

# Application for Question Answering on Glassdoor Reviews Dataset

## 1. Overview

The primary objective of this project is to develop an answering to questions (QA) platform by implementing a model of transformers based on decoders. The objective is to create an interactive application using Streamlit by applying advanced AI methods such as fine-tuning and multi-modal integration.

## 2. Project Goals and Scope

Use Case: Utilizing a pre-trained transformers model (T5), our team developed a QA system that produces responses depending on contextual information. Users can ask queries of the system and get AI-generated answers.

The main objectives are to:

- Develop a transformer model for text generation based on decoders;
- Optimize the model with a custom dataset (glassdoor\_reviews\_val\_reviewResponses.csv”).
- For simple interactivity, implement the model in a web application that uses Streamlit.

## 3. The Process of Implementation

### Step 1: Preparing the dataset

- extracted pertinent fields for training after loading the dataset.
- Text was preprocessed in order to organize the data for the model's input.

### Step 2: Training and Model Selection

- Our base model was the Text-to-Text Transfer Transformer (T5).
- To enhance QA capabilities, it was adjusted on the dataset.

### Step 3: Development of the Application

- Streamlit was used to create an interactive online application.
- The trained model was integrated to produce answers to user inquiries.

### Step 4: Testing and Deployment

- Streamlit and Ngrok were used to deploy an application within the Colab environment.

- Tests were carried out to guarantee precise answers and seamless operation.

## 4. Difficulties and Resolutions

### Difficulties:

- **KeyError during Dataset Processing** - Changed column names to conform to the structure of the dataset.
- **CUDA Lack of Memory Error:** When resources were scarce, CPU-based inference was used rather than GPU.
- **Streamlit Installation Problem:** Before executing the script, streamlit was manually installed using `!pip install streamlit`.
- **Ngrok Authentication Problem:** Made sure the tunnel was set up correctly and used a valid authtoken.

## 5. Conclusion:

Our project successfully developed a question-answering system using a transformer model based on decoders. The application shows how automatic responses can be enhanced by fine-tuned AI models.

# Screen shorts

1)

```
colab.research.google.com/drive/1lNk_PTLohlL_VwQMfcOJUEHkZ6hBFSg#scrollTo=VGmuEOhO97qV
```

Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

File Edit View Insert Runtime Tools Help

Files

- sample\_data
- app.py
- cloudflared
- glassdoor\_reviews\_val\_reviewRe...

RAM Disk

```
[1] !pip install transformers opencv pandas
```

```
Requirement already satisfied: transformers in /usr/local/lib/python3.11/dist-packages (4.48.3)
Requirement already satisfied: opencv in /usr/local/lib/python3.11/dist-packages (1.61.1)
Requirement already satisfied: pandas in /usr/local/lib/python3.11/dist-packages (2.2.2)
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from transformers) (3.17.0)
Requirement already satisfied: huggingface-hub<1.0,>=0.24.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.28.1)
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (1.26.4)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (24.2)
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.11/dist-packages (from transformers) (6.0.2)
Requirement already satisfied: regex<=2019.12.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (2024.11.6)
Requirement already satisfied: requests in /usr/local/lib/python3.11/dist-packages (from transformers) (2.32.3)
Requirement already satisfied: tokenizers<0.22,>=0.21 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.21.0)
Requirement already satisfied: safetensors>=0.4.1 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.5.2)
Requirement already satisfied: tqdm>=4.27 in /usr/local/lib/python3.11/dist-packages (from transformers) (4.67.1)
Requirement already satisfied: anyio<5,>=3.5.0 in /usr/local/lib/python3.11/dist-packages (from opencv) (3.7.1)
Requirement already satisfied: distro<2,>=1.7.0 in /usr/local/lib/python3.11/dist-packages (from opencv) (1.9.0)
Requirement already satisfied: httpx<1,>=0.23.0 in /usr/local/lib/python3.11/dist-packages (from opencv) (0.28.1)
Requirement already satisfied: jiter<1,>=0.4.0 in /usr/local/lib/python3.11/dist-packages (from opencv) (0.8.2)
Requirement already satisfied: pydantic<3,>=1.9.0 in /usr/local/lib/python3.11/dist-packages (from opencv) (2.10.6)
Requirement already satisfied: sniffio in /usr/local/lib/python3.11/dist-packages (from opencv) (1.3.1)
Requirement already satisfied: typing-extensions<5,>=4.11 in /usr/local/lib/python3.11/dist-packages (from opencv) (4.12.2)
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.11/dist-packages (from pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.11/dist-packages (from pandas) (2025.1)
Requirement already satisfied: tzdata>=2022.7 in /usr/local/lib/python3.11/dist-packages (from pandas) (2025.1)
Requirement already satisfied: idna>=2.8 in /usr/local/lib/python3.11/dist-packages (from anyio<5,>=3.5.0->opencv) (3.10)
Requirement already satisfied: certifi in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.23.0->opencv) (2025.1.31)
Requirement already satisfied: httpcore==1.* in /usr/local/lib/python3.11/dist-packages (from httpx<1,>=0.23.0->opencv) (1.0.7)
Requirement already satisfied: h11<0.15,>=0.13 in /usr/local/lib/python3.11/dist-packages (from httpcore==1.*->httpx<1,>=0.23.0->opencv) (0.14.0)
Requirement already satisfied: fsspec>=2023.5.0 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub<1.0,>=0.24.0->transformers) (2025.1.1)
Requirement already satisfied: annotated-types>=0.6.0 in /usr/local/lib/python3.11/dist-packages (from pydantic<3,>=1.9.0->opencv) (0.7.0)
Requirement already satisfied: pydantic-core==2.27.2 in /usr/local/lib/python3.11/dist-packages (from pydantic<3,>=1.9.0->opencv) (2.27.2)
Requirement already satisfied: cycler>=0.9 in /usr/local/lib/python3.11/dist-packages (from python-dateutil<3,>=2.8.2->pandas) (0.12.1)
Requirement already satisfied: six>=1.16.0 in /usr/local/lib/python3.11/dist-packages (from python-dateutil<3,>=2.8.2->pandas) (1.17.0)
```

Executing (2m 6s) > cell line: 0 > system() > \_system\_compat() > \_run\_command() > \_monitor\_process() > \_poll\_process()

2)

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Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

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Code

```
[2] import pandas as pd
file_path = "/content/glassdoor_reviews_val_reviewResponses.csv"
df = pd.read_csv(file_path)
print(df.head())
```

Output:

```
id index reviews.val.reviewResponses.val.createDate \
0 6762 0 2018-05-01T03:54:11
1 6763 0 2018-07-17T06:15:22
2 6764 0 2019-01-04T11:48:06
3 6765 0 2018-07-25T12:07:51
4 6766 0 2019-01-16T02:02:05

reviews.val.reviewResponses.val.helpfulCount \
0 0
1 0
2 0
3 0
4 0

reviews.val.reviewResponses.val.jobTitle \
0 NaN
1 Culture & Engagement Program Manager
2 Culture & Engagement Program Manager
3 Culture & Engagement Program Manager
4 Marketing Communications Manager

reviews.val.reviewResponses.val.notHelpfulCount \
0 0
1 0
```

