



DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

Module 2: Rapid
Prototyping with
Streamlit on Snowflake



DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

Building Prototypes on
Snowflake

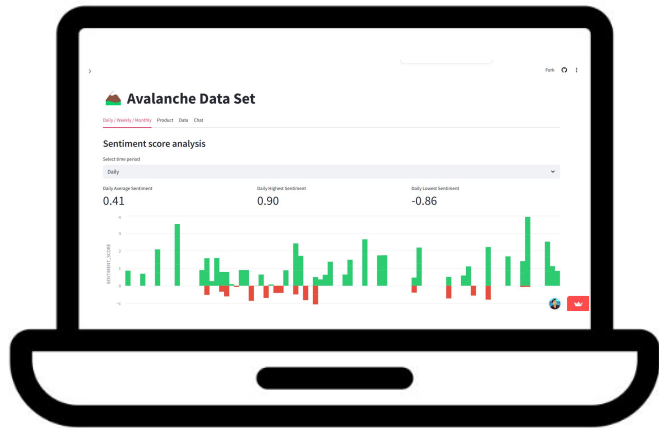
MVP Build Plan



Avalanche Dashboard App

1. Load a dataset with pandas
2. Analyze the reviews sentiments
3. Display the dataset
4. Visualize the sentiment analysis

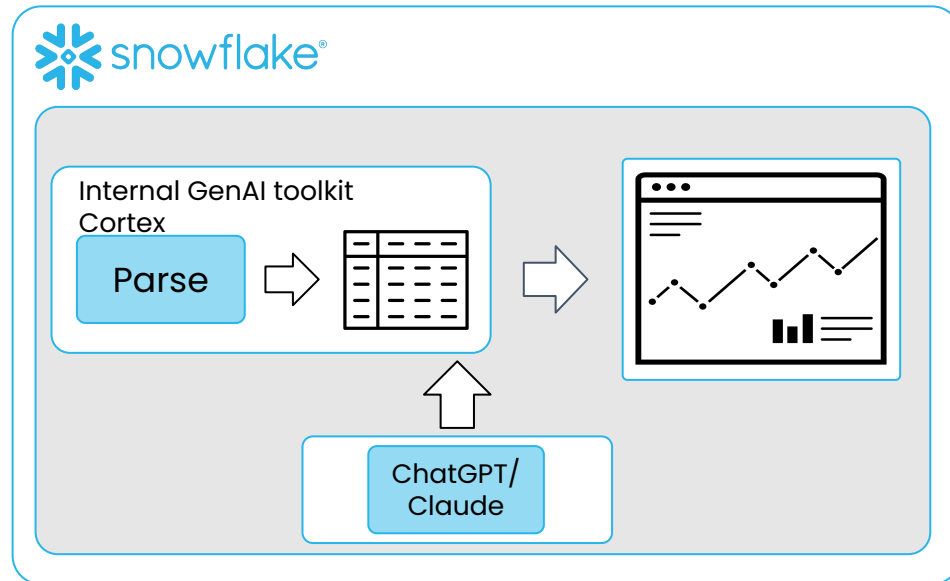
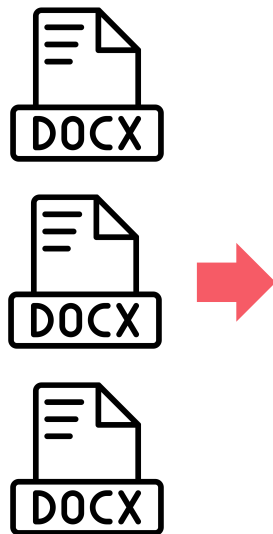
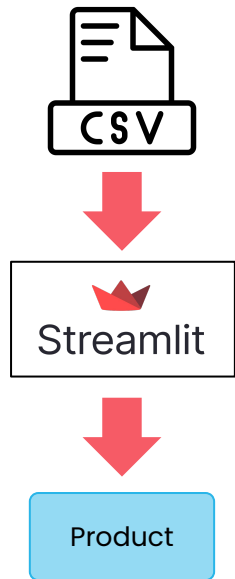
What You've Built So Far



- ✓ Ingested a .csv file of customer reviews
- ✓ Performed cleanup and sentiment analysis on the data
- ✓ Visualized the results
- ✓ Used Streamlit to create a quick user interface accessible in your web browser

