

SimPath 2.0: An Emotion-Aware Virtual Patient System for Therapist Training Using Multimodal AI

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INTRODUCTION

SimPath is an **AI-powered** platform that simulates realistic patient interviews for therapy learners. Trainees interact through text, audio, and video while receiving **automated hints** and **diagnostic feedback** to develop clinical communication skills.

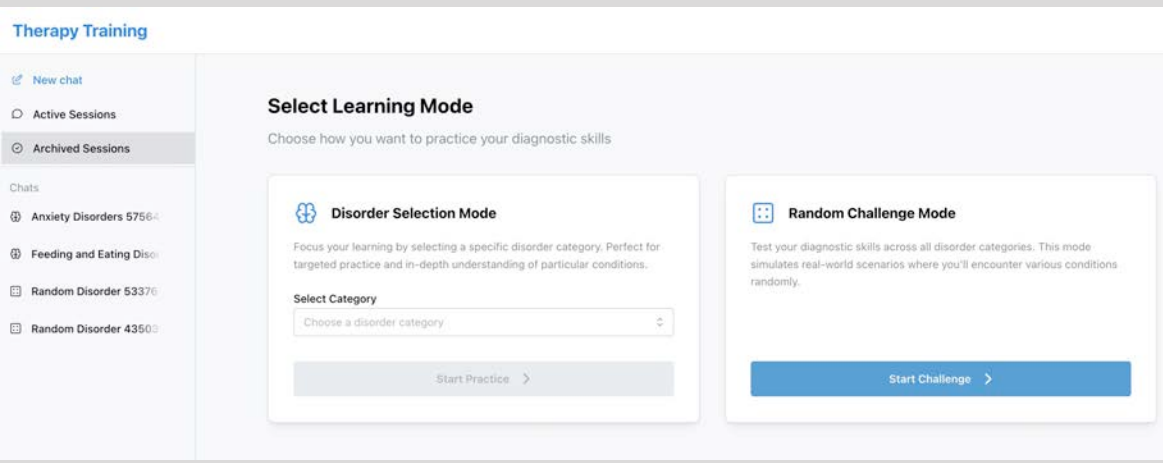


Fig1: Dashboard
Fig2: Promotion poster

PROBLEM STATEMENT

- Problem:** Existing AI mental-health tools focus on patient support, not therapist training, creating a gap in scalable, realistic education.
- Limitation:** Current virtual-patient systems rely on scripted dialogues and lack emotional depth or adaptive behavior.
- Opportunity:** LLLMs enable dynamic, emotion-aware patient conversations, offering more realistic therapist-training simulations.

SYSTEM DESIGN & WORKFLOW

Data → Patient persona generation → Mode selection → Interactive session → Scoring & feedback