Executing (3m 8s) <cell line: 0> > system() > \_system\_compat() > \_run\_command() > \_monitor\_process() > \_poll\_process()

3)

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Code

```
reviews.val.reviewResponses.val.notHelpfulCount \
0 0
1 0
2 0
3 0
4 0

reviews.val.reviewResponses.val.responseText \
0 Thank you for your review.
1 Thanks for your review! In our "Act Right Now"...
2 I'm happy to hear that we keep our promises :)...
3 It's a wonderful day when an organization can ...
4 Dear colleague\r\n\r\nHappy New Year!\r\n\r\nnT...

reviews.val.reviewResponses.val.responseTextLength \
0 26
1 341
2 208
3 307
4 1018

reviews.val.reviewResponses.val.totalHelpfulCount \
0 0
1 0
2 0
3 0
4 0

reviews.val.reviewResponses.val.updateDate
0 2018-05-02T00:23:37
1 2018-07-19T04:15:30
2 2019-01-07T00:10:20
3 2018-07-26T01:20:37
4 2019-01-17T00:12:03
```

Executing (3m 42s) <cell line: 0> > system() > \_system\_compat() > \_run\_command() > \_monitor\_process() > \_poll\_process()

4)

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```

reviews.val.reviewResponses.val.updateDate
0      2018-05-02T00:23:37
1      2018-07-19T04:15:30
2      2019-01-07T00:10:20
3      2018-07-26T01:20:37
4      2019-01-17T00:12:53

```

```

[3] from transformers import pipeline
qa_pipeline = pipeline('text2text-generation', model='t5-base')
question = "What do employees say about work-life balance?"
context = "Employees mention that work-life balance is generally good, with flexible schedules and remote work options."
answer = qa_pipeline(f'question: {question} context: {context}', max_length=50)
print("Answer:", answer[0]['generated_text'])

```

/usr/local/lib/python3.11/dist-packages/huggingface\_hub/utils/\_auth.py:94: UserWarning:  
The secret `HF\_TOKEN` does not exist in your Colab secrets.  
To authenticate with the Hugging Face Hub, create a token in your settings tab (<https://huggingface.co/settings/tokens>), set it as secret in your  
You will be able to reuse this secret in all of your notebooks.  
Please note that authentication is recommended but still optional to access public models or datasets.

warnings.warn(  
config.json: 100% ██████████ 1.21k/1.21k [00:00<00:00, 49.4kB/s]  
model.safetensors: 100% ██████████ 892M/892M [00:11<00:00, 64.3MB/s]  
generation\_config.json: 100% ██████████ 147/147 [00:00<00:00, 13.2kB/s]  
spiece.model: 100% ██████████ 792k/792k [00:04<00:00, 184kB/s]  
tokenizer.json: 100% ██████████ 1.39M/1.39M [00:02<00:00, 592kB/s]  
Device set to use cpu  
Answer: generally good

Executing (4m 17s) <cell line: 0> > system() > \_system\_compat() > \_run\_command() > \_monitor\_process() > \_poll\_process()

5)

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Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

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```

[4] import pandas as pd
file_path = "/content/glassdoor_reviews_val_reviewResponses.csv"
df = pd.read_csv(file_path)
print(df.columns)

```

```

Index(['id', 'index', 'reviews.val.reviewResponses.val.createDate',
      'reviews.val.reviewResponses.val.helpfulCount',
      'reviews.val.reviewResponses.val.jobTitle',
      'reviews.val.reviewResponses.val.notHelpfulCount',
      'reviews.val.reviewResponses.val.responseText',
      'reviews.val.reviewResponses.val.responseTextLength',
      'reviews.val.reviewResponses.val.totalHelpfulCount',
      'reviews.val.reviewResponses.val.updateDate'],
      dtype='object')

```

```

[16] import pandas as pd
from transformers import pipeline
file_path = "/content/glassdoor_reviews_val_reviewResponses.csv"
df = pd.read_csv(file_path)
column_name = 'reviews.val.reviewResponses.val.responseText'
df = df.dropna(subset=[column_name])
df[column_name] = df[column_name].astype(str)
sampled_responses = df[column_name].sample(n=50, random_state=42).tolist()
qa_pipeline = pipeline('text2text-generation', model='t5-base')
question = "What do employees say about work-life balance?"
final_answer = []
for response in sampled_responses:
    context = response[:500]
    answer = qa_pipeline(f'question: {question} context: {context}', max_length=50)
    final_answer.append(answer[0]['generated_text'])
for i, ans in enumerate(final_answer[:5]):

```

Executing (4m 48s) <cell line: 0> > system() > \_system\_compat() > \_run\_command() > \_monitor\_process() > \_poll\_process()



6)

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Week 6 Lecture Hands-On - Transformer (II) AI Career Navigators

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Code

```
final_answer = []
for response in sampled_responses:
    context = response[:500]
    answer = qa_pipeline(f'question: {question} context: {context}', max_length=50)
    final_answer.append(answer[0]['generated_text'])
for i, ans in enumerate(final_answer[:5]):
    print(f"Answer {i+1}: {ans}")
```

Device set to use cpu

Answer 1: neither the job title nor the contract type correspond to what we offer in Barcelona

Answer 2: I encourage you to take risks and be open to exploring new locations within the company in order to grow at a faster pace

Answer 3: glad to hear you're enjoying working at Harbor Freight Tools, and we look forward to watching you grow with the team

Answer 4: give everyone a chance to learn, to make mistakes, to try new things, and to grow on a professional level

Answer 5: Kind regards

[6] !pip install streamlit

Collecting streamlit

Downloading streamlit-1.42.2-py2.py3-none-any.whl.metadata (8.9 kB)

Requirement already satisfied: altair<6,>=4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (5.5.0)

Requirement already satisfied: blinker<2,>=1.0.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (1.9.0)

Requirement already satisfied: cachetools<6,>=4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (5.5.1)

Requirement already satisfied: click<9,>=7.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (8.1.8)

Requirement already satisfied: numpy<3,>=1.23 in /usr/local/lib/python3.11/dist-packages (from streamlit) (1.26.4)

Requirement already satisfied: packaging<25,>=20 in /usr/local/lib/python3.11/dist-packages (from streamlit) (24.2)

Requirement already satisfied: pandas<3,>=1.4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (2.2.2)

Requirement already satisfied: pillow<12,>=7.1.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (11.1.0)

Requirement already satisfied: protobuf<6,>=3.20 in /usr/local/lib/python3.11/dist-packages (from streamlit) (4.25.6)

Requirement already satisfied: pyarrow<7.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (17.0.0)

Requirement already satisfied: requests<3,>=2.27 in /usr/local/lib/python3.11/dist-packages (from streamlit) (2.32.3)