Streamlit vs Snowflake Workflows

Avalanche
customer_reviews.csv



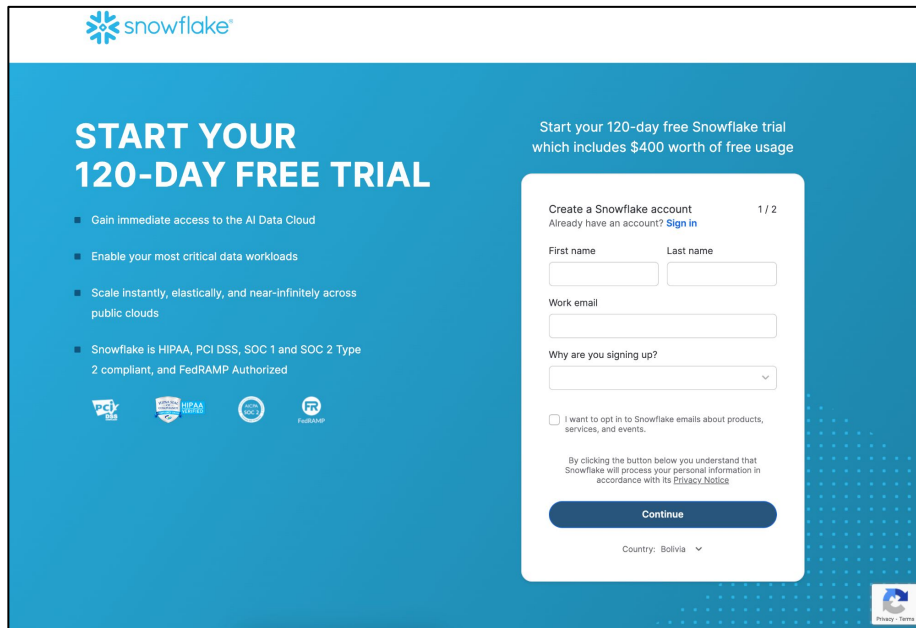


DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

Introducing Snowflake

Setting Up Your Snowflake Trial Account



The screenshot shows the Snowflake trial sign-up page. On the left, under the heading "START YOUR 120-DAY FREE TRIAL", there is a list of benefits: "Gain immediate access to the AI Data Cloud", "Enable your most critical data workloads", "Scale instantly, elastically, and near-infinately across public clouds", and "Snowflake is HIPAA, PCI DSS, SOC 1 and SOC 2 Type 2 compliant, and FedRAMP Authorized". Below this list are logos for PCI DSS, HIPAA, SOC 1, and FedRAMP. On the right, the text says "Start your 120-day free Snowflake trial which includes \$400 worth of free usage". Below this is a form titled "Create a Snowflake account" with a progress indicator "1 / 2". The form includes a link for "Already have an account? Sign in", input fields for "First name" and "Last name", a "Work email" field, and a dropdown menu for "Why are you signing up?". There is a checkbox for "I want to opt in to Snowflake emails about products, services, and events." and a "Continue" button. At the bottom, it says "Country: Bolivia" with a dropdown arrow. A "Privacy Notice" link is also present.

START YOUR 120-DAY FREE TRIAL

- Gain immediate access to the AI Data Cloud
- Enable your most critical data workloads
- Scale instantly, elastically, and near-infinately across public clouds
- Snowflake is HIPAA, PCI DSS, SOC 1 and SOC 2 Type 2 compliant, and FedRAMP Authorized

Start your 120-day free Snowflake trial which includes \$400 worth of free usage

Create a Snowflake account 1 / 2
Already have an account? [Sign in](#)

First name Last name

Work email

Why are you signing up?

☐ I want to opt in to Snowflake emails about products, services, and events.

By clicking the button below you understand that Snowflake will process your personal information in accordance with its [Privacy Notice](#)

Continue

Country: Bolivia

bit.ly/snowflake-dlai-trial

Final Step



Check your inbox for a verification email



Click the verification link



You'll be able to log in and access the platform



Congratulations on getting started with Snowflake! Click the button below to activate your account.

CLICK TO ACTIVATE

This activation link is temporary and will expire in 72 hours.

*Don't see the email?
Check your **Spam** or Promotions folder!*

Snowflake Dev Environment Overview

Home

Search this account, Marketplace, and documentation

Quick actions

- Upload local files**
Quickly convert data into tables
- Load from cloud storage**
Use a SQL template to load data
- Query data**
Create a SQL Worksheet
- Create User**
Provide access to collaborators

Simplify Oracle, SQL Server, Teradata & Redshift migrations with SnowConvert
Automate 96% of code and object conversion on average with SnowConvert. Download the tool for free and access guides in the Migration Hub.
[Visit Migrations hub](#)

All projects

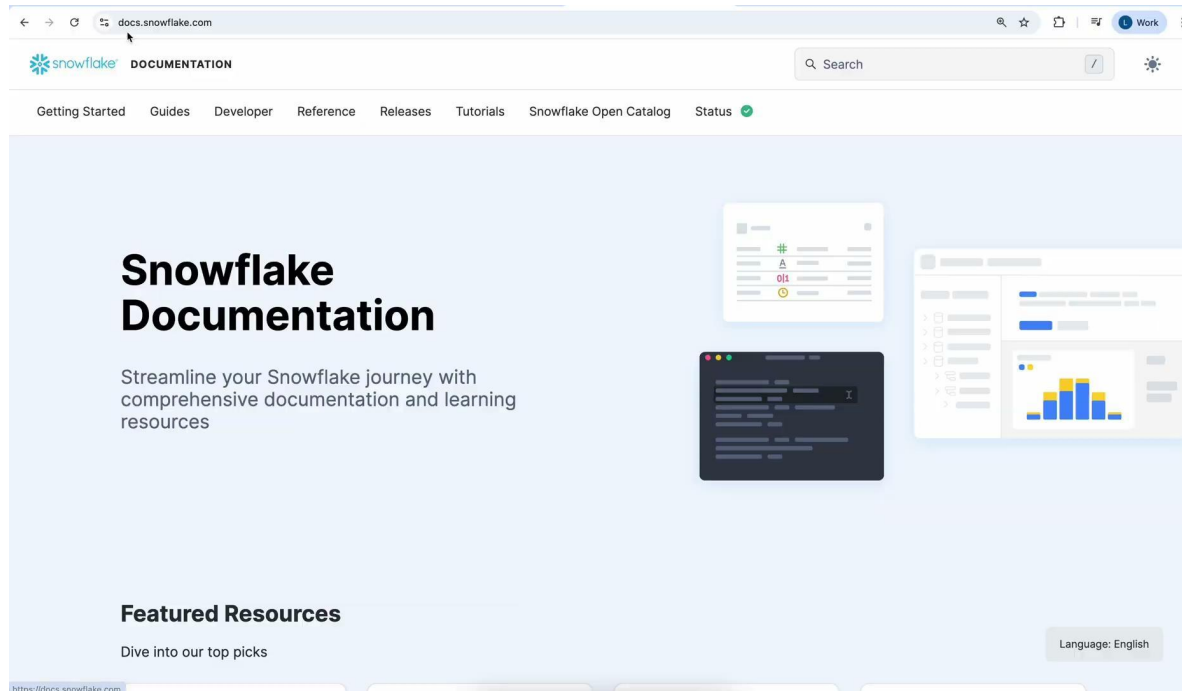
[All projects](#) Worksheets Notebooks Streamlit Dashboards Folders

TITLE	TYPE	VIEWS ↓	UPDATED
Load sample data with SQL from S3 bucket Getting Started Tutorials	SQL Worksheet	1 month ago	1 month ago
Getting Started Tutorials	Folder	2 months ago	3 months ago
Load sample data with Python from S3 bucket Getting Started Tutorials	Python Worksheet	—	3 months ago
[Template] Adding a user and granting roles Getting Started Tutorials	SQL Worksheet	—	3 months ago
Sample queries on TPC-H data Benchmarking Tutorials	SQL Worksheet	—	3 months ago
Sample queries on TPC-DS data Benchmarking Tutorials	SQL Worksheet	—	3 months ago

\$400 credits left ⓘ ...
Trial ends in 16 days
[Upgrade](#)

← **Snowsight**


Snowflake Dev Environment Overview



<https://docs.snowflake.com/>

Snowflake Dev Environment Overview

Welcome to Snowflake! How do you want to start?




