIENCE

Character Archetypes (MVP)

The platform ships with 6 pre-designed character archetypes, each with distinct personality vectors, voice profiles, and visual avatars:

| CHARACTER | ARCHETYPE | KEY TRAITS | USE CASE |
|------------|-------------------|----------------------------------|--------------------------------------|
| Alex | Supportive Mentor | High empathy, patient, warm | Building confidence, gentle feedback |
| Morgan | Tough Manager | Direct, demanding, low patience | Managing up, handling criticism |
| Jordan | Difficult Client | Volatile, high expectations | Client management, de-escalation |
| Sam | Peer Collaborator | Casual, opinionated, competitive | Team dynamics, negotiation |
| Dr. Reeves | Executive Coach | Analytical, strategic, Socratic | Leadership skills, strategic comms |
| Casey | Interview Panel | Formal, evaluative, structured | Interview prep, presentations |

Personality Tuning Interface

Users can modify any archetype or create custom characters using slider-based controls:

Tunable Parameters

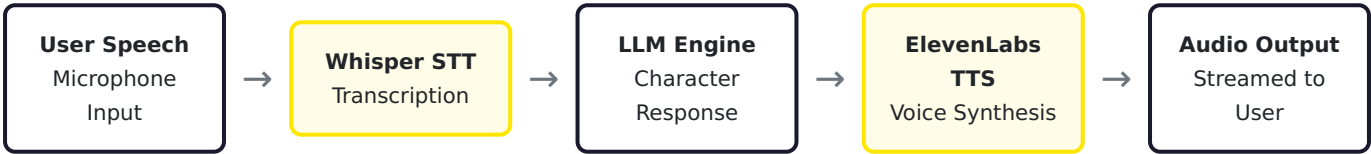
- **Directness** — Blunt ↔ Diplomatic
- **Patience** — Impatient ↔ Very patient
- **Warmth** — Cold/formal ↔ Friendly/warm
- **Assertiveness** — Passive ↔ Aggressive
- **Emotional Range** — Stoic ↔ Expressive
- **Formality** — Casual ↔ Corporate

Technical Implementation

Slider values (0-100) are normalized into a personality vector that dynamically generates the LLM system prompt using a template engine. The same vector modulates ElevenLabs TTS parameters:

- Voice **stability** maps to emotional range
- Voice **speed** maps to patience level
- Voice **style** maps to warmth/formality
- Voice **selection** maps to archetype gender/age

Voice Pipeline Architecture



Target latency: <1.5s end-to-end using streaming TTS and LLM token streaming. WebSocket connection maintains persistent session state.

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Gamification & Adaptive Learning Engine

ENGAGEMENT-DRIVEN SKILL DEVELOPMENT

Gamification Mechanics

The gamification system is grounded in self-determination theory (SDT) and flow theory — targeting intrinsic motivation through autonomy, competence, and relatedness. Every mechanic maps to a measurable learning outcome.

Core Mechanics

| MECHANIC | IMPLEMENTATION |
|-------------------|---------------------------------------------------------------------------------------------------|
| XP System | Points earned per session based on performance scores across 8 skill dimensions |
| Skill Badges | Unlocked at mastery thresholds (e.g., "Empathy Expert" at 80% empathy score avg over 10 sessions) |
| Daily Streaks | Consecutive day engagement with streak multipliers (1.5x at 7 days, 2x at 30 days) |
| Leaderboards | Global, weekly, team-based. Ranked by XP, skill scores, or streak length |
| Weekly Challenges | Themed scenarios (e.g., "Negotiation Week") with bonus XP rewards |
| Level Progression | Novice → Intermediate → Advanced → Expert → Master per skill domain |

Adaptive Learning Algorithm

The pathway engine uses a modified **knowledge tracing** model (BKT variant) combined with spaced repetition scheduling:

- **Skill State Estimation** — Bayesian probability model tracks mastery per skill dimension
- **Difficulty Calibration** — AI character difficulty auto-adjusts based on estimated skill state
- **Session Scheduling** — Optimal review intervals calculated per skill to maximize retention
- **Content Recommendation** — Scenario selection weighted by weakest skills and user goals