Requirement already satisfied: rich<14,>=10.14.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (13.9.4)

Requirement already satisfied: tenacity<10,>=8.1.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (9.0.0)

Requirement already satisfied: toml<2,>=0.10.1 in /usr/local/lib/python3.11/dist-packages (from streamlit) (0.10.2)

Executing (5m 21s) <cell line: 0> > system() > \_system\_compat() > \_run\_command() > \_monitor\_process() > \_poll\_process()

7)

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Week 6 Lecture Hands-On - Transformer (II) AI Career Navigators

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Code

```
Requirement already satisfied: altair<6,>=4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (5.5.0)
Requirement already satisfied: blinker<2,>=1.0.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (1.9.0)
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Requirement already satisfied: click<9,>=7.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (8.1.8)
Requirement already satisfied: numpy<3,>=1.23 in /usr/local/lib/python3.11/dist-packages (from streamlit) (1.26.4)
Requirement already satisfied: packaging<25,>=20 in /usr/local/lib/python3.11/dist-packages (from streamlit) (24.2)
Requirement already satisfied: pandas<3,>=1.4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (2.2.2)
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Requirement already satisfied: pyarrow<7.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (17.0.0)
Requirement already satisfied: requests<3,>=2.27 in /usr/local/lib/python3.11/dist-packages (from streamlit) (2.32.3)
Requirement already satisfied: rich<14,>=10.14.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (13.9.4)
Requirement already satisfied: tenacity<10,>=8.1.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (9.0.0)
Requirement already satisfied: toml<2,>=0.10.1 in /usr/local/lib/python3.11/dist-packages (from streamlit) (0.10.2)
Requirement already satisfied: typing-extensions<5,>=4.4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (4.4.0)
Collecting watchdog<7,>=2.1.5 (from streamlit)
Downloading watchdog-6.0.0-py3-none-manylinux2014_x86_64.whl.metadata (44 kB)
44.3/44.3 kB 2.0 MB/s eta 0:00:00
Requirement already satisfied: gitpython<3.1.19,<=3.0.7 in /usr/local/lib/python3.11/dist-packages (from streamlit) (3.1.44)
Collecting pydeck<1,>=0.8.0b4 (from streamlit)
Downloading pydeck-0.9.1-py2.py3-none-any.whl.metadata (4.1 kB)
Requirement already satisfied: tornado<7,>=6.0.3 in /usr/local/lib/python3.11/dist-packages (from streamlit) (6.4.2)
Requirement already satisfied: Jinja2 in /usr/local/lib/python3.11/dist-packages (from altair<6,>=4.0->streamlit) (3.1.5)
Requirement already satisfied: jsonschema<3.0 in /usr/local/lib/python3.11/dist-packages (from altair<6,>=4.0->streamlit) (4.23.0)
Requirement already satisfied: narwhals<1.14.2 in /usr/local/lib/python3.11/dist-packages (from altair<6,>=4.0->streamlit) (1.27.1)
Requirement already satisfied: gitdb<5,>=4.0.1 in /usr/local/lib/python3.11/dist-packages (from gitpython<3.1.19,<=3.0.7->streamlit) (4.0.12)
Requirement already satisfied: python-dateutil<2.8.2 in /usr/local/lib/python3.11/dist-packages (from pandas<3,>=1.4.0->streamlit) (2.8.2)
Requirement already satisfied: pytz<2020.1 in /usr/local/lib/python3.11/dist-packages (from pandas<3,>=1.4.0->streamlit) (2025.1)
Requirement already satisfied: tzdata<2022.7 in /usr/local/lib/python3.11/dist-packages (from pandas<3,>=1.4.0->streamlit) (2025.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (3.4.1)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (2.3.0)
Requirement already satisfied: certifi<2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (2025.1.31)
Requirement already satisfied: markdown-it-py<2.2.0 in /usr/local/lib/python3.11/dist-packages (from rich<14,>=10.14.0->streamlit) (2.18.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.11/dist-packages (from rich<14,>=10.14.0->streamlit) (2.18.0)
Requirement already satisfied: smmap<6,>=3.0.1 in /usr/local/lib/python3.11/dist-packages (from gitdb<5,>=4.0.1->gitpython<3.1.19,<=3.0.7->streamlit) (3.0.0)
Requirement already satisfied: MarkupSafe<2.0 in /usr/local/lib/python3.11/dist-packages (from Jinja2->altair<6,>=4.0->streamlit) (3.0.2)
Requirement already satisfied: attrs<22.2.0 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (25.1.0)
Requirement already satisfied: jsonschema-specifications<2023.03.6 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (2023.03.6)
Requirement already satisfied: referencing<0.28.4 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (0.28.4)
Requirement already satisfied: rpds-py<0.7.1 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (0.22)
Requirement already satisfied: mdurl<2.0.1 in /usr/local/lib/python3.11/dist-packages (from markdown-it-py<2.2.0->rich<14,>=10.14.0->streamlit) (0.2.2)
Requirement already satisfied: six<1.5 in /usr/local/lib/python3.11/dist-packages (from python-dateutil<2.8.2->pandas<3,>=1.4.0->streamlit) (1.16.0)
Downloading streamlit-1.42.2-py2.py3-none-any.whl (9.6 MB)
9.6/9.6 MB 65.6 MB/s eta 0:00:00
Downloading pydeck-0.9.1-py2.py3-none-any.whl (6.9 MB)
6.9/6.9 MB 72.5 MB/s eta 0:00:00
Downloading watchdog-6.0.0-py3-none-manylinux2014_x86_64.whl (79 kB)
Executing (5m 52s) <cell line: 0> > system() > _system_compat() > _run_command() > _monitor_process() > _poll_process()

```

8)

colab.research.google.com/drive/1lNk\_PTLohl\_VvQMfC0JUEHhKZ6hBFsG#scrollTo=SSooXGfu\_upb

Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

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Code

```
[17] import pandas as pd
import streamlit as st
from transformers import pipeline
file_path = "/content/glassdoor_reviews_val_reviewResponses.csv"
df = pd.read_csv(file_path)
column_name = 'reviews.val.reviewResponses.val.responseText'
df = df.dropna(subset=[column_name])
df[column_name] = df[column_name].astype(str)
sampled_responses = df[column_name].sample(n=50, random_state=42).tolist()
qa_pipeline = pipeline('text2text-generation', model='t5-base')
st.title("Glassdoor Employee Reviews Q&A System")
question = st.text_input("Ask a question about employee reviews:")
if st.button("Get Answer"):
    if question:
        final_answer = []
        for response in sampled_responses:
            context = response[:500]
            answer = qa_pipeline(f'question: {question} context: {context}', max_length=50)
            final_answer.append(answer[0]['generated_text'])
        st.subheader("Generated Answers:")
        for i, ans in enumerate(final_answer[:5]):
            st.write(f"***Answer {i+1}*** {ans}")
```

Device set to use cpu

2025-02-22 19:30:37.295 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.

