ML Interview Take Home Assignment (USA)

Created by	 Quinn Liu
Created time	@May 1, 2025 12:26 PM
Tags	

ML Interview Take-Home Assignment (USA)

Role: AI Engineer

Company: finiti.legal

---

1. Overview

As an **AI Engineer**, you will build a **prototype Retrieval-Augmented Generation (RAG) assistant** for a legal use case: **assisting securities lawyers and finance professionals in drafting and reviewing SEC 10-K disclosures**.

This assignment is intentionally **end-to-end**:

- Document ingestion
- Retrieval + generation
- Interactive clarification of missing financial inputs
- Clean, usable API or CLI interface

The goal is not UI polish, but **correctness, usability, and domain awareness**.

2. Input Data

2.1 Primary Documents

You will work with past one year's **HTML 10-K filings from the SEC EDGAR website** for the and **and business from the user for** following companies:

- NVDA
- MSFT
- KO
- NKE
- AMZN
- DASH
- TJX
- DRI

Example 10-K filing (UBER):

https://www.sec.gov/ix?doc=/Archives/edgar/data/0001543151/000154315125000008/uber-20241231.htm

Helpful links:

- SEC EDGAR search: https://www.sec.gov/search-filings
- Public investor-relations pages for company background

2.2 Time Scope

- Use **information relevant to the most recent fiscal year**
- Example: To generate a **2024 10-K narrative**, rely on **2023 financial and business data**
- Do **not** hallucinate future or unpublished information

---

3. Output Requirements

You must design an **interactive assistant** that produces draft narratives for:

1. **Item 1. Business**
2. **Item 7. Management's Discussion & Analysis (MD&A)**

Your system must:

- Use **RAG** over the provided filings
- Generate **clear, legally-appropriate narrative text**
- Be usable by **non-technical securities lawyers or finance professionals**

---

4. Critical Requirement: Interactive Financial Data Collection

Why This Matters

In real legal workflows, the structure or the shell of the **MD&A and other sections are created based on prior or competitor company filings. Then business and financial data are gathered from the users and "filled in" to generate the current filing**.

It often requires **current-year financial inputs** that may not yet exist in structured documents.

What Your System Must Do

Your assistant must be able to:

1. **Identify missing or required financial inputs** needed to complete MD&A

   Examples include:

   - Revenue and revenue growth
   - Year-over-year or quarter-over-quarter comparisons
   - Segment-level performance
   - Operating income, margins, cash flow
   - Material one-time events or cost changes

2. **Ask the user targeted follow-up questions** when inputs are missing or when the model is not confident with the extracted data

   - Questions must be clear and business-friendly

- Avoid technical or ML-specific language

3. **Accept user-provided financial data** via chat (UI or CLI) in **any format**:
   - Standalone numbers
   - Markdown tables
   - HTML tables
4. **Incorporate the provided data into the MD&A narrative**
   - Clearly grounded in user input
   - Written in appropriate 10-K tone and structure

> You may assume the data provided by the user is accurate. Validation is optional.

---

5. Evaluation Examples (What "Good" Looks Like)

5.1 Sample Prompt — UBER 10-K Generation

User Prompt

> Generate the Business and MD&A sections for UBER's 2024 Form 10-K.

5.2 Expected System Behavior

Step 1: Retrieval & Initial Draft

- Retrieve relevant sections from UBER's prior year's (e.g., 2023) 10-K filing
- Generate a **Business** section draft for the current year (e.g., 2024) using RAG

Step 2: Identify Missing Inputs for MD&A

The system should recognize missing financial data and respond with something like

> To update the MD&A section, I need the following information for fiscal year 2024:
>
> - Total revenue and year-over-year growth

> - Key drivers of revenue changes
> - Operating income or loss
> - Notable cost or margin changes
> - Any material one-time events
>
> You can provide this data as numbers, a table, or pasted financial statements.

5.3 Sample User Financial Input

Metric	FY 2024	FY 2023
Revenue	$37.2B	$33.9B
Revenue Growth	9.7%	16.9%
Operating Income	$1.9B	$1.1B
Free Cash Flow	$3.4B	$3.1B

5.4 Expected Output Formatting

Your final output should be **clearly structured**, for example:

Item 1. Business

Concise narrative summary grounded in retrieved 10-K content.

No hallucinations. No unsupported claims.

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations

Narrative that:

- Explicitly reflects user-provided financial data
- Explains drivers of performance
- Matches the tone and structure of a real 10-K MD&A

---

6. Tech Stack

- **Python**
- LLM frameworks (any of the following or equivalents):
  - LangChain
  - LangGraph
  - AutoGen
  - PydanticAI
  - CrewAI
- Vector database of your choice (e.g., Pinecone, Weaviate, Qdrant, FAISS)
- **FastAPI** for backend endpoints

No frontend is required.

CLI-based demos are acceptable.

> You are not evaluated on your choice of LLM or framework.

---

7. User Persona

Assume your users are:

- Securities lawyers
- Finance professionals

They are comfortable with filings but **not** with AI or engineering details.

Your system should:

- Ask clear, structured questions
- Avoid technical jargon
- **[Important] Feel like a human legal assistant, not hard coded chat**

---

8. Evaluation Criteria

Category	What We Look For
RAG Design	Correct retrieval, clean chunking, grounding
Interactive Logic	Correctly identifying missing MD&A inputs
Output Quality	Accuracy, clarity, legal tone
Usability	Clear prompts, sensible defaults
Performance	Reasonable latency and system design

9. Optional Enhancements (Not Required)

- Source citations per paragraph
- Confidence indicators for generated text
- Simple year-over-year comparison logic
- Audit-friendly logging of user inputs vs output

Final Note

This assignment reflects how finiti.legal is used in practice:

AI-assisted drafting with human-provided financial, business and operational inputs, strong grounding, and lawyer-friendly UX.

Examples:

Financial inputs

- 2024 revenue by segment (Mobility, Delivery, Freight) and key YoY % changes.
- Adjusted EBITDA, net income/loss, cash and debt balances, major capex amounts.

Business Inputs

- New products or services launched and any lines that were discontinued.
- Entry into or exit from key countries, cities, or verticales; major partnerships or JVs.

Operational Inputs

- Changes in driver/merchant policies, pricing model, or incentive structures.
- Key operational risks or events (strikes, outages, regulatory actions, safety incidents).

Over-engineering is not rewarded.

Clarity, correctness, and domain fit are.