Progression Formula

XP = Base(50) × Performance(0.5-2.0) × Streak(1.0-2.0) × Difficulty(0.8-1.5)

Where Performance = weighted average across 8 skill dimensions scored by evaluation LLM

Learning Pathway Example

User Goal: "I want to get better at pushing back on my manager's unreasonable deadlines"

- WEEK 1-2 Assertiveness Foundations** — Practice with supportive "Alex" character at low difficulty. Learn assertion frameworks.
- WEEK 3-4 Escalating Difficulty** — Switch to "Morgan" (tough manager). Increase directness/impatience sliders. Practice pushback scenarios.
- WEEK 5-6 Custom Tuning** — User tunes character to match their actual manager's personality. Realistic rehearsal.
- WEEK 7-8 Mastery & Generalization** — Cross-context practice. Different scenarios. Assessment to confirm skill transfer.

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Monetization & Pricing Strategy

REVENUE MODEL

| FEATURE | FREE TIER | PREMIUM (\$19/MO) | ENTERPRISE (CUSTOM) |
|--------------------|-------------------|-----------------------------|----------------------------------|
| Sessions / month | 5 sessions | Unlimited | Unlimited |
| AI Characters | 2 (Alex + Sam) | All 6 + Custom | All + Custom corporate personas |
| Personality Tuning | Basic (3 sliders) | Full (6 sliders) | Full + API-driven presets |
| Voice Interaction | Text only | Full voice (STT+TTS) | Full voice + custom voices |
| Analytics | Basic score | Full 8-dimension dashboard | Team analytics + manager reports |
| Gamification | XP + Streaks | Full (badges, leaderboards) | Team leaderboards + goals |
| Learning Pathways | Auto-generated | Custom + AI recommended | Manager-defined team pathways |
| Support | Community | Priority email | Dedicated CSM + SLA |

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B2B Enterprise Module

TEAM DEVELOPMENT AT SCALE

The enterprise module enables companies to onboard teams, define skill development goals, and track progress through a dedicated admin dashboard.

Admin Dashboard Features

- **Team Management** — Add/remove members, create teams (e.g., "Engineering", "Sales")
- **Goal Setting** — Define team-level skill goals (e.g., "Improve presentation skills by Q3")
- **Progress Tracking** — Aggregate skill scores, session completion rates, engagement metrics
- **Custom Scenarios** — Upload company-specific scenarios (e.g., handling customer complaints per brand guidelines)
- **Reporting** — Exportable PDF/CSV reports for HR and L&D teams

Enterprise Integration Points

- **SSO** — SAML 2.0 / OAuth 2.0 integration
- **LMS Integration** — SCORM/xAPI compatibility for existing learning management systems
- **HRIS Sync** — Team structure auto-sync from HR systems
- **API Access** — REST API for custom integrations and automation
- **Data Residency** — Configurable data storage region for compliance

Enterprise Example

"A 50-person engineering team at Company X wants to improve presentation skills before a major product launch. The L&D manager sets a team goal, assigns the 'Casey — Interview Panel' character with custom scenarios around technical presentations, and tracks weekly progress via the admin dashboard."

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Technology Stack & Infrastructure

ENGINEERING DECISIONS

Frontend

| Component | Technology |
|------------------|-------------------------------|
| Framework | Next.js 15 (React 19) |
| State Management | Zustand |
| UI Library | Tailwind CSS + Shadcn/UI |
| Real-time Comms | WebSocket (Socket.io) |
| Audio Handling | Web Audio API + MediaRecorder |
| Charts/Analytics | Recharts |
| Authentication | NextAuth.js |

AI / ML Layer

| Component | Technology |
|-------------------|---------------------------------------------------------|
| Core LLM | Llama 3.1 70B / Mistral Large (via Groq or Together AI) |
| Speech-to-Text | OpenAI Whisper (open-source, self-hosted) |
| Text-to-Speech | ElevenLabs API (production) / Coqui TTS (fallback) |
| Character Visuals | Ready Player Me / Custom SVG Avatars |
| Embeddings | BGE-base / Nomic-embed for RAG |
| Evaluation | Dedicated LLM scoring pipeline |

