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Domain Pro Chatbot: A Multi-Domain AI Career Advisor System

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Abstract

Traditional career guidance systems are often generic, expensive, or limited to a single professional domain. This paper presents Domain Pro Chatbot, a standalone multi-domain AI career advisor system designed to provide personalized guidance across 39 professional domains. The system is built using Python and the Flask framework, with Google Gemini as the underlying large language model. Key features include secure user authentication, persistent chat history, full resume and cover-letter generation, LinkedIn summary creation, resume review, mock interview simulation, and interactive MCQ-based skill assessment. Users can also attach images or PDF documents for context-aware advice. The application stores accounts and conversations in a local SQLite database and can operate on the free tier of the Gemini API. Experimental use demonstrates that the system delivers domain-specific, MNC-grade career guidance and complete professional documents in a single conversational interface, making high-quality career support accessible to diploma and degree students as well as early-career professionals.

Keywords: Career Advisor, Chatbot, Artificial Intelligence, Flask, Gemini API, Resume Generation, Mock Interview, Multi-Domain Guidance

I. INTRODUCTION

In the modern digital era, students and early-career professionals face significant challenges in obtaining high-quality, domain-specific career guidance. Generic online resources and static career portals cannot adapt advice to individual backgrounds or generate complete, ATS-optimized documents on demand. Human career counselling is limited in availability and often costly, creating an accessibility gap especially for diploma and undergraduate students.

Existing recruitment and career tools either focus narrowly on keyword matching or lock users into expensive commercial platforms. They typically lack conversational context across multiple professional domains, persistent personal history, interactive skill-practice features, and the ability to produce full resumes, cover letters, and LinkedIn summaries in a single session.

This paper introduces Domain Pro Chatbot, a self-hosted multi-domain AI career advisor. The system combines secure authentication, domain-specific system prompts for 39 professional fields, conversation persistence, document generation, resume review, mock interviews, and interactive MCQ tests. It is implemented as a lightweight Flask application that integrates with the Google Gemini API and stores data in SQLite, enabling deployment with minimal infrastructure cost.

II. RELATED WORK

Traditional career-guidance systems rely on static websites, printed handbooks, or simple keyword-based tools. While useful, they lack conversational context and cannot generate complete professional documents.

Several commercial AI-powered career platforms exist, but most are subscription-based and not easily accessible to students. Research on resume parsing and job recommendation has focused on information extraction and matching algorithms; however, few open systems integrate multi-domain conversational advice, document generation, and interactive skill assessment in one application.

Recent advances in large language models (LLMs) such as Google Gemini enable high-quality semantic understanding and document generation. Domain Pro Chatbot builds on these capabilities by providing a practical, self-hosted implementation tailored for multi-domain career support without external platform lock-in.

III. SYSTEM ARCHITECTURE

The system follows a client-server architecture with three main layers.

A. Frontend Layer

The user interface is developed using HTML, CSS, and vanilla JavaScript. It includes login and registration pages, a domain picker covering 39 professional domains, a chat window with history sidebar, quick-action chips (Generate Resume, Cover Letter, LinkedIn Summary, Resume Review, Mock Interview, MCQ Mock Test), and file-attachment controls.

B. Backend Layer

The backend is implemented in Python using the Flask framework. Flask-Login manages user sessions. Optional Google OAuth is supported via Authlib. Chat requests are processed by building a domain-specific system prompt and calling the Google Gemini API. Responses are persisted and returned to the client.

C. Database Layer

A local SQLite database (domain_pro.db) stores users, conversations, and messages. The main tables are: users (id, name, email, password_hash, google_id, created_at), conversations (id, user_id, domain, title, timestamps), and messages (id, conversation_id, role, content, attachment_name, created_at).

D. Data Flow

1) User registers or logs in. 2) User selects a professional domain. 3) A new conversation is created. 4) User sends a message (optionally with an image or PDF attachment up to 15 MB). 5) Backend constructs a domain-specific prompt and queries Gemini. 6) The AI response is stored and displayed. 7) User may request document generation, resume review, mock interview, or MCQ test. 8) Conversation history remains available for later resumption.