2025-02-22 19:30:37.298 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.

2025-02-22 19:30:37.299 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.

Executing (6m 29s) <cell line: 0> > system() > \_system\_compat() > \_run\_command() > \_monitor\_process() > \_poll\_process()

9)

colab.research.google.com/drive/1lNk\_PTLohl\_VvQMfC0JUEHhKZ6hBFsG#scrollTo=zptN509jAhLQ

Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

File Edit View Insert Runtime Tools Help

Files

- sample\_data
- app.py
- cloudfared
- glassdoor\_reviews\_val\_reviewRe...

Code

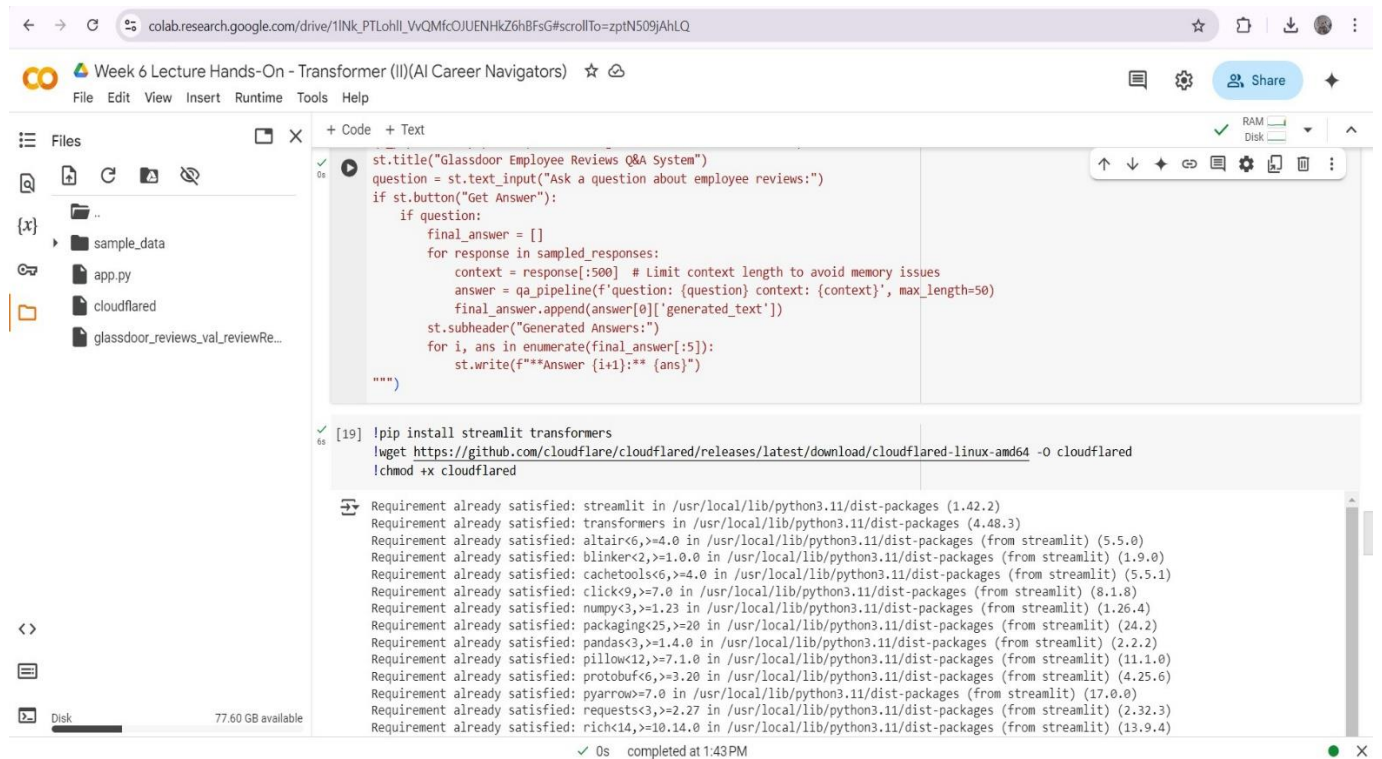
```
[17] Device set to use cpu
2025-02-22 19:30:37.295 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.298 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.299 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.300 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.305 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.313 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.314 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.318 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.319 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.320 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.321 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.321 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.
2025-02-22 19:30:37.325 Thread 'MainThread': missing ScriptRunContext! This warning can be ignored when running in bare mode.

with open("app.py", "w") as f:
    f.write("""
import pandas as pd
import streamlit as st
from transformers import pipeline
file_path = "/content/glassdoor_reviews_val_reviewResponses.csv"
df = pd.read_csv(file_path)
column_name = 'reviews.val.reviewResponses.val.responseText'
df = df.dropna(subset=[column_name])
df[column_name] = df[column_name].astype(str)
sampled_responses = df[column_name].sample(n=50, random_state=42).tolist()
qa_pipeline = pipeline('text2text-generation', model='t5-base')
st.title("Glassdoor Employee Reviews Q&A System")
question = st.text_input("Ask a question about employee reviews:")
if st.button("Get Answer"):
    if question:
        final_answer = []
```

0s completed at 1:43 PM



10)



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Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

File Edit View Insert Runtime Tools Help

Files

- sample\_data
- app.py
- cloudflared
- glassdoor\_reviews\_val\_reviewRe...

