

TUMJA ScienceHackathon

AI Conflict Resolution - Challenges



Beginner-Level Challenges

These are suitable for participants with limited coding experience or from non-CS backgrounds.

UI / UX

Make the interface mobile responsive.

Add a dark mode toggle for better accessibility.

Display a real-time typing animation when the AI is responding.

Visually distinguish between AI agent, user, and mediator using colors or avatars.

Add labels or tooltips explaining what each button/feature does.

Use the existing server to generate a PDF summary of the conversation.

Dialogue & Behavior

What differences could you identify between Engine 1 and Engine 2.

Pre-fill conversation settings and trait templates (e.g., assertive boss, passive employee).

Allow saving and reloading previous conversations.

Provide a "conflict resolution tip" based on the current chat tone.

Add a timeline or log of how the conflict escalated or de-escalated.

Humanities & Ethics

Research and explain what types of conflicts exist in real life (workplace, academic, domestic).

Document the ethical risks of AI participating in conflict resolution (e.g., bias, trust, misinformation).

Create a guide on how to act in character when taking over an agent role.

Intermediate-Level Challenges

These require technical skills in React, APIs, and a basic understanding of AI or backend development.

AI & Behavior Modeling

Integrate text-to-speech (TTS) for AI responses using provided backend features of the base app or Web Speech API or ElevenLabs.

Let users choose which AI model to use (e.g., GPT-3.5, GPT-4o, Claude, Mistral).

Add a configuration to control response length, creativity (temperature), or tone.

Introduce a feedback loop: let the user train the AI agent based on its previous message performance.

UI & Experience

Visualize the emotion of each message using emojis or a sentiment meter.

Add background sound/music that changes with emotional tension.

Create a “scenario builder” wizard to help participants build realistic conflicts.

Backend Enhancements

Implement a mediator AI agent that can be summoned mid-chat to talk to the existing participants of the conversation.

Store all chats in a database (e.g., SQLite, Firebase) for later analysis.

Implement a basic analytics dashboard (number of escalations, agent responses, resolution status).

Hard-Level Challenges

These are suitable for advanced students in AI/ML, ethics, or full-stack development. These will make submissions stand out.

AI & Advanced NLP

Replace OpenAI API with a self-hosted RAG system using LangChain + Hugging Face models.

Fine-tune your own small model on custom conflict resolution data.

Implement emotion simulation (not just detection), where the agent's traits shift based on stress or escalation.

Make the AI adaptive: e.g., after 5 user inputs, it learns and modifies its tone automatically.

Create a mediation framework: 2 agents + 1 AI judge that suggests resolutions and evaluates fairness.

Voice & Modal Interfaces

Integrate speech-to-text (STT) for voice-based conflict role-playing.

Use a web avatar (like Synthesia or DeepMotion) to give agents human-like presence.

Use TTS + STT to make the simulation entirely voice-based (no typing required).

Analytics & Feedback

Create a heatmap of conflict escalation intensity across messages.

Use NLP to detect sarcasm, gaslighting, or manipulation.

Implement a scoring system (conflict resolution effectiveness, empathy score, aggression level).

Philosophical & Humanities

Critically analyze: Should AI ever mediate human conflict? Document both sides.

Create a framework to classify conflict styles (e.g., passive-aggressive, constructive) based on AI messages.

Simulate historical or literary conflicts (e.g., Julius Caesar vs. Brutus).

Investigate how AI response bias might differ by user gender, tone, or authority level.

Bonus Meta Challenges

Host the app on GitLab Pages or a VPS and document the deployment process.

Create a project pitch video with a demo and narrated conflict.

Submit an ethics and bias audit report of your modified simulation.

Conduct a user study with 3+ people acting out roles using your app.

Write a blog/article reflecting on how AI changed your view of conflict.