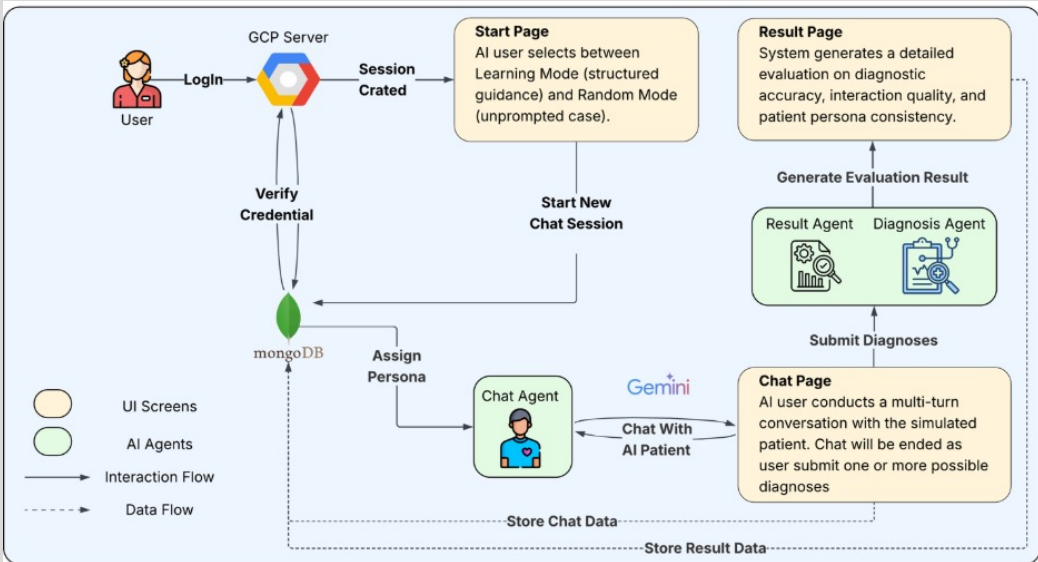


Fig3: System Design

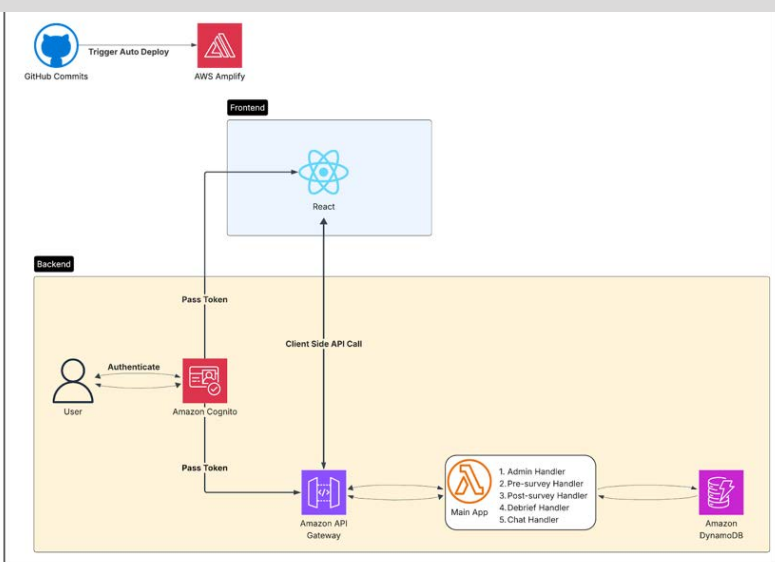


Fig4: AWS Framework

APPROACHES

- The system **incorporates advanced features** such as:
 - Clinically aligned virtual patients:** We processed 9,500+ DSM-5–based therapy transcripts to build a GPT-driven persona generator that models demographics, symptoms, and social context. This enables diverse, realistic patient profiles for targeted training scenarios.
 - Natural multimodal interaction:** Beyond text chat, the system supports real-time **audio (STT + TTS)** and **video avatars**, creating a conversation flow closer to real clinical interviews and improving immersion.