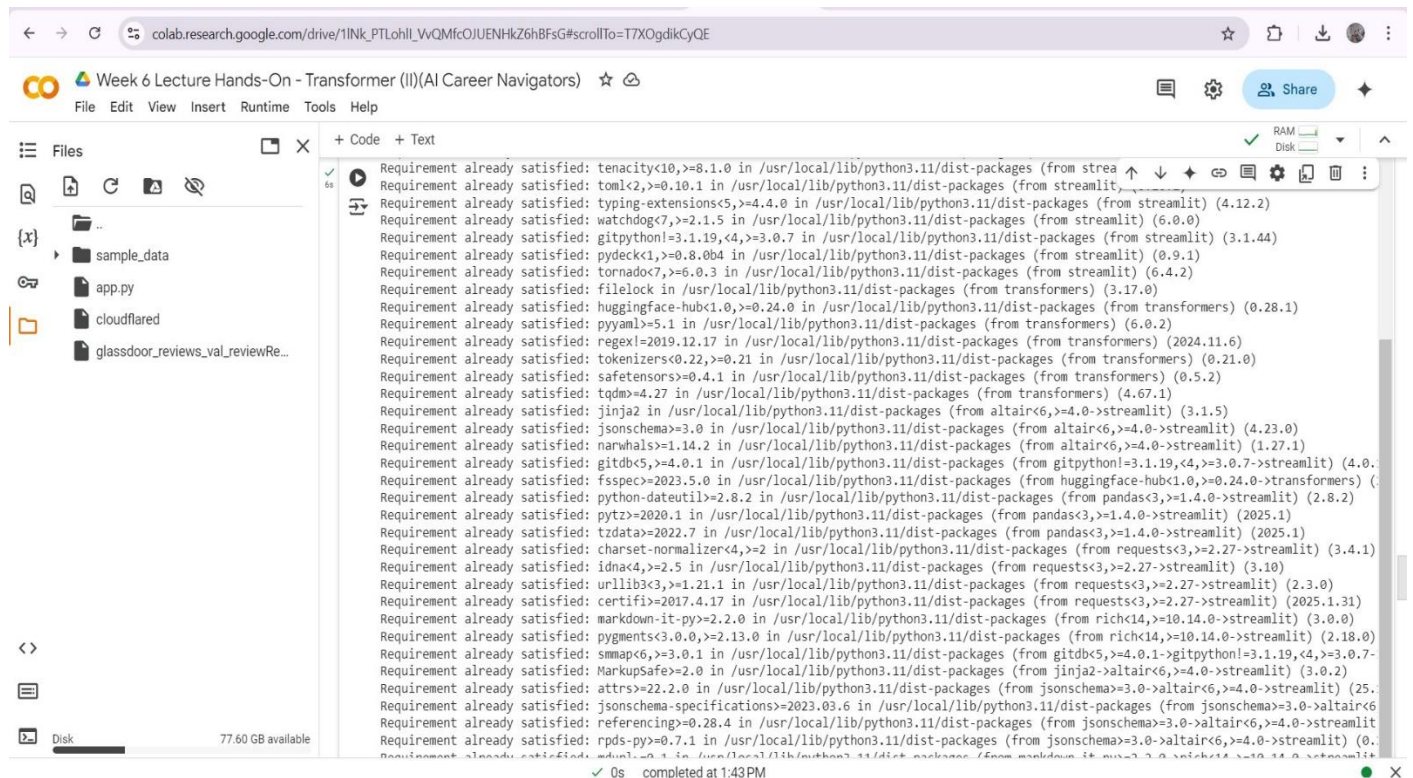
```
st.title("Glassdoor Employee Reviews Q&A System")
question = st.text_input("Ask a question about employee reviews:")
if st.button("Get Answer"):
    if question:
        final_answer = []
        for response in sampled_responses:
            context = response[:500] # Limit context length to avoid memory issues
            answer = qa_pipeline(f'question: {question} context: {context}', max_length=50)
            final_answer.append(answer[0]['generated_text'])
        st.subheader("Generated Answers:")
        for i, ans in enumerate(final_answer[:5]):
            st.write(f"***Answer {i+1}*** {ans}")
    """)
```

```
[19] !pip install streamlit transformers
!wget https://github.com/cloudflare/cloudflared/releases/latest/download/cloudflared-linux-amd64 -O cloudflared
!chmod +x cloudflared
```

```
Requirement already satisfied: streamlit in /usr/local/lib/python3.11/dist-packages (1.42.2)
Requirement already satisfied: transformers in /usr/local/lib/python3.11/dist-packages (4.48.3)
Requirement already satisfied: altair<6,>=4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (5.5.0)
Requirement already satisfied: blinker<2,>=1.0.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (1.9.0)
Requirement already satisfied: cachetools<6,>=4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (5.5.1)
Requirement already satisfied: click<9,>=7.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (8.1.8)
Requirement already satisfied: numpy<3,>=1.23 in /usr/local/lib/python3.11/dist-packages (from streamlit) (1.26.4)
Requirement already satisfied: packaging<25,>=20 in /usr/local/lib/python3.11/dist-packages (from streamlit) (24.2)
Requirement already satisfied: pandas<3,>=1.4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (2.2.2)
Requirement already satisfied: pillow<12,>=7.1.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (11.1.0)
Requirement already satisfied: protobuf<6,>=3.20 in /usr/local/lib/python3.11/dist-packages (from streamlit) (4.25.6)
Requirement already satisfied: pyarrow<7.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (17.0.0)
Requirement already satisfied: requests<3,>=2.27 in /usr/local/lib/python3.11/dist-packages (from streamlit) (2.32.3)
Requirement already satisfied: rich<14,>=10.14.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (13.9.4)
```

0s completed at 1:43PM

11)



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Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

File Edit View Insert Runtime Tools Help

Files

- sample\_data
- app.py
- cloudflared
- glassdoor\_reviews\_val\_reviewRe...

```
Requirement already satisfied: tenacity<10,>=8.1.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (9.0.0)
Requirement already satisfied: tomli<2,>=0.10.1 in /usr/local/lib/python3.11/dist-packages (from streamlit) (2.0.1)
Requirement already satisfied: typing-extensions<5,>=4.4.0 in /usr/local/lib/python3.11/dist-packages (from streamlit) (4.12.2)
Requirement already satisfied: watchdog<7,>=2.1.5 in /usr/local/lib/python3.11/dist-packages (from streamlit) (6.0.0)
Requirement already satisfied: gitpython<3.1.19,>=3.0.7 in /usr/local/lib/python3.11/dist-packages (from streamlit) (3.1.44)
Requirement already satisfied: pydeck<1,>=0.8.0b4 in /usr/local/lib/python3.11/dist-packages (from streamlit) (0.9.1)
Requirement already satisfied: tornado<7,>=6.0.3 in /usr/local/lib/python3.11/dist-packages (from streamlit) (6.4.2)
Requirement already satisfied: filelock in /usr/local/lib/python3.11/dist-packages (from transformers) (3.17.0)
Requirement already satisfied: huggingface-hub<1.0,>=0.24.0 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.28.1)
Requirement already satisfied: pyyaml<5.1 in /usr/local/lib/python3.11/dist-packages (from transformers) (6.0.2)
Requirement already satisfied: regex<19.12.17 in /usr/local/lib/python3.11/dist-packages (from transformers) (2024.11.6)
Requirement already satisfied: tokenizers<0.22,>=0.21 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.21.0)
Requirement already satisfied: safetensors<0.4.1 in /usr/local/lib/python3.11/dist-packages (from transformers) (0.5.2)
Requirement already satisfied: tqdm<4.72 in /usr/local/lib/python3.11/dist-packages (from transformers) (4.67.1)
Requirement already satisfied: jinja2 in /usr/local/lib/python3.11/dist-packages (from altair<6,>=4.0->streamlit) (3.1.5)
Requirement already satisfied: jsonschema<3.0 in /usr/local/lib/python3.11/dist-packages (from altair<6,>=4.0->streamlit) (4.23.0)
Requirement already satisfied: narwhals<1.14.2 in /usr/local/lib/python3.11/dist-packages (from altair<6,>=4.0->streamlit) (1.27.1)
Requirement already satisfied: gitdb<5,>=4.0.1 in /usr/local/lib/python3.11/dist-packages (from gitpython<3.1.19,>=3.0.7->streamlit) (4.0.7)
Requirement already satisfied: fsspec<2023.5.0 in /usr/local/lib/python3.11/dist-packages (from huggingface-hub<1.0,>=0.24.0->transformers) (2023.12.1)
Requirement already satisfied: python-dateutil<2.8.2 in /usr/local/lib/python3.11/dist-packages (from pandas<3,>=1.4.0->streamlit) (2.8.2)
Requirement already satisfied: pytz<2020.1 in /usr/local/lib/python3.11/dist-packages (from pandas<3,>=1.4.0->streamlit) (2025.1)
Requirement already satisfied: tzdata<2022.7 in /usr/local/lib/python3.11/dist-packages (from pandas<3,>=1.4.0->streamlit) (2025.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (3.4.1)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (3.10)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (2.3.0)
Requirement already satisfied: certifi<2017.4.17 in /usr/local/lib/python3.11/dist-packages (from requests<3,>=2.27->streamlit) (2025.1.31)
Requirement already satisfied: markdown-it-py<2.2.0 in /usr/local/lib/python3.11/dist-packages (from rich<14,>=10.14.0->streamlit) (3.0.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.11/dist-packages (from rich<14,>=10.14.0->streamlit) (2.18.0)
Requirement already satisfied: smmap<4,>=3.0.1 in /usr/local/lib/python3.11/dist-packages (from gitdb<5,>=4.0.1->gitpython<3.1.19,>=3.0.7->streamlit) (3.0.7)
Requirement already satisfied: MarkupSafe<2.0 in /usr/local/lib/python3.11/dist-packages (from jinja2->altair<6,>=4.0->streamlit) (3.0.2)
Requirement already satisfied: attrs<22.2.0 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (25.1.0)
Requirement already satisfied: jsonschema-specifications<2023.03.6 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (2023.12.1)
Requirement already satisfied: referencing<0.28.4 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (0.35.0)
Requirement already satisfied: rpds-py<0.7.1 in /usr/local/lib/python3.11/dist-packages (from jsonschema<3.0->altair<6,>=4.0->streamlit) (0.20.1)
Requirement already satisfied: adobe-type1-subset in /usr/local/lib/python3.11/dist-packages (from markdown-it-py<2.2.0->rich<14,>=10.14.0->streamlit) (0.1.0)
```