Explore a sample data set

Load and query sample data from **TastyBytes**, a fictional global food truck business.

Start

OR



Load data into Snowflake

You can load data from any of the following:

- Local files
- External cloud providers
- 3rd party connectors (20+ providers)

Start

Skip for now

Snowflake Dev Environment Overview

Snowsight:
The Snowflake
web interface

The screenshot displays the Snowflake Snowsight web interface. On the left is a sidebar with navigation options: Create, Home (selected), Search, Projects, Data, Data Products, AI & ML, Monitoring, and Admin. At the bottom of the sidebar, it shows '\$400 credits left', 'Trial ends in 16 days', and an 'Upgrade' button. The main content area is titled 'Home' and includes a search bar. Below the search bar are four 'Quick actions' cards: 'Upload local files', 'Load from cloud storage', 'Query data', and 'Create User'. A promotional banner for 'SnowConvert' is also present. The 'All projects' section is active, showing a table of projects with columns for Title, Type, Viewed, and Updated.

TITLE	TYPE	VIEWED ↓	UPDATED
Load sample data with SQL from S3 bucket <small>Getting Started Tutorials</small>	SQL Worksheet	1 month ago	1 month ago
Getting Started Tutorials	Folder	2 months ago	3 months ago
Load sample data with Python from S3 bucket <small>Getting Started Tutorials</small>	Python Worksheet	—	3 months ago
[Template] Adding a user and granting roles <small>Getting Started Tutorials</small>	SQL Worksheet	—	3 months ago
Sample queries on TPC-H data <small>Benchmarking Tutorials</small>	SQL Worksheet	—	3 months ago
Sample queries on TPC-DS data <small>Benchmarking Tutorials</small>	SQL Worksheet	—	3 months ago

Snowflake Dev Environment Overview


Command
Line
Interface
(CLI)


Downloads


- CLI Client (snowsql)
- JDBC Driver
- ODBC Driver
- Python Components
- Node.js Driver
- Spark Connector


CLI Client (snowsql)

Download the latest version of SnowSQL for your platform.
For installation and configuration details, see the [Snowflake Documentation](#)

 CLI Client (snowsql) 1.1.62 Linux

 CLI Client (snowsql) 1.1.62 64-bit Windows

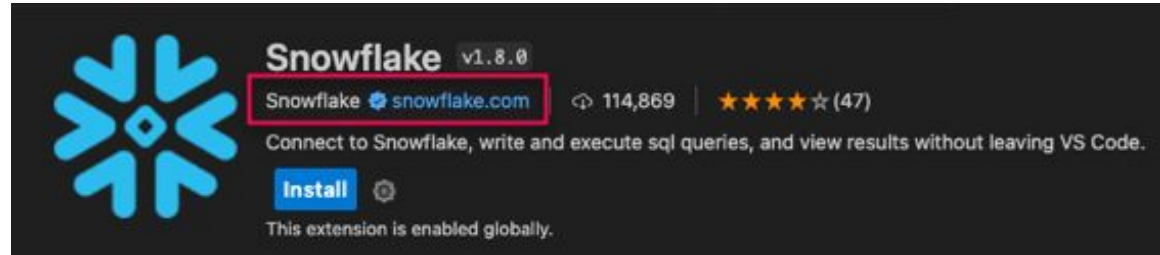
 CLI Client (snowsql) 1.1.62 64-bit Mac OSX

 Snowflake GPG Public Key For Linux

Done

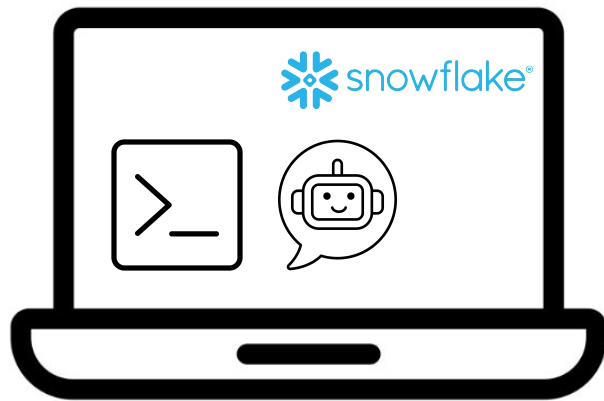
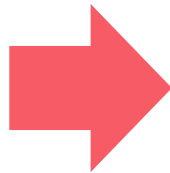
Snowflake Dev Environment Overview

VS Code
Extension

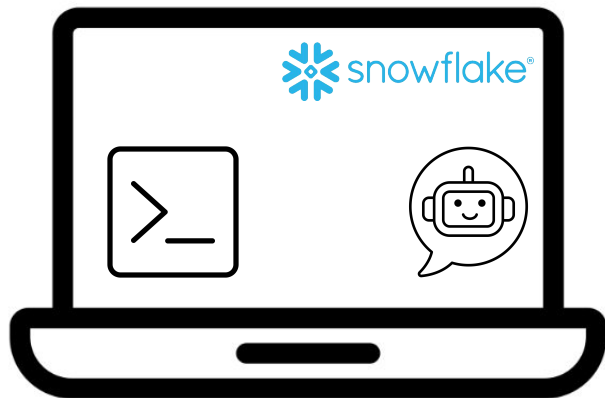


docs.snowflake.com/en/user-guide/vscode-ext

Using Streamlit in Snowflake



Using Streamlit in Snowflake

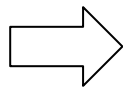


- ✓ Create dashboards directly from Snowflake tables
- ✓ Explore and visualize your data in real time
- ✓ Keep your entire workflow in one place