Backend

| Component | Technology |
|------------------|------------------------------|
| Runtime | Node.js 22 (Express/Fastify) |
| Database | PostgreSQL 16 (Supabase) |
| Cache / Sessions | Redis (Upstash) |
| File Storage | AWS S3 / Cloudflare R2 |
| Job Queue | BullMQ (Redis-backed) |
| API Docs | OpenAPI 3.0 / Swagger |

Infrastructure & DevOps

| Component | Technology |
|------------|----------------------------------------------|
| Hosting | Vercel (Frontend) + Railway/Render (Backend) |
| CI/CD | GitHub Actions |
| Monitoring | Sentry + LogTail |
| Analytics | PostHog (open-source) |
| Email | Resend |
| Payments | Stripe |

Why This Stack?

Every choice optimizes for three constraints: **(1) cost efficiency** — leveraging free tiers (Vercel, Supabase, Upstash), open-source models, and usage-based pricing; **(2) speed to market** — battle-tested tools with rich ecosystems reduce development time; **(3) scalability** — all components are horizontally scalable when the platform grows past MVP.

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Development Roadmap & Timelines

20-WEEK DELIVERY PLAN

- 1

Phase 1 — Foundation & Core Architecture

WEEKS 1-4

Project setup, CI/CD pipeline, database schema design, authentication system (NextAuth + Supabase), base UI framework (Tailwind + Shadcn), API architecture, WebSocket infrastructure for real-time communication.

Deliverables: Authenticated app shell, API gateway, database schema, dev/staging environments.
- 2

Phase 2 — AI Engine & Voice Pipeline

WEEKS 5-8

LLM integration (Llama/Mistral via Groq), character persona system with personality vectorization, prompt engineering for all 6 archetypes, Whisper STT integration, ElevenLabs TTS integration, streaming voice pipeline, personality tuning slider system.

Deliverables: Working voice conversation with AI characters, personality tuning interface, end-to-end voice pipeline.
- 3

Phase 3 — Learning Pathways & Analytics

WEEKS 9-12

Onboarding diagnostic assessment, NLP-driven skill mapping, adaptive learning pathway engine, session evaluation pipeline (8-dimension scoring), post-session analytics dashboard, progress tracking with longitudinal charts.

Deliverables: Personalized pathway generation, session scoring, analytics dashboard.
- 4

Phase 4 — Gamification & Monetization

WEEKS 13-16

XP system, badges, streaks, leaderboards (global + weekly), level progression system, Stripe payment integration, free/premium tier gating, subscription management, premium feature unlocks.

Deliverables: Full gamification system, payment flow, tier-based access control.
- 5

Phase 5 — B2B Enterprise & Launch

WEEKS 17-20

Enterprise admin dashboard, team management, goal setting, team leaderboards, aggregate reporting, SSO integration, QA testing, performance optimization, security audit, staging → production deployment, launch.

Deliverables: Enterprise module, production deployment, launch-ready platform.

| | | | |
|--------------------------------------|--------------------------------------------|------------------------------------------------|-------------------------------------------------|
| <div>20</div> <div>WEEKS TOTAL</div> | <div>5</div> <div>DEVELOPMENT PHASES</div> | <div>Week 8</div> <div>FIRST USABLE DEMO</div> | <div>Week 20</div> <div>PRODUCTION LAUNCH</div> |
|--------------------------------------|--------------------------------------------|------------------------------------------------|-------------------------------------------------|