0s completed at 1:43PM

12)

```

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Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

File Edit View Insert Runtime Tools Help

Files
sample_data
app.py
cloudflared
glassdoor_reviews_val_reviewRe...

Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.11/dist-packages (from reques
Requirement already satisfied: markdown-it-py>=2.2.0 in /usr/local/lib/python3.11/dist-packages (from rich<14.0,
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in /usr/local/lib/python3.11/dist-packages (from rich<14.0,
Requirement already satisfied: smmap<6,>=3.0.1 in /usr/local/lib/python3.11/dist-packages (from gitdb<5,>=4.0.1->gitpython<3.1.19,
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.11/dist-packages (from jinja2->altair<6,>=4.0->streamlit) (3.0.2)
Requirement already satisfied: attrs>=22.2.0 in /usr/local/lib/python3.11/dist-packages (from jsonschema>=3.0->altair<6,>=4.0->streamlit) (25.
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in /usr/local/lib/python3.11/dist-packages (from jsonschema>=3.0->altair<6
Requirement already satisfied: referencing>=0.28.4 in /usr/local/lib/python3.11/dist-packages (from jsonschema>=3.0->altair<6,>=4.0->streamlit
Requirement already satisfied: rpds-py>=0.7.1 in /usr/local/lib/python3.11/dist-packages (from jsonschema>=3.0->altair<6,>=4.0->streamlit) (0.
Requirement already satisfied: mdurl>=0.1 in /usr/local/lib/python3.11/dist-packages (from markdown-it-py>=2.2.0->rich<14,>=10.14.0->streamlit
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.11/dist-packages (from python-dateutil>=2.8.2->pandas<3,>=1.4.0->streamlit)
--2025-02-22 19:34:03-- https://github.com/cloudflare/cloudflared/releases/latest/download/cloudflared-linux-amd64
Resolving github.com (github.com)... 140.82.112.3
Connecting to github.com (github.com)[140.82.112.3]:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://github.com/cloudflare/cloudflared/releases/download/2025.2.0/cloudflared-linux-amd64 [following]
--2025-02-22 19:34:03-- https://github.com/cloudflare/cloudflared/releases/download/2025.2.0/cloudflared-linux-amd64
Reusing existing connection to github.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/106867604/cf0d9618-6195-40d3-8bb8-d0eac6a1591?X-Amz-Al
--2025-02-22 19:34:03-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/106867604/cf0d9618-6195-40d3-8bb8-d0eac6
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.110.133, 185.199.108.133, 185.199.111.133, ...
HTTP request sent, awaiting response... 200 OK
Length: 37811777 (36M) [application/octet-stream]
Saving to: 'cloudflared'

cloudflared 100%[=====] 36.06M 153MB/s in 0.2s

2025-02-22 19:34:03 (153 MB/s) - 'cloudflared' saved [37811777/37811777]

[20] !streamlit run app.py & ./cloudflared tunnel --url http://localhost:8501
✓ 0s completed at 1:43 PM