Architectural Diagram Domain Pro Chatbot

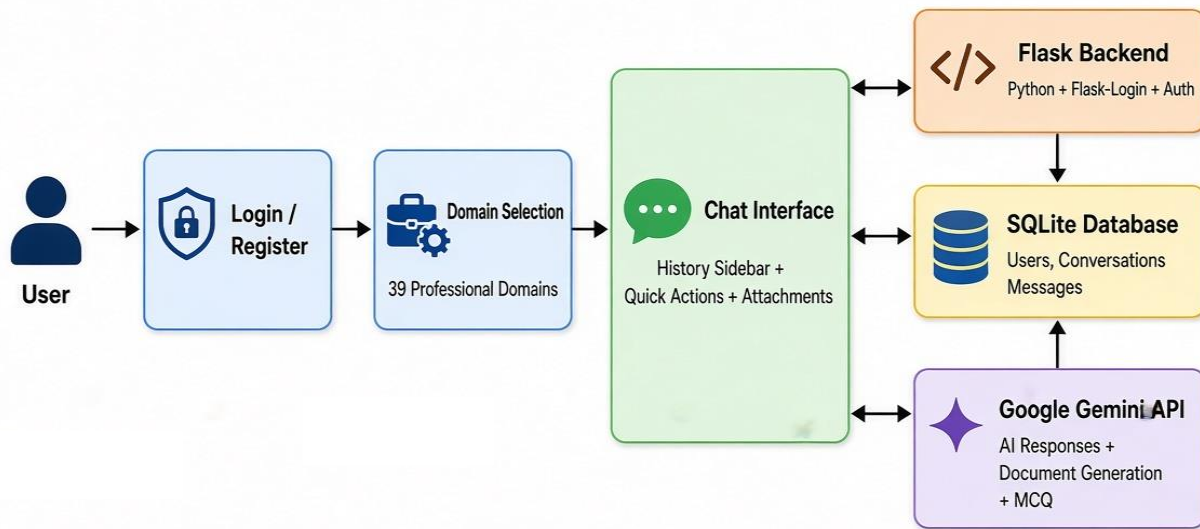


Fig: Architectural Diagram

IV. IMPLEMENTATION DETAILS

The application is implemented as a standalone Flask project with the following core technologies: Python 3, Flask, Flask-Login, Authlib, google-genai (Gemini client), SQLite, HTML/CSS/JavaScript, and python-dotenv.

A. Authentication Module

Users register with name, email, and password. Passwords are stored as secure hashes. Optional Google sign-in is available when client credentials are configured. All chat features require authentication.

B. Domain Selection and Prompting

Thirty-nine professional domains are supported. For each domain, a carefully designed system prompt instructs the model to provide MNC-grade, domain-specific advice, use professional language, and generate complete documents when requested.

C. Document Generation

When a user provides personal and professional details and requests a resume, cover letter, or LinkedIn summary, the system produces a complete, ATS-friendly Markdown document. The model is instructed to include standard sections (Contact, Summary, Skills, Experience, Education, etc.) and to optimize keyword placement for applicant tracking systems.

