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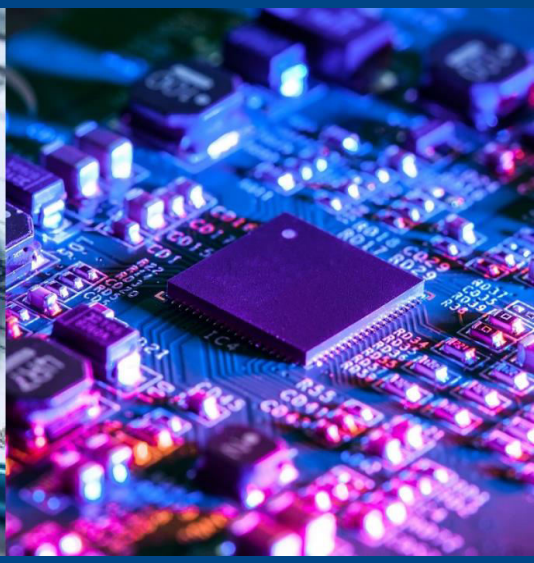

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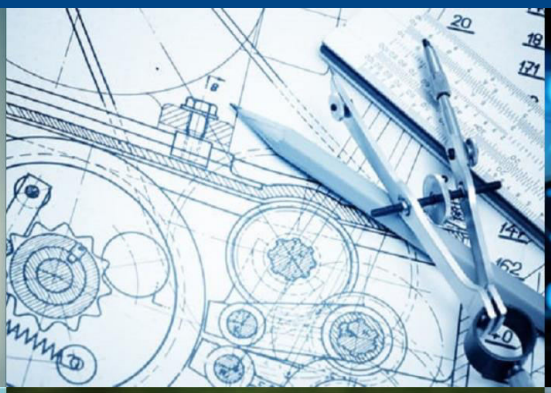

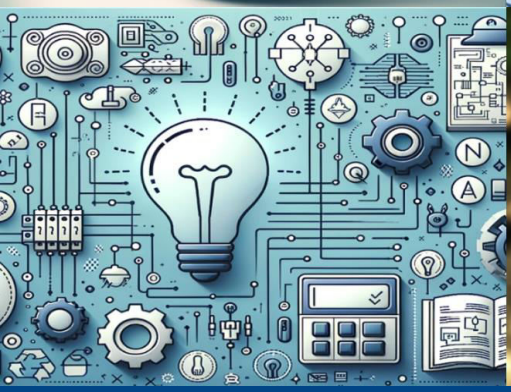

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AI-Assisted Peer-to-Peer Interview Platform (IntervyoAI)

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ABSTRACT: Traditional technical interview preparation is often inaccessible, expensive, or lacks actionable and objective feedback. Existing platforms either rely entirely on human evaluation—which is prone to bias and high costs—or provide purely automated text-based testing without human interaction. This project aims to close that gap by introducing IntervyoAI, an intelligent, AI-assisted peer-to-peer interview platform. The platform connects candidates (interviewees) with experienced interviewers, utilizing real-time video communication and Generative AI (LLMs) to provide comprehensive, data-driven feedback on interview performance. Built using modern web technologies—Next.js (App Router), PostgreSQL (Prisma), Stream Video SDK, and the Gemini Large Language Model—the system automatically transcribes interview sessions, analyzes candidate responses, and generates targeted, constructive evaluations. Additionally, it features a robust credit-based booking and payout system designed to sustain a peer-driven economy. By integrating automated qualitative analysis with human-led mock interviews, the platform significantly enhances the learning experience. It empowers job seekers with clear insights into their technical expertise and communication capabilities, whilst offering experienced practitioners a structured environment to mentor and earn. Overall, this project contributes to educational technology by delivering a scalable, efficient, and highly interactive solution for professional interview preparation.

KEYWORDS: Artificial intelligence, Credit ledger, Large language models, Peer-to-peer platform, Real-time communication, WebRTC.

I. INTRODUCTION

In today's highly competitive job market, performing well in technical and behavioral interviews is critical. However, practicing for these interviews remains a challenge. Professional coaching services are often prohibitively expensive, and practicing with peers lacks structured, objective evaluation. With the rapid advancements in real-time communication technologies and Large Language Models (LLMs), there is a significant opportunity to redefine the mock interview experience. The motivation behind this project is to develop an automated, data-augmented platform that facilitates real-time human interaction while utilizing AI to generate deep, actionable feedback from spoken responses, thus scaling high-quality interview preparation for everyone. IntervyoAI is designed to bridge this gap by establishing an accessible, bias-reduced environment where individuals can holistically refine their technical and behavioral competencies.