Using Streamlit in Snowflake

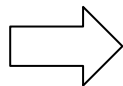


Snowflake Notebook



- Great for rapid prototyping
- Working with teammates

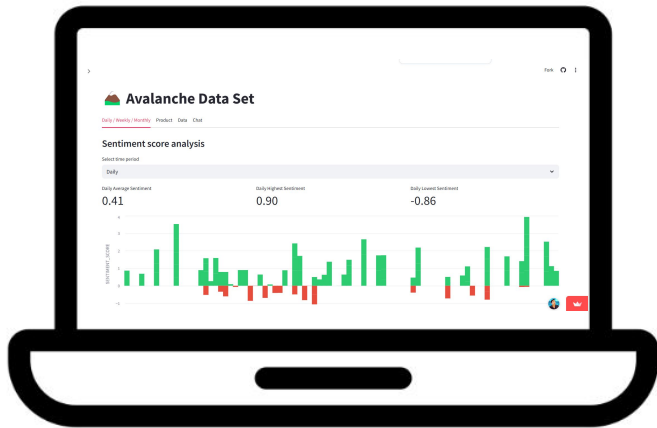
Streamlit in Snowflake



- When you're ready to share your app more broadly

What You've Already Built

Module 1



Module 2

- Connecting your app to **Snowflake** tables
- Adding filters, interactive widgets, and visualizations



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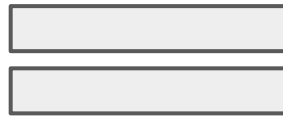
Snowsight
Development
Environment

What is Snowflake?



Snowflake is your all-in-one data command center in the cloud.

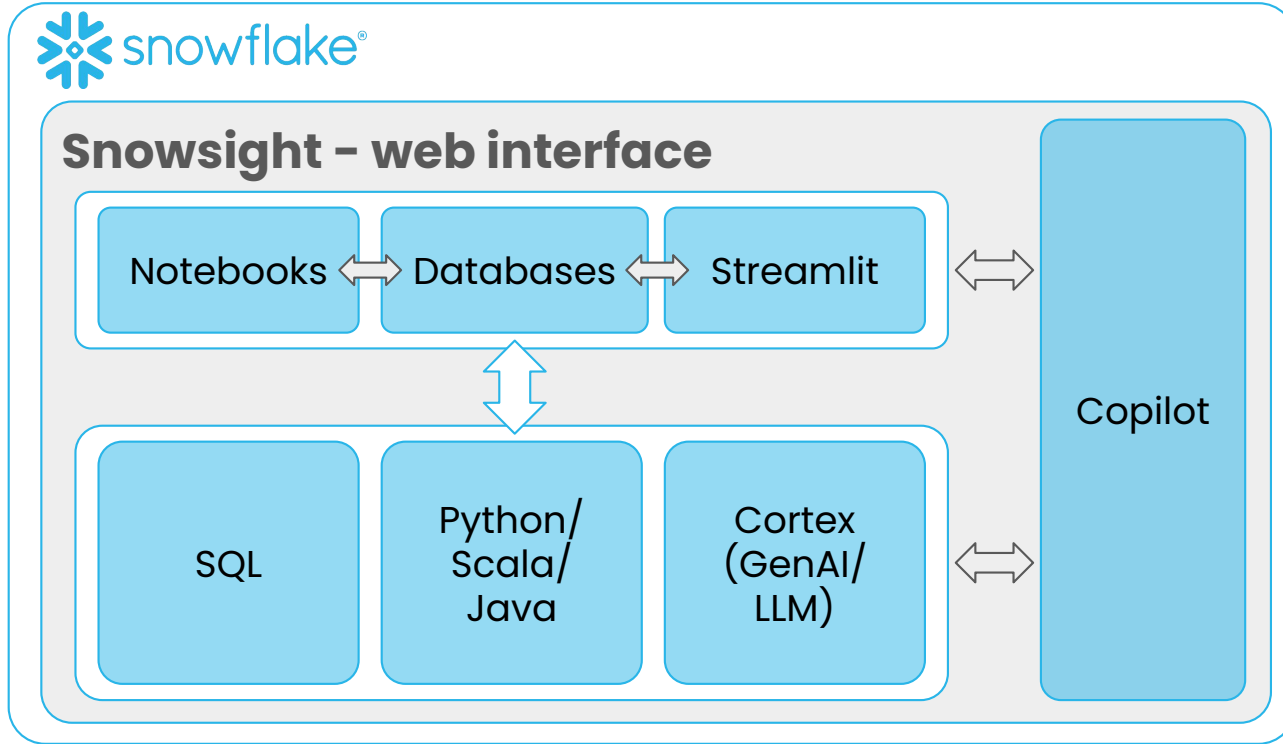
Virtual
Warehouses



Storage Layer



What is Snowflake?