D. Interactive Features

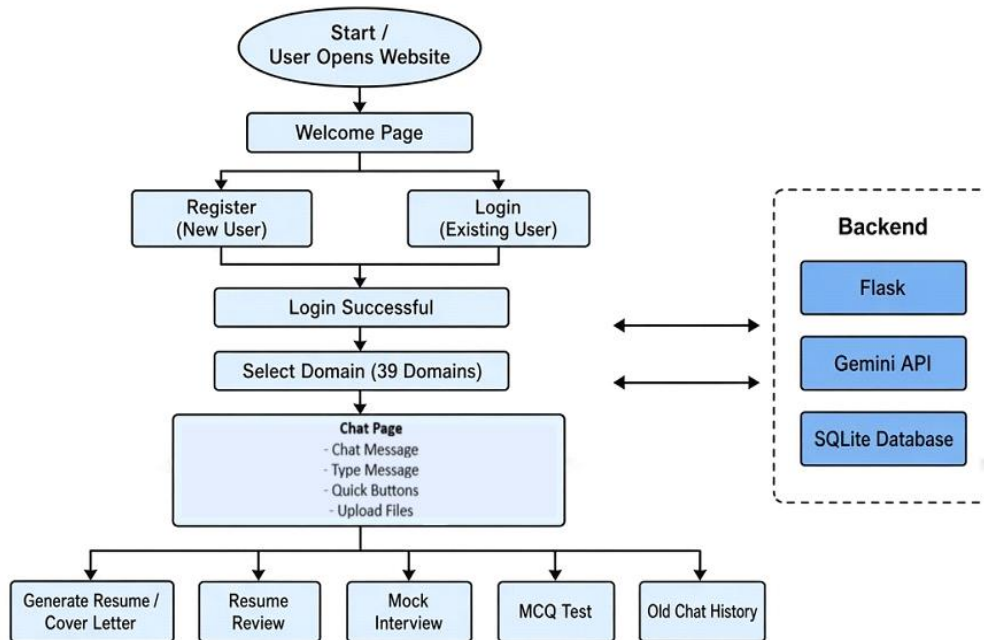
Resume review offers concrete rewrite suggestions. Mock interviews simulate role-specific questioning. MCQ mock tests present one question at a time, score the answer with explanations, and conclude with a scorecard and revision tips for weak topics.

E. Multimodal Input

Users can attach images (PNG, JPEG, WEBP, GIF) or PDFs (up to 15 MB). Attachments are forwarded to the Gemini multimodal endpoint so the model can analyze resumes, job descriptions, or screenshots alongside the text query.

F. Flow Chart

Website Flow Chart - Domain Pro Chatbot



V. KEY FEATURES

The main capabilities of Domain Pro Chatbot are summarized below:

1. Multi-domain support across 39 professional fields with tailored system prompts.
2. Secure registration and login with hashed passwords and optional Google OAuth.
3. Persistent, private chat history stored in SQLite and resumable from a sidebar.
4. Full generation of resumes, cover letters, and LinkedIn About sections in Markdown.
5. Resume review with before/after style suggestions aligned to MNC hiring standards.
6. Mock interview simulation tailored to the selected domain and target role.
7. Interactive MCQ mock tests with scoring, explanations, and revision guidance.
8. Image and PDF attachment support for context-aware advice.
9. Quick-action chips that pre-fill common career-related prompts.
10. Runs on free-tier Gemini API with no mandatory paid services or platform lock-in.

VI. RESULTS AND DISCUSSION

The system was successfully implemented and tested for the complete user journey: registration, domain selection, multi-turn chat, document generation, resume review, mock interview, MCQ testing, and file attachment.

Document generation produces complete, well-structured Markdown outputs suitable for further editing or conversion to PDF/Word. MCQ sessions correctly present questions one at a time, score answers, and

generate a final scorecard. Conversation isolation is enforced so that one user cannot access another user's history.

Performance on the free Gemini tier is acceptable for individual and small-group use. Local Flask and SQLite operations remain fast; response latency is dominated by the external API call. The architecture is portable and can be deployed on a standard laptop or low-cost server.

Overall, Domain Pro Chatbot meets its design objectives by providing accessible, multi-domain, AI-powered career guidance and professional document generation without requiring complex on-device machine-learning models or expensive subscriptions.

VII. CONCLUSION AND FUTURE WORK

This paper presented Domain Pro Chatbot, a multi-domain AI career advisor system built with Flask and Google Gemini. The system integrates authentication, domain-specific prompting, persistent history, document generation, resume review, mock interviews, and interactive MCQ tests in a single lightweight application.

Future enhancements include mobile-responsive design and progressive web app support, multi-language interface, direct export of generated documents to PDF/DOCX, an institutional admin dashboard, additional model fallbacks, role-based access and SSO, and expanded curated MCQ question banks per domain.

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