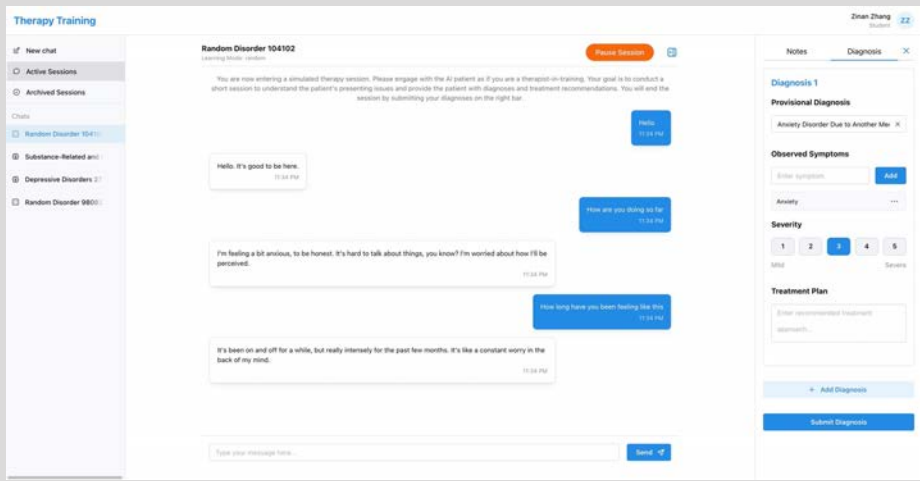


Fig5: Voice Mode Chat Panel

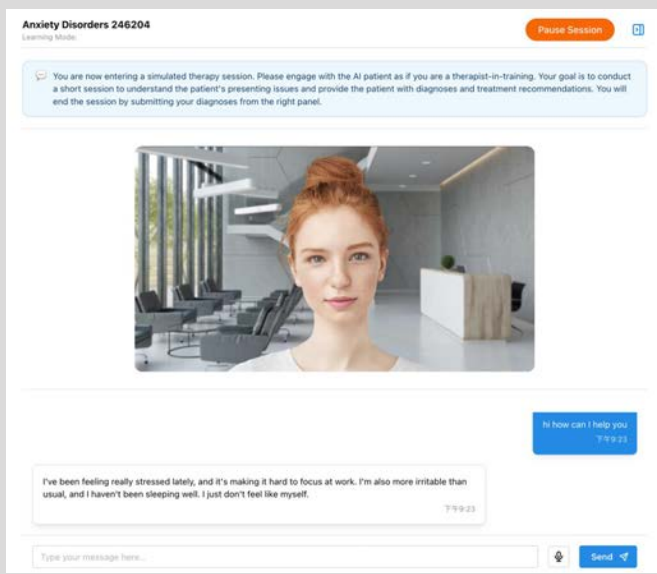


Fig6: Video Mode Chat Panel

- Real-time hints and feedback:** During the session, the model provides timely hints based on the ongoing dialogue. After diagnosis submission, the system generates structured feedback to help learners improve questioning and reasoning.
- To support stable multimodal interactions,** we deployed the system on AWS (EC2 + S3) for lower latency and reproducible performance.

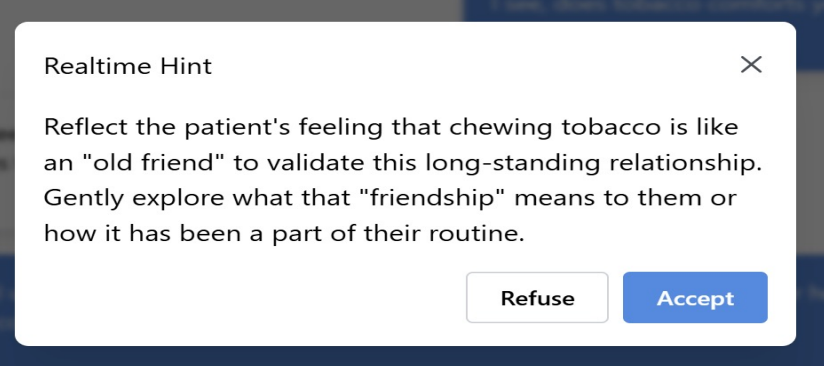


Fig7(up): Realtime Hint

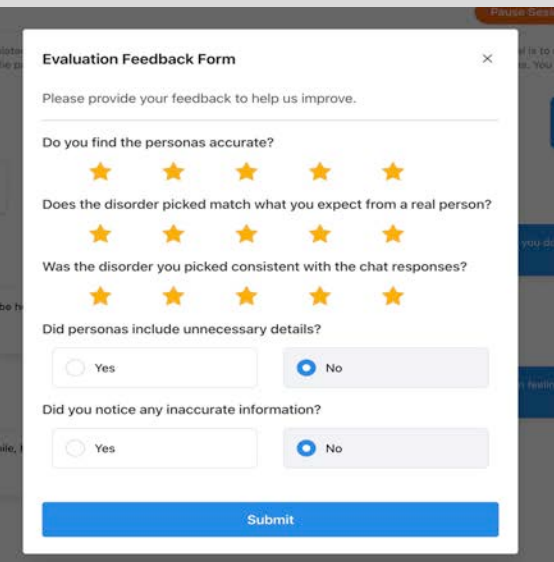


Fig8(left): User Feedback Form

RESULTS

- Diagnostic Output.** Each interview generates a structured summary of the predicted disorder, key symptoms, and a suggested treatment plan to help learners verify their clinical reasoning.
- Performance Evaluation.** The system automatically scores five skill areas—diagnostic accuracy, questioning, response quality, treatment planning, and engagement—providing concise improvement suggestions.
- Usability & Stability.** Audio/video modes improved realism and pacing, while AWS deployment reduced latency and stabilized multimodal interactions.