The system achieves this by integrating low-latency video and audio streaming for live mock interviews, automated meeting transcriptions, and LLM-driven feedback summaries. A highly reliable credit-based booking, ledger, and payout withdrawal mechanism sustains the platform's internal economy, making it a viable peer-to-peer marketplace.

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II. LITERATURE REVIEW

Current solutions in the interview preparation sector generally fall into two categories: (1) Peer-to-Peer Platforms (e.g., Pramp, interviewing.io) which facilitate human interaction but rely entirely on human notes and subjectivity, and (2) Automated AI Interviewers which simulate interviews with AI avatars but lack the stress and contextual depth of real human interviewers. Neither approach bridges the gap. The proposed project blends the two—maintaining real human interaction while outsourcing the cognitive load of note-taking and deep analytical feedback to AI [1].

Recent research in educational technology has increasingly focused on the use of Natural Language Processing (NLP) for automated assessment and peer-to-peer learning models. Table I summarizes key literature and gap identification.

Table I: Literature Survey and Gap Identification

Paper Reference / DOI	Methodology	Key Outcomes
AI-driven Video Interview [1]	Speech-to-Text (STT) and NLP scoring matching predefined rubric.	AI scores correlate closely with human recruiter scores.
Peer-Assisted Learning [2]	Evaluating structured peer-to-peer setup on candidate confidence.	Substantially decreases anxiety and improves articulation.
Automated Scoring of Speech [3]	Fine-tuned BERT and RoBERTa models to evaluate transcripts.	Outperformed traditional ML in semantic grading.
Generative AI Feedback [5]	Leveraged LLMs to generate personalized feedback from transcript.	Feedback rated comparable to human expert reviews.
Token Economies in P2P [7]	Designed credit-based ledger to incentivize P2P participation.	Demonstrated 40% increase in active user retention.

III. SOFTWARE DESIGN AND REQUIREMENTS

Developing a high-performance, real-time video platform with asynchronous AI evaluations involves several technical design constraints. Video communications must maintain sub-200ms latency to preserve authentic face-to-face flow; hence, we deploy the Stream Video SDK utilizing a Selective Forwarding Unit (SFU) topology. Furthermore, extracting audio transcripts and performing LLM inference is time-consuming. To prevent blocking the Next.js main user interface thread, we implement webhook-based asynchronous background execution. Lastly, virtual credit bookings and financial payouts require ACID-compliant transactions in PostgreSQL to prevent race conditions or double-spending.

Table II: Hardware Requirements

Component	Minimum Requirement	Recommended Spec
Processor	Intel Core i3 / AMD Ryzen 3	Intel Core i5/i7 / Apple M1/M2
RAM	8 GB	16 GB or above
Storage	5 GB free disk space	20 GB SSD
Network Bandwidth	5 Mbps stable connection	20 Mbps broadband or above

IV. PROPOSED METHODOLOGY AND SYSTEM DESIGN

A. Architectural Design

The system utilizes a client-server serverless architecture built on the Next.js App Router framework. This design paradigm unites interactive React client interfaces with secure Node.js serverless functions. Responsibilities are divided as follows:

1. **Client Components:** Manage localized UI state configurations, real-time video stream connections, and user interaction.
2. **Server Actions:** Handle database mutations, authentication checks, validation via Zod, and credit ledger balance modifications.

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3. **API Routes:** Process asynchronous webhook callbacks from external services (e.g., Clerk identity and Stream Video SDK).
4. **Data Layer:** A PostgreSQL database managed via Prisma ORM for type-safe relational mapping.