How It All Works Together



sentiment analysis
and text generation

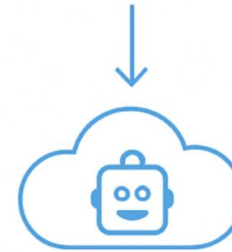


Snowflake
Cortex

Claude or ChatGPT
to work with python



Snowflake
Copilot

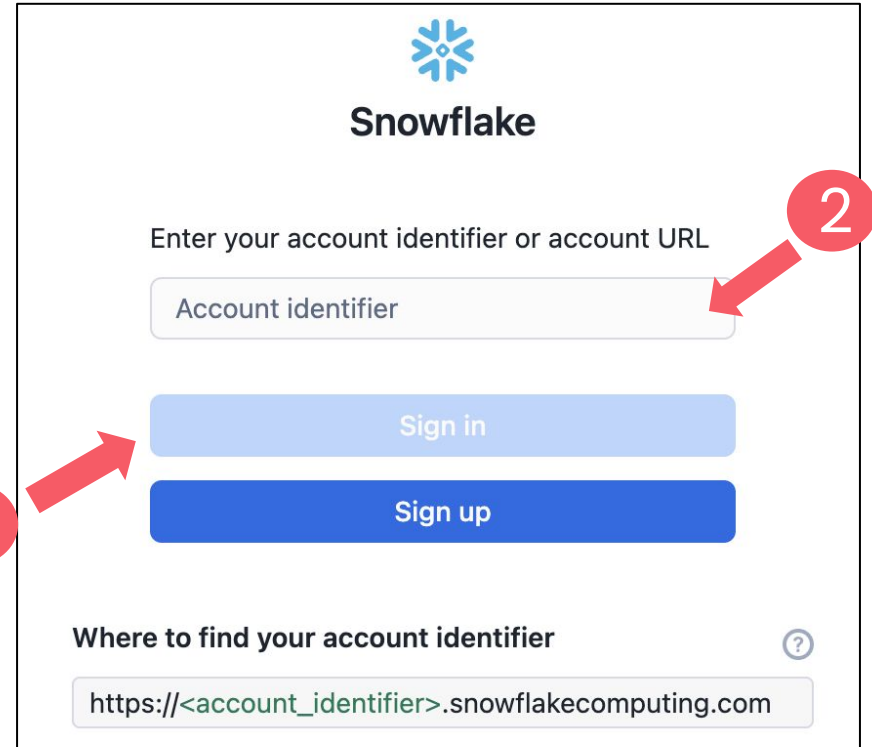


4 Deploy in Snowflake
or on Streamlit
Community Cloud

Logging In to Snowsight

1

<https://app.snowflake.com>



The screenshot shows the Snowflake login interface. At the top is the Snowflake logo and the word "Snowflake". Below this is the text "Enter your account identifier or account URL". A red arrow labeled "2" points to the "Account identifier" input field. Below the input field are two buttons: "Sign in" (light blue) and "Sign up" (dark blue). A red arrow labeled "3" points to the "Sign in" button. At the bottom, there is a section titled "Where to find your account identifier" with a help icon (question mark in a circle). Below this title is a text box containing the URL template: `https://<account_identifier>.snowflakecomputing.com`.

How Snowflake Organizes Your Data



Data

Database

└ Schema

(subfolders)

└ Table

(where the data actually lives)






└ View

(virtual table)

└ Stage

(file upload location)

Wrap Up

- Logged into Snowsight 
- Explored the Avalanche database 
- Navigated schemas and tables 
- Peeked inside the customer_reviews table 
- Checked out key tools like Worksheets, Notebooks, and Apps 



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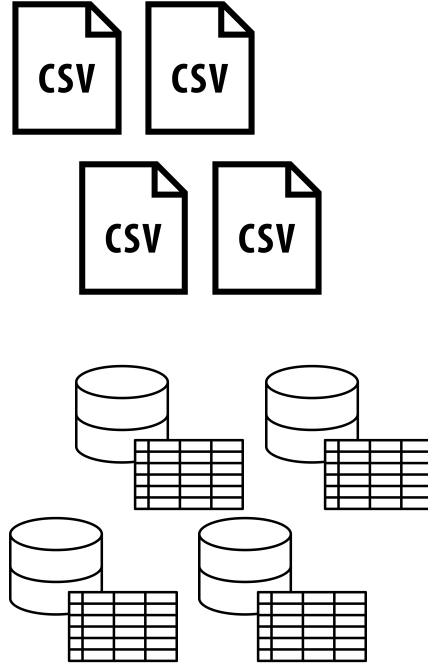
From CSV to Cloud — Using
Notebooks to Ingest
Avalanche Data

MVP Build Plan



1. Getting data into Snowflake
2. Parsing and Structuring
3. Cleanup Data
4. Analyze Data
5. Visualize Results
6. Create interface with a tab called "Data" that displays the head of the dataset
7. Deploy to cloud

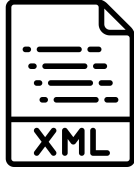
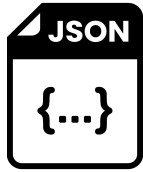
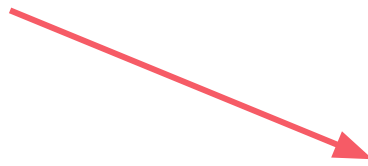
What Kind of Files does Snowflake Support?



What Kind of Files does Snowflake Support?



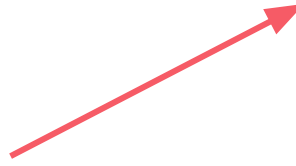
Structured



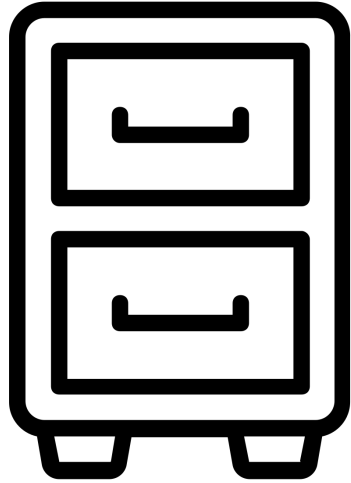
Semi-structured



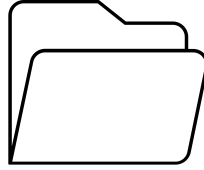
Unstructured



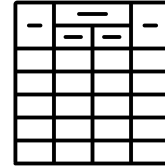
How Snowflake Organizes Your Data



Databases



Schemas



Tables

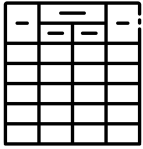


Views

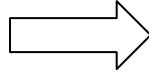


Stages

How Snowflake Organizes Your Data



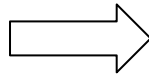
Tables



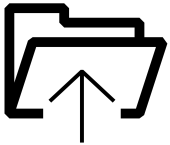
rows and columns of structured data



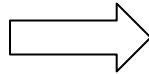
Views



saved queries that look like tables



Stages



secure zones to store raw files

How Snowflake Organizes Your Data



Database

└ Schema

(subfolders)