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Budget Breakdown

INVESTMENT ALLOCATION — \$25,000 USD

| # | CATEGORY | SCOPE | AMOUNT | % |
|-------|---------------------------------|------------------------------------------------------------------------------------|----------|------|
| 1 | Frontend Development | Next.js app, UI/UX, responsive design, all user-facing screens, audio integration | \$5,500 | 22% |
| 2 | Backend & API Development | API architecture, database, auth, WebSocket, job queues, payment integration | \$4,500 | 18% |
| 3 | AI/ML Engine Development | LLM integration, character system, personality tuning, evaluation pipeline, RAG | \$5,000 | 20% |
| 4 | Voice Pipeline (STT + TTS) | Whisper integration, ElevenLabs integration, streaming audio, latency optimization | \$2,500 | 10% |
| 5 | Gamification System | XP, badges, leaderboards, streaks, progression engine, adaptive learning | \$2,000 | 8% |
| 6 | B2B Enterprise Module | Admin dashboard, team mgmt, goal setting, reporting, SSO | \$2,500 | 10% |
| 7 | UI/UX Design | Wireframes, high-fidelity mockups, design system, character avatars | \$1,500 | 6% |
| 8 | QA, Testing & DevOps | Testing, CI/CD, monitoring setup, security review, deployment | \$1,000 | 4% |
| 9 | Third-Party Services (6 months) | ElevenLabs API, Groq/Together AI credits, Vercel, Supabase, hosting | \$500 | 2% |
| TOTAL | | | \$25,000 | 100% |

Budget Optimization Strategy

This aggressive budget is achievable through: **(1)** leveraging open-source models (Whisper, Llama/Mistral) to eliminate per-query LLM costs during development; **(2)** using free-tier infrastructure (Vercel,

Supabase, Upstash) for MVP; **(3)** a lean, senior-heavy team where every engineer covers multiple domains; **(4)** using pre-built UI components (Shadcn) to accelerate frontend development by ~40%.

Payment Schedule

| Milestone | Trigger | Amount |
|-------------|--------------------------------------------------------|----------------|
| Milestone 1 | Project kickoff + Phase 1 completion (Week 4) | \$7,500 (30%) |
| Milestone 2 | Phase 2-3 completion — Working AI voice demo (Week 12) | \$7,500 (30%) |
| Milestone 3 | Phase 4-5 completion — Full platform launch (Week 20) | \$10,000 (40%) |

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Risk Mitigation & Quality Assurance

PROACTIVE RISK MANAGEMENT

| RISK | SEVERITY | MITIGATION STRATEGY | CONTINGENCY |
|-------------------------------|----------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Voice latency > 2s | HIGH | Streaming TTS, LLM token streaming, WebSocket persistent connection, edge caching | Fallback to text-first mode with optional voice replay |
| LLM response quality | MEDIUM | Extensive prompt engineering, character-specific system prompts, evaluation guardrails | A/B test multiple LLM providers; upgrade to larger model if needed |
| ElevenLabs API costs at scale | MEDIUM | Free tier uses text-only; voice reserved for premium. Cache common phrases. | Migrate to open-source Coqui TTS for cost-heavy use cases |
| Scope creep | HIGH | Strict phase-gated delivery, weekly sprint reviews, documented change request process | Defer non-MVP features to v1.1 backlog |
| Data privacy / GDPR | MEDIUM | No voice data stored permanently; session transcripts encrypted at rest; user data deletion API | Engage compliance consultant pre-launch if targeting EU market |

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Why Idrak AI

YOUR ENGINEERING PARTNER

Our Capabilities

- **AI-Native Team** — Deep expertise in LLM integration, prompt engineering, and conversational AI systems
- **Full-Stack Delivery** — End-to-end product development from design to deployment
- **Voice AI Experience** — Prior work with real-time voice pipelines, STT/TTS integration
- **Rapid Prototyping** — Lean methodology, fast iteration, working demos within weeks

Our Commitment

- **Transparent Communication** — Weekly progress reports, demo sessions, open Slack channel
- **Quality First** — Code reviews, automated testing, staging environment for every release
- **Post-Launch Support** — 30-day post-launch support included in scope
- **Knowledge Transfer** — Full documentation, codebase walkthrough, and handoff support

Ready to Build the Future of Social Skills Training

Idrak AI — Building Intelligent Systems That Understand People

Contact: **hello@idrak.ai** | Let's build Persona AI together.