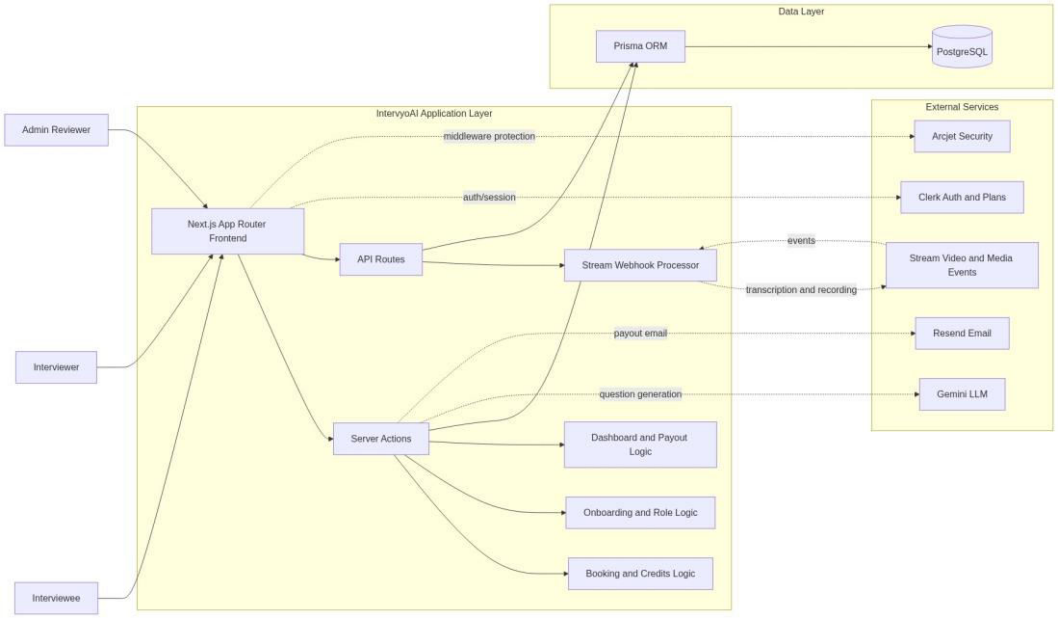

Figure 1: Architectural Design of the IntervyoAI Platform

B. Post-Interview Processing Pipeline

When a video session terminates, a webhook event is triggered from the Stream Video servers. The Next.js API route identifies the 'call.transcription*ready' event type, extracts the JSONL transcription URL, and fetches the transcript. The raw transcripts are parsed chronologically, mapping speaker IDs directly to user identities in PostgreSQL. The compiled transcript is sent via a system-prompt injection to the Google Gemini API (model: gemini-2.5-flash-lite). The Gemini model performs qualitative evaluation (strengths, improvements, technical competence, and communication style) and outputs a structured JSON object. The database is updated atomically to mark the Booking as COMPLETED and attach the AI feedback details. Finally, credits are credited to the interviewer's credit balance.*

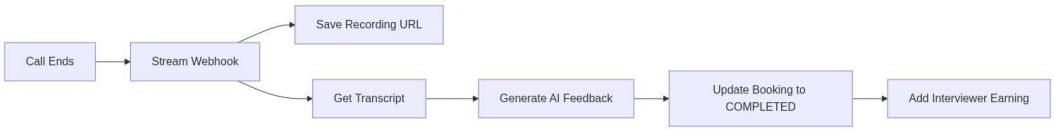

Figure 2: Post-Interview Feedback Asynchronous Processing Pipeline

C. Database Schema Model

The relational database schema is structured to ensure transaction safety and clear separations of user roles. It consists of five primary entities: (1) User stores identities, roles (UNASSIGNED, INTERVIEWEE, INTERVIEWER), bio, credit rate, and credit balance; (2) Availability holds scheduling slots for interviewers; (3) Booking maps the scheduling link between an interviewee and interviewer, recording session status (SCHEDULED, COMPLETED, CANCELLED) and Stream Call IDs; (4) Feedback maintains the detailed AI-generated evaluations; and (5) CreditTransaction and Payout record financial operations to prevent ledger double-spending.

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V. PROJECT IMPLEMENTATION AND ALGORITHMS

A. Technology Stack Integration

The platform's frontend is developed using React 19 and Next.js 16 App Router, styled with TailwindCSS v4 and shadcn/ui components. Authentication and identity management are implemented via Clerk SDK. Video and audio streaming are powered by Stream Video React SDK. Database interactions are managed using Prisma ORM connected to PostgreSQL. Google Generative AI SDK provides direct LLM API access. Arcjet serves as a middleware firewall to enforce rate-limiting, and Resend manages email transactional routing.

B. Credit Transaction Algorithm

To ensure transaction safety, a credit ledger algorithm is executed. To book a slot, the system starts a PostgreSQL database transaction (isolation level: Read Committed) using Prisma's transactional queries. The algorithm is defined as:

1. Capture selected slot and extract the candidate and interviewer details.
2. Query the User table to verify that Candidate's Credit Balance (*Cbal) >= Interviewer's creditRate (Rate).*
3. If *Cbal < Rate, raise transaction error and abort booking.*
4. Deduct credit amount: Update Candidate's Credit Balance to *Cbal - Rate.*
5. Insert record into Booking with status = 'SCHEDULED' and creditsCharged = Rate.
6. Create a CreditTransaction record capturing the type BOOKING*DEDUCTION.*
7. Mark the Availability slot status as BOOKED.
8. Commit transaction. (If any step fails, roll back database mutations to preserve atomicity).