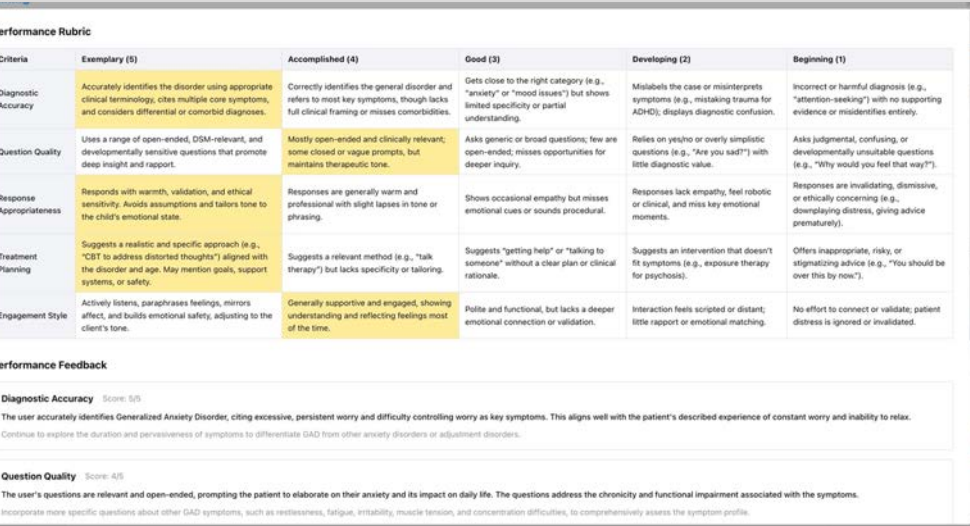
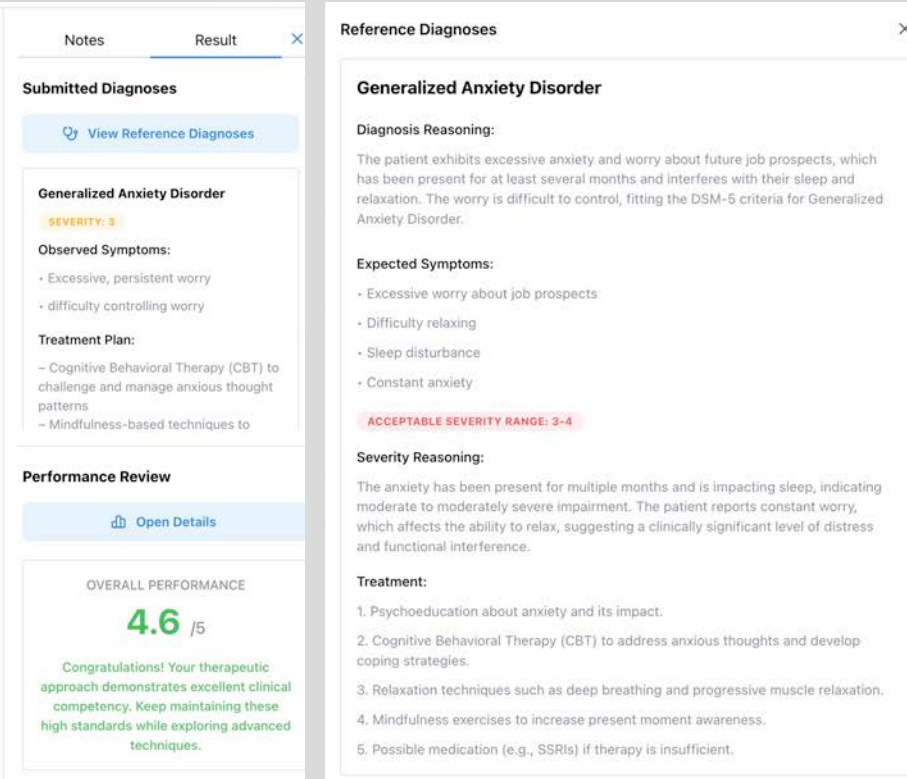


Fig9: Submitted Diagnoses
Fig10: Reference Diagnoses View
Fig11: Performance Review

Conclusions

By providing **accurate virtual patients, realistic user-patient interaction and real-time formative feedback**, SimPath platform transforms therapy simulation to a **dynamic user-centric experience** so that students can improve their clinical skills on communication and diagnoses identification.

Git Repo URL: <https://github.com/HC-AIGroup/therapy-training/tree/main>
APP URL: <https://main.dxaw6icazvtj.amplifyapp.com/>
Testing: instructor login: username: PT103, password: 103