└ Table

(holds your structured data)

└ View

(queries that look like tables)

└ Stage

(file upload location)

Avalanche 'customer_reviews.csv'

Load Your Data into DataFrames

Database

└ Schema

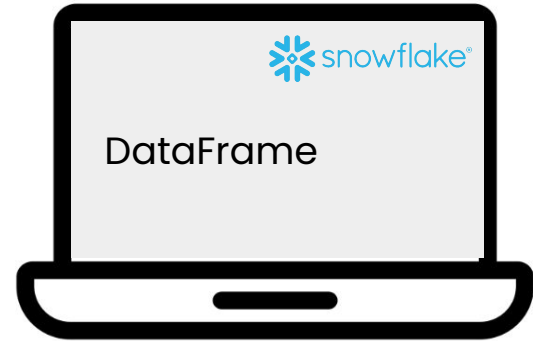
└ Table

└ View

└ Stage



'customer_reviews.csv'



- Pandas DataFrames
- Snowpark DataFrames

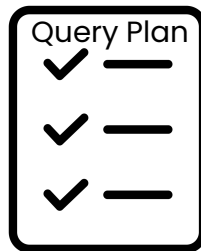
Snowflake vs Pandas Dataframes

Pandas DataFrames



- ✓ small datasets
- ✗ slow down or crash with larger data

Snowpark DataFrames



- ✓ when you're ready
- ↓
- Snowflake's cloud infrastructure

Snowflake vs Pandas Dataframes

Feature	Pandas Dataframes	Snowpark Dataframes
Execution	Eager (runs immediately in local memory)	Lazy (SQL runs in Snowflake when needed)
Location	Resides in your local Python process	Resides in Snowflake's cloud infrastructure
Scale	Limited by your machine's memory	Handles massive datasets with ease
Syntax	Familiar pandas-style indexing and operations	Similar to pandas, but uses <code>.filter()</code> , <code>.select()</code> instead of direct indexing
Use Case	Best for small to medium data on your local machine	Best for working with large, cloud-scale datasets securely

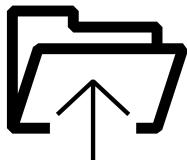


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Fast Prototyping of GenAI Apps with Streamlit

Uploading a Batch of Files

Why Use Stages



Stages

Stages are like
a secure
holding zone
for your files.

- ✓ Help you preview and validate files before ingestion
- ✓ Keep your uploads organized
- ✓ Let you reuse the same files across multiple workflows



Stages

Database

└ Schema

└ **Stage**

AVALANCHE_DB

AVALANCHE_SCHEMA

AVALANCHE_STAGE

/Data/customer_reviews_docx.zip



DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

From Stage to Table
with Cortex

MVP Build Plan

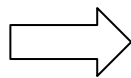


1. Getting data into Snowflake ✓
2. Parsing and Structuring
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6. Create interface with a tab called "Data" that displays the head of the dataset
7. Deploy to cloud

MVP Build Plan

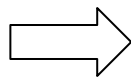
2. Parsing and Structuring

PARSE_DOCUMENT



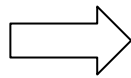
extract content from each of your staged Word Docs

Create a table



doc's filename and the extracted_text

Preview the results in your Snowflake Notebook



make sure everything worked as planned



Database

└ Schema

└ **Stage**

AVALANCHE_DB

AVALANCHE_SCHEMA

AVALANCHE_STAGE

Using Cortex

Snowflake
Cortex

- to process and analyze data



simple SQL

- PARSE_
DOCUMENT



extract content

Cortex handles it all for you – fast, secure, and right inside Snowflake!




DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

Extracting Information
from the Content

MVP Build Plan



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DeepLearning.AI

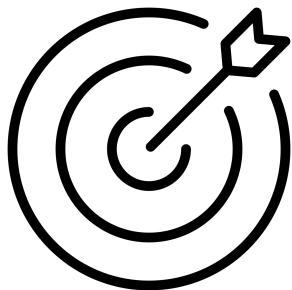
Fast Prototyping of GenAI Apps with Streamlit

Lab 1 – Avalanche
Shipping Analytics

Your Mission



shipping-logs.csv



- ✓ Upload the file to the Avalanche stage
- ✓ Clean and validate the content
- ✓ Load it into a Snowflake table
- ✓ Prep the cleaned data for combining with the customer reviews in the next lab

Your Files

GitHub repo:

M2

- └ Lesson_01
 - └ Lab1
 - └ shipping-logs.csv
 - └ M2Lab1_solution.ipynb

- Database AVALANCHE_DB
 - └ Schema AVALANCHE_SCHEMA
 - └ **Stage** AVALANCHE_STAGE

Lesson 2

Data Analysis with Snowflake and GenAI



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Fast Prototyping of GenAI Apps with Streamlit

One Table to Rule
Them All

MVP Build Plan



1. Getting data into Snowflake ✓
2. Parsing and Structuring ✓
3. Clean up Data
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Set Up Your Environment