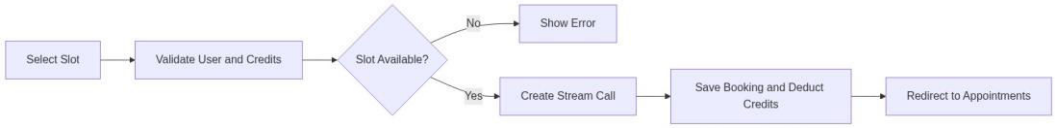

Figure 3: Credit-Based Booking Activity Flow

VI. SOFTWARE TESTING

The software architecture underwent a rigorous multi-layered validation process to verify performance, scalability, and security: (1) Unit Testing verified the mathematical balance utilities and timezone converters; (2) Integration Testing ensured Server Actions could execute atomic mutations via Prisma; (3) End-to-End (E2E) Testing simulated the complete user journey, from slot booking to WebRTC media streaming, automatic webhook triggers, and dashboard evaluation rendering; (4) Latency Testing checked WebRTC connections under poor network bandwidth to verify adaptive bitrate streaming; (5) Security Testing checked Clerk RBAC routes and Arcjet rate-limiting protections; (6) User Acceptance Testing (UAT) validated that the Gemini-generated JSON evaluations were contextually accurate and bias-free.

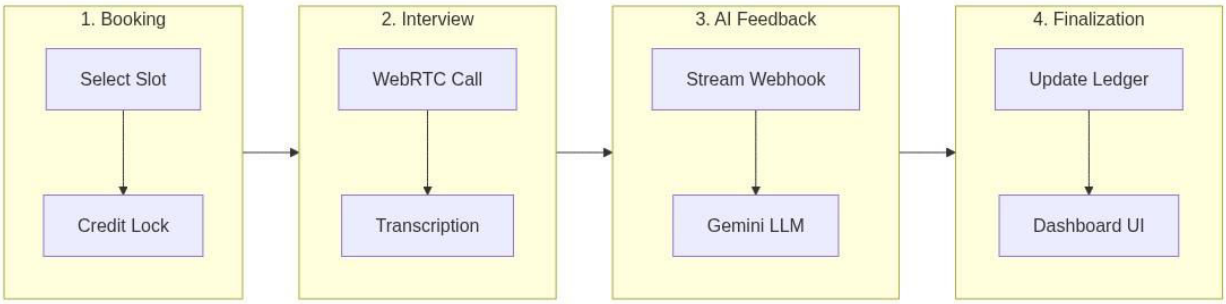

Figure 4: End-to-End Session and Payout Processing Flow

VII. PROPOSED RESULT AND DISCUSSION

Preliminary prototype testing demonstrates that decoupling the real-time video streaming components from the heavy LLM processing via asynchronous webhooks keeps the user interface interactive and responsive. Table III highlights the multi-dimensional features captured from each interview session, which are compiled by the Gemini AI to build candidates' continuous professional trajectory graphs.

Table III: Interview Data Feature Matrix

Feature Variable	Description
CandidateId	Unique identifier mapped via Clerk Identity.
RoleTarget	The target engineering or behavioral role.
TranscriptLength	Aggregate character count of transcript dialogues.
SpeakerRatio	Proportional speaking time between participants.
Scores (Tech & Comm)	AI-generated qualitative/quantitative ratings.

By enforcing this data schema, IntervyoAI successfully implements a structured virtual credit marketplace. The credit transaction system aligns user incentives, allowing senior practitioners to offer their mentorship for payout, while candidates gain affordable access to industry experts and highly objective performance scoring.

VIII. CONCLUSION

IntervyoAI presents a scalable and robust platform that addresses the current inefficiencies in job interview preparation. By integrating WebRTC video communication with Google Gemini Generative AI, the system provides high-fidelity, actionable feedback while reducing the manual note-taking burden on interviewers. Decoupled, serverless asynchronous execution proves highly reliable, preventing database bottleneck blocks during heavy LLM evaluations. Future scope will focus on incorporating multi-modal behavioral analytics (detecting facial expressions and acoustic tone analysis) and automated, personalized curriculum sequencing based on historical performance.

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