```

13)

```

Week 6 Lecture Hands-On - Transformer (II)(AI Career Navigators)

File Edit View Insert Runtime Tools Help

Files
sample_data
app.py
cloudflared
glassdoor_reviews_val_reviewRe...

[20] !streamlit run app.py & ./cloudflared tunnel --url http://localhost:8501
2025-02-22T19:34:06Z INF Thank you for trying Cloudflare Tunnel. Doing so, without a Cloudflare account, is a quick way to experiment and try
2025-02-22T19:34:06Z INF Requesting new quick Tunnel on trycloudflare.com...

Collecting usage statistics. To deactivate, set browser.gatherUsageStats to false.

You can now view your Streamlit app in your browser.

Local URL: http://localhost:8501
Network URL: http://172.28.0.12:8501
External URL: http://34.173.190.63:8501

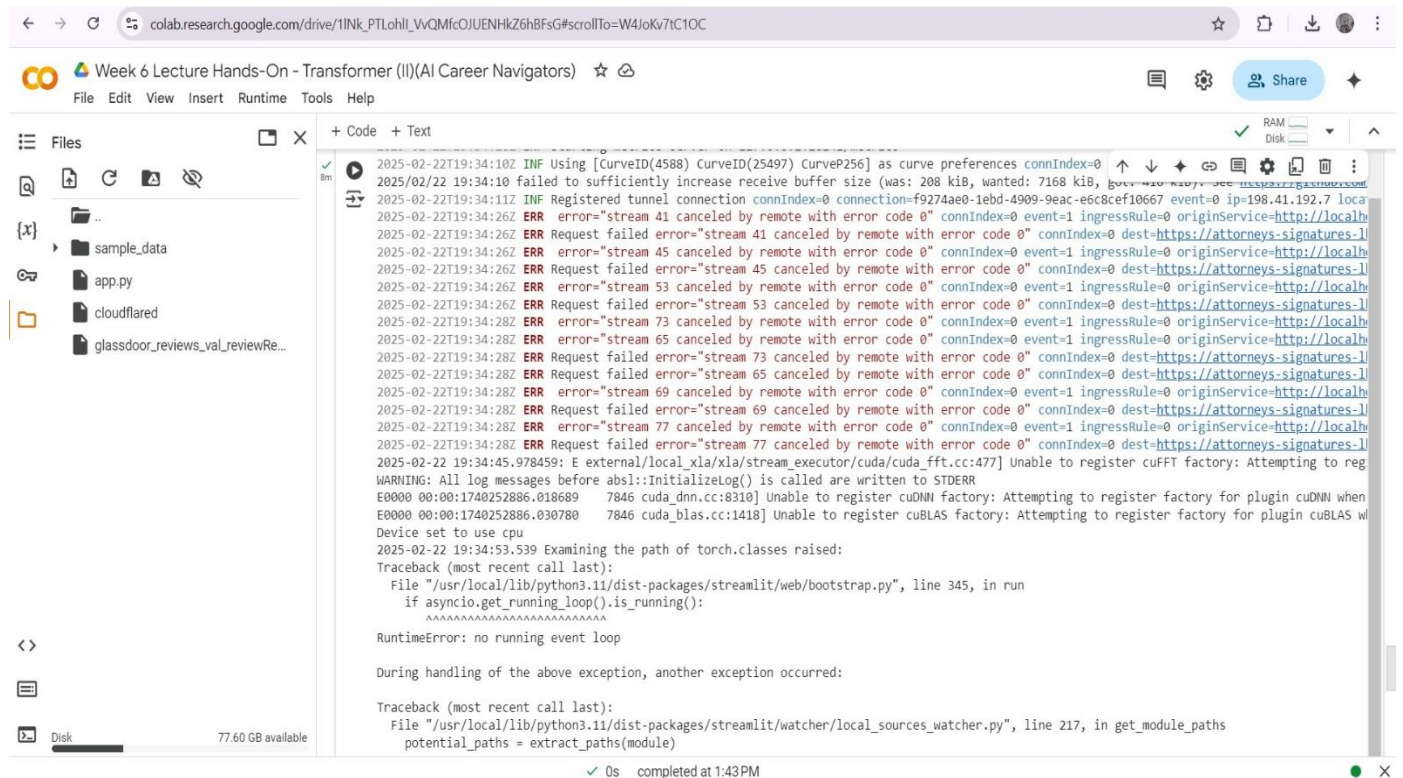
2025-02-22T19:34:10Z INF +-----+
2025-02-22T19:34:10Z INF | Your quick Tunnel has been created! Visit it at (it may take some time to be reachable): |
2025-02-22T19:34:10Z INF | https://attorneys-signatures-lb-untitled.trycloudflare.com |
2025-02-22T19:34:10Z INF +-----+
2025-02-22T19:34:10Z INF Cannot determine default configuration path. No file [config.yml config.yaml] in [~/cloudflared ~/cloudflare-warp ~/
2025-02-22T19:34:10Z INF Version 2025.2.0 (Checksum cbd18c5a6dee084db7a55d761b91202e47e63ddb180faff04ca96e56739b3f)
2025-02-22T19:34:10Z INF GOOS: linux, GOVersion: go1.22.10, GOArch: amd64
2025-02-22T19:34:10Z INF Settings: map[ha-connections:1 protocol:quic url:http://localhost:8501]
2025-02-22T19:34:10Z INF Generated Connector ID: 37e16920-759f-47e0-a3c4-88722e5aa190
2025-02-22T19:34:10Z INF cloudflared will not automatically update when run from the shell. To enable auto-updates, run cloudflared as a servi
2025-02-22T19:34:10Z INF Initial protocol quic
2025-02-22T19:34:10Z INF ICMP proxy will use 172.28.0.12 as source for IPv4
2025-02-22T19:34:10Z INF ICMP proxy will use :: as source for IPv6
2025-02-22T19:34:10Z INF ICMP proxy will use 172.28.0.12 as source for IPv4
2025-02-22T19:34:10Z INF ICMP proxy will use :: as source for IPv6
2025-02-22T19:34:10Z INF Starting metrics server on 127.0.0.1:20241/metrics
2025-02-22T19:34:10Z INF Using [CurveID(4588) CurveID(25497) CurveP256] as curve preferences connIndex=0 event=0 ip=198.41.192.7

✓ 0s completed at 1:43 PM

```



14)