Database

AVALANCHE_DB

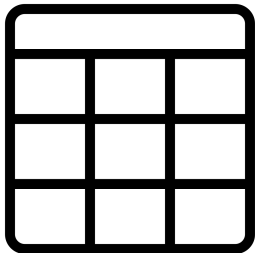
└ Schema

AVALANCHE_SCHEMA

└ Stage

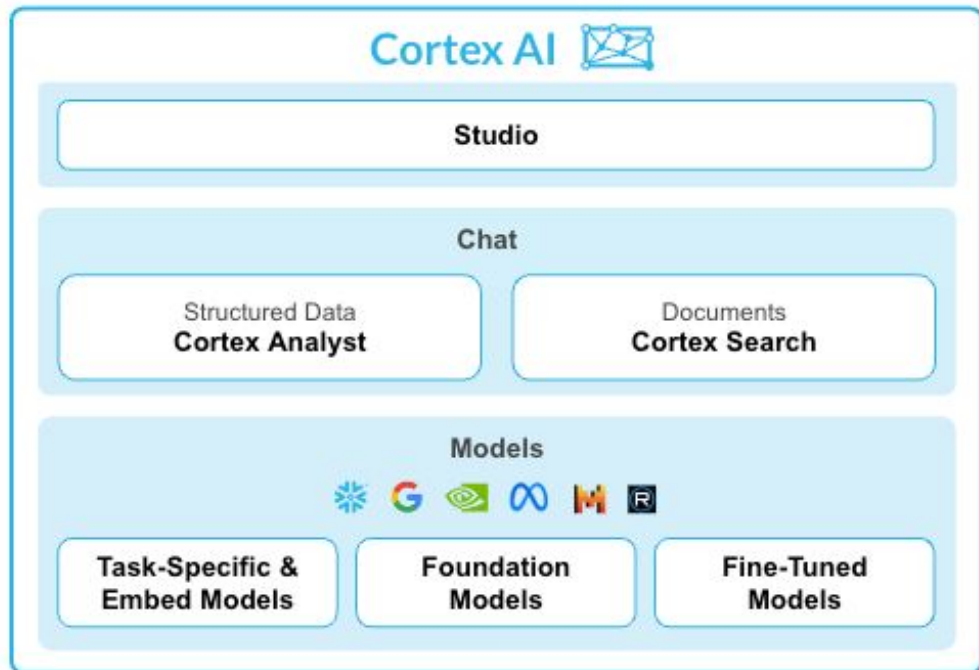
AVALANCHE_STAGE

Set Up Your Environment



- customer_reviews
- shipping_logs

Quick Recap: What is Snowflake Cortex?



https://quickstarts.snowflake.com/guide/getting_started_with_cortex_analyst

- **Cortex Analyst:** ask questions about structured data without writing SQL
"What were our total sales in Q2 by region?"
- **Cortex Search:** explore unstructured text documents
"What customer complaints mention late deliveries?"

Quick Recap: What is Snowflake Cortex?

Cortex – AI Tools



Easily generate and run SQL queries

Quickly parse documents and extract text

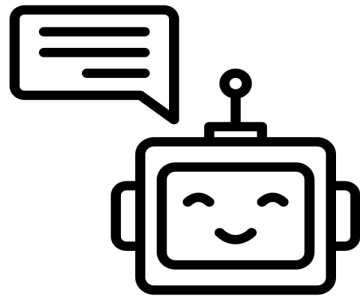
Summarize and classify content

Analyze data using LLM

Use GenAI As Your Coding Partner

Write SQL  Snowflake Notebook

Ask your GenAI app to refresh your memory on what those tables contain!



Use GenAI As Your Coding Partner

① Open a Snowflake Notebook

② Write Snowflake SQL  Ask your GenAI app to help



*Write Snowflake SQL
to show me a
preview of two tables
named
customer_reviews
and shipping_logs.*



```
DESC TABLE CUSTOMER_REVIEWS;  
DESC TABLE SHIPPING_LOGS;
```

Use GenAI As Your Coding Partner



"Write Snowflake SQL to join two tables—customer_reviews and shipping_logs—on order_id. Include review text, shipping date, carrier, and status."



```
CREATE OR REPLACE TABLE
merged_reviews AS
SELECT
    r.order_id,
    r.review_text,
    s.carrier,
    s.shipping_date,
    s.status
FROM
    customer_reviews r
JOIN
    shipping_logs s
ON
    r.order_id = s.order_id;
```

Use GenAI As Your Coding Partner

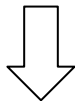
✓ Tables are merged

```
SELECT * FROM merged_reviews LIMIT 10;
```

Clean Up And Summarize The Customer Reviews

 Clean Data →  Better Sentiment Analysis

Spend time cleaning up the customer reviews



AI model for sentiment analysis



Quality of your results → Quality of your input data

Clean Up And Summarize The Customer Reviews



Clean Data →



Better Sentiment Analysis



Issue



Why it matters

Empty rows

Adds noise, no value

Inconsistent formatting

Affects pattern recognition



DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

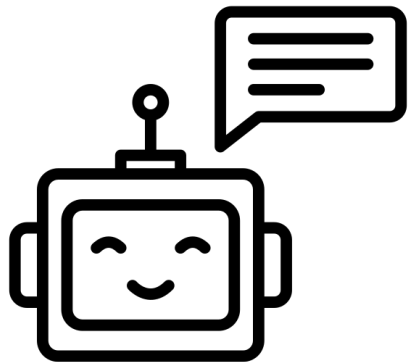
Sentiment Analysis with
Cortex

MVP Build Plan



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6. Create interface with a tab called "Data" that displays the head of the dataset
7. Deploy to cloud

How Else Can GenAI Support You?



- ✓ Ask what functions are available in Cortex
- ✓ Write and debug Python and Snowpark code
- ✓ Parse and extract data from complex fields
- ✓ Visualize the output in matplotlib or Streamlit
- ✓ Suggest error handling or model alternatives



DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

Data Visualization in
Snowflake

MVP Build Plan



1. Getting data into Snowflake ✓
2. Parsing and Structuring ✓
3. Clean up Data ✓
4. Analyze Data ✓
5. Visualize Results
6. Create interface with a tab called "Data" that displays the head of the dataset
7. Deploy to cloud



DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

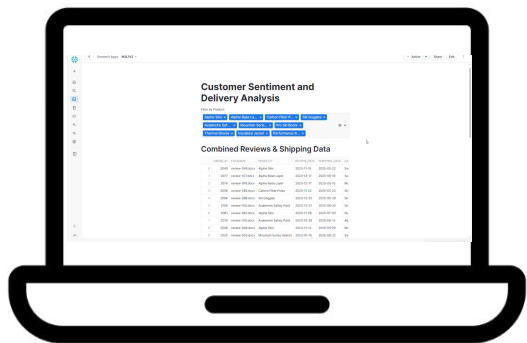
Building Your
AI-Powered Streamlit
App Inside Snowflake

MVP Build Plan



1. Getting data into Snowflake ✓
2. Parsing and Structuring ✓
3. Clean up Data ✓
4. Analyze Data ✓
5. Visualize Results ✓
6. Create interface with a tab called "Data" that displays the head of the dataset
7. Deploy to cloud

Starting a Snowflake Notebook



You'll write your entire Streamlit app as code in a notebook cell

① Set Up

Create a new notebook

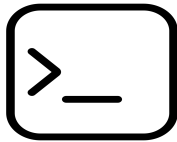
"Avalanche_App"

**Connected to
Avalanche database and schema*

Point it at the combined table

Create the App Shell

**② Create
just a basic
Streamlit shell**



"Write a Streamlit app that loads a table on Snowflake for sentiment analysis, shows some basic stats, and adds a title and sidebar."