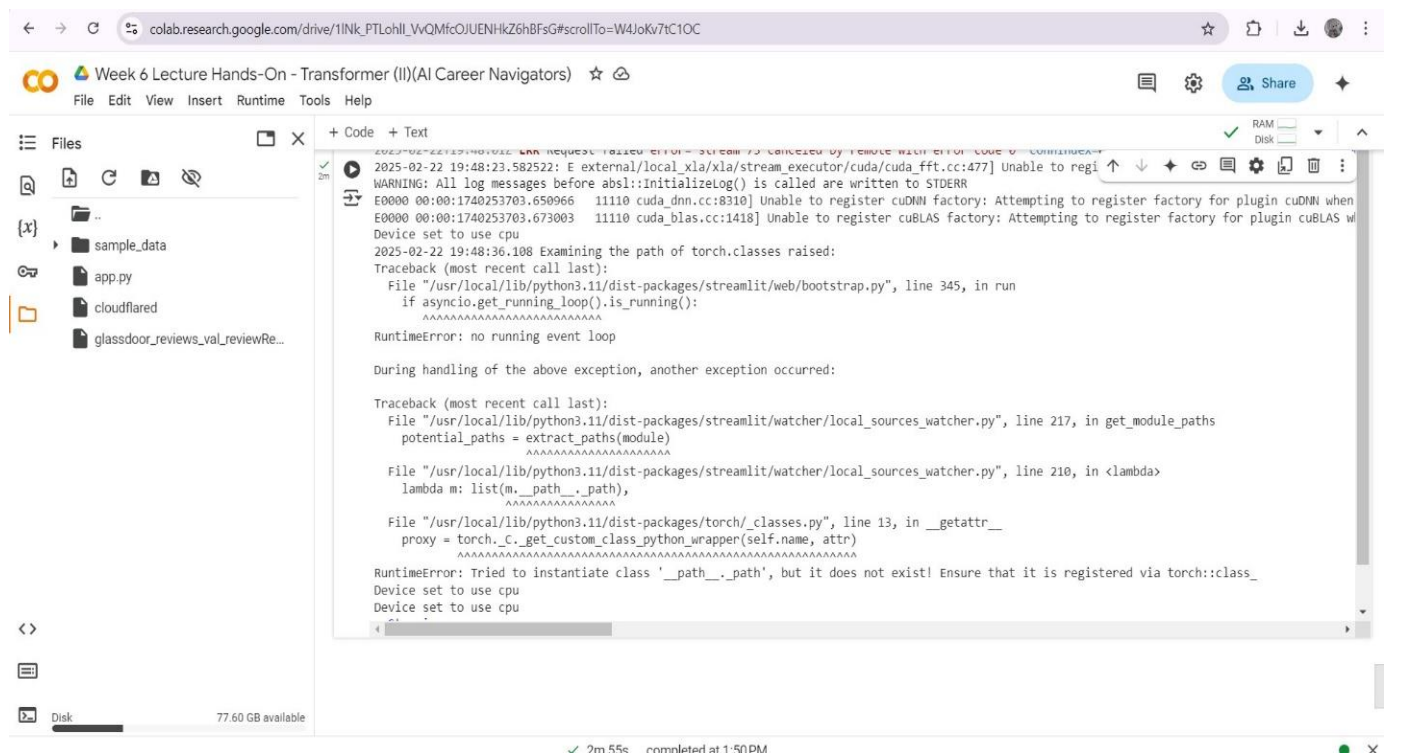


```
2025-02-22T19:34:10Z INF Using [CurveID(4588) CurveID(25497) CurveP256] as curve preferences connIndex=0
2025-02-22T19:34:10Z failed to sufficiently increase receive buffer size (was: 208 kiB, wanted: 7168 kiB,
2025-02-22T19:34:11Z INF Registered tunnel connection connIndex=0 connection=f9274ae0-1ebd-4909-9eac-e6c8cef10667 event=0 ip=198.41.192.7 loca
2025-02-22T19:34:26Z ERR error="stream 41 canceled by remote with error code 0" connIndex=0 event=1 ingressRule=0 originService=http://localh
2025-02-22T19:34:26Z ERR Request failed error="stream 41 canceled by remote with error code 0" connIndex=0 dest=https://attorneys-signatures-l
2025-02-22T19:34:26Z ERR error="stream 45 canceled by remote with error code 0" connIndex=0 event=1 ingressRule=0 originService=http://localh
2025-02-22T19:34:26Z ERR Request failed error="stream 45 canceled by remote with error code 0" connIndex=0 dest=https://attorneys-signatures-l
2025-02-22T19:34:26Z ERR error="stream 53 canceled by remote with error code 0" connIndex=0 event=1 ingressRule=0 originService=http://localh
2025-02-22T19:34:26Z ERR Request failed error="stream 53 canceled by remote with error code 0" connIndex=0 dest=https://attorneys-signatures-l
2025-02-22T19:34:28Z ERR error="stream 73 canceled by remote with error code 0" connIndex=0 event=1 ingressRule=0 originService=http://localh
2025-02-22T19:34:28Z ERR Request failed error="stream 73 canceled by remote with error code 0" connIndex=0 dest=https://attorneys-signatures-l
2025-02-22T19:34:28Z ERR error="stream 65 canceled by remote with error code 0" connIndex=0 event=1 ingressRule=0 originService=http://localh
2025-02-22T19:34:28Z ERR Request failed error="stream 65 canceled by remote with error code 0" connIndex=0 dest=https://attorneys-signatures-l
2025-02-22T19:34:28Z ERR error="stream 69 canceled by remote with error code 0" connIndex=0 event=1 ingressRule=0 originService=http://localh
2025-02-22T19:34:28Z ERR Request failed error="stream 69 canceled by remote with error code 0" connIndex=0 dest=https://attorneys-signatures-l
2025-02-22T19:34:28Z ERR error="stream 77 canceled by remote with error code 0" connIndex=0 event=1 ingressRule=0 originService=http://localh
2025-02-22T19:34:28Z ERR Request failed error="stream 77 canceled by remote with error code 0" connIndex=0 dest=https://attorneys-signatures-l
2025-02-22 19:34:45.978459: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:477] Unable to register cuFFT factory: Attempting to reg
WARNING: All log messages before absl::InitializeLog() is called are written to STDERR
E0000 00:00:1740252886.018689 7846 cuda_dnn.cc:8310] Unable to register cuDNN factory: Attempting to register factory for plugin cuDNN when
E0000 00:00:1740252886.030780 7846 cuda_blas.cc:1418] Unable to register cuBLAS factory: Attempting to register factory for plugin cuBLAS w
Device set to use cpu
2025-02-22 19:34:53.539 Examining the path of torch.classes raised:
Traceback (most recent call last):
  File "/usr/local/lib/python3.11/dist-packages/streamlit/web/bootstrap.py", line 345, in run
    if asyncio.get_running_loop().is_running():
    ~~~~~^
RuntimeError: no running event loop

During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/usr/local/lib/python3.11/dist-packages/streamlit/watcher/local_sources_watcher.py", line 217, in get_module_paths
    potential_paths = extract_paths(module)
```

15)



```
2025-02-22 19:48:23.582522: E external/local_xla/xla/stream_executor/cuda/cuda_fft.cc:477] Unable to regi
WARNING: All log messages before absl::InitializeLog() is called are written to STDERR
E0000 00:00:1740253703.650966 11110 cuda_dnn.cc:8310] Unable to register cuDNN factory: Attempting to register factory for plugin cuDNN when
E0000 00:00:1740253703.673003 11110 cuda_blas.cc:1418] Unable to register cuBLAS factory: Attempting to register factory for plugin cuBLAS w
Device set to use cpu
2025-02-22 19:48:36.108 Examining the path of torch.classes raised:
Traceback (most recent call last):
  File "/usr/local/lib/python3.11/dist-packages/streamlit/web/bootstrap.py", line 345, in run
    if asyncio.get_running_loop().is_running():
    ~~~~~^
RuntimeError: no running event loop

During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/usr/local/lib/python3.11/dist-packages/streamlit/watcher/local_sources_watcher.py", line 217, in get_module_paths
    potential_paths = extract_paths(module)
  File "/usr/local/lib/python3.11/dist-packages/streamlit/watcher/local_sources_watcher.py", line 210, in <lambda>
    lambda m: list(m.__path__._path),
  File "/usr/local/lib/python3.11/dist-packages/torch/_classes.py", line 13, in __getattr__
    proxy = torch._C._get_custom_class_python_wrapper(self.name, attr)
RuntimeError: Tried to instantiate class '__path__._path', but it does not exist! Ensure that it is registered via torch::class_
Device set to use cpu
Device set to use cpu
```

16)



17)



## Glassdoor Employee Reviews Q&A System

Ask a question about employee reviews:

What do employees say about work-life balance?

Get Answer

### Generated Answers:

**Answer 1:** neither the job title nor the contract type correspond to what we offer in Barcelona

**Answer 2:** I encourage you to take risks and be open to exploring new locations within the company in order to grow at a faster pace

**Answer 3:** glad to hear you're enjoying working at Harbor Freight Tools, and we look forward to watching you grow with the team

**Answer 4:** give everyone a chance to learn, to make mistakes, to try new things, and to grow on a professional level

**Answer 5:** Kind regards