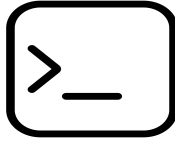
Python code (copy/paste the code)



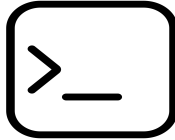
Run the cell

Create the App Shell

**② Create
just a basic
Streamlit shell**



"Help me fix this error:....."



"Can you rewrite this function to avoid this error?"

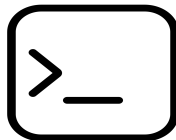
Add Visualizations

③ Add Visualizations

Use charts (created in earlier lessons)

- A line chart of shipments per day
- A bar chart of sentiment distribution
- Product-level stats or top-N product breakdowns

Ask GenAI:



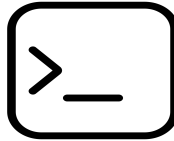
"Make a Streamlit line chart to show shipment."

```
st.line_chart(  
df.set_index("shipping_date")["shipment_count"])
```

Add Filters

④ Use Streamlit widgets

Ask GenAI:



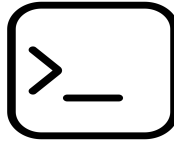
"Add a date and sentiment filter to my Streamlit app."

```
selected_date = st.date_input("Select a  
shipping date")  
  
filtered_df = df[df["shipping_date"] ==  
selected_date]  
  
st.dataframe(filtered_df)
```

Adding a Chatbot Data Assistant

⑤ Use Streamlit Cortex

Ask GenAI:



"Create a chatbot in Streamlit that uses Snowflake Cortex to answer questions about the clean_reviews table."

```
from snowflake.cortex import complete

response = complete(prompt=f"Answer this
question using the dataset:
{user_question}", model="gpt-3.5")

st.write(response['choices'][0]['text'])
```

Adding a Chatbot Data Assistant

install the snowflake-ml-python package
from the dropdown menu

Use

⑤ **Streamlit
Cortex**

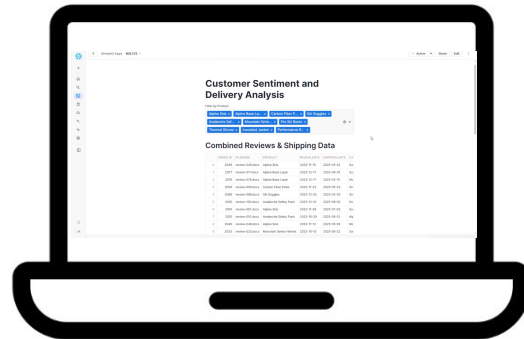
Ask Questions:

- "What's the average sentiment for Product A?"
- "Why were there fewer shipments on this date?"

Your Final Prototype

6

**Run the
Notebook**



M2/Lesson_02/M2L2V4.ipynb



DeepLearning.AI

Fast Prototyping of GenAI Apps with Streamlit

Lab 2 Overview– Using
Copilot for Sentiment
Analysis

Your Mission



Build a Product:

Intelligence Dashboard for Avalanche's product team



- Explore customer sentiment across time and regions
- Visualize trends in shipping delays and delivery performance
- Ask natural language questions

Your Mission



Build a Product:

Intelligence Dashboard for Avalanche's product team



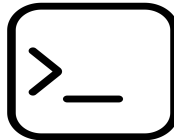
- Create new visualizations by combining sentiment and shipping data
- Build a filtered table
- Add a chatbot assistant
- Use GenAI heavily throughout the process

What You'll Do

① **Connect to Snowflake and Load Data**

Use your existing combined table

Ask GenAI:

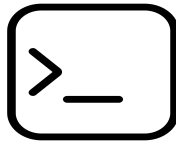


"Write Python code to connect to Snowflake and load the reviews_with_sentiment table into a Pandas DataFrame."

What You'll Do

② Create a New Streamlit App

Start a new notebook and ask GenAI:



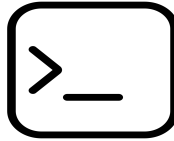
"Create a basic Streamlit app that loads my dataset and includes a sidebar with product filters."

Add a title, sidebar filters, and a data preview

What You'll Do

③ Visualize Sentiment by Region

Ask GenAI:



"Plot average sentiment score by region using matplotlib and Streamlit."

Your plot should help answer:

Which regions have the most negative feedback?

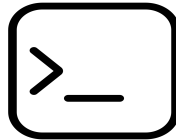
What You'll Do

④ Highlight Delivery Issues

Create a table that shows:

- product_id
- region
- delivery_status
- sentiment

Ask GenAI:

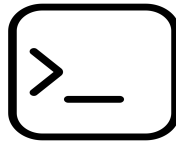


"Filter for reviews with negative sentiment and delivery issues. Show a table grouped by region and product_id."

What You'll Do

⑤ Add a Custom LLM-Powered Chatbot

Ask GenAI:

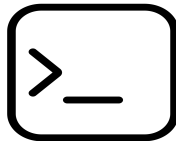


"Add a chatbot to my Streamlit app using Cortex complete"

What You'll Do

⑥ **Deploy or Share**

Ask GenAI:



"How do I deploy this Streamlit app in Snowflake?"

"Follow GenAI's steps to share the app"

Tips for Success



Use GenAI for every step



Keep your app simple and focused



Add comments to your code

Where to Start



In the course Github repo:

- M2/Lesson_02/Lab2/