📧 AI Email Assistant

1. Overview

The AI Email Assistant automatically fetches emails, analyses their **priority** and **sentiment**, generates **draft replies**, and provides a dashboard to review and edit them.

It consists of:

- A **backend service** (Gmail integration, processing, database).
- A **Streamlit dashboard** (for interaction and control).

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2. Architecture

🗂️ Project Structure

```
backend/
├── run_all.py          # Main entry point
├── gmail_utils.py      # Gmail authentication & fetch
├── email_tasks.py      # Database + processing logic
├── dashboard.py        # Streamlit dashboard
├── runtime_emails.db   # SQLite database (auto-created)
└── stop_flag.txt       # Stop signal (auto-created)
```

🔷 Components

- **Backend**: Handles Gmail fetch, database update, AI reply generation.
- **Database**: SQLite (reset on each run).
- **Dashboard**: Streamlit app for viewing, filtering, and editing emails.

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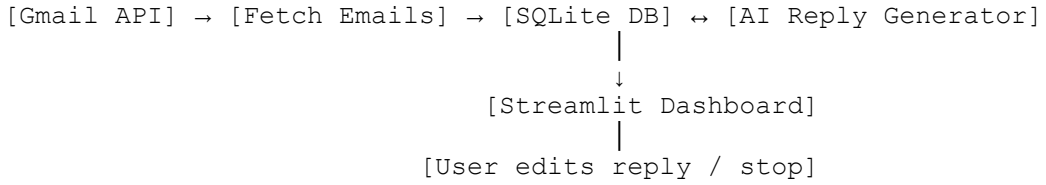
3. Workflow

```
flowchart TD
    A[Gmail API] --> B[Fetch Emails]
    B --> C[SQLite Database]
    C --> D[AI Reply Generator]
    D --> C
    C --> E[Streamlit Dashboard]
    E --> F[User edits reply / stops loop]
    F --> C
```

ASCII:



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4. Approach

1. **Fetch Emails**
   - Connect to Gmail API, retrieve latest `N` messages.
2. **Pre-process & Store**
   - Extract `sender`, `subject`, `body`.
   - Classify **priority** & **sentiment**.
   - Save into SQLite DB.
3. **Generate Replies**
   - Draft AI replies stored in DB under `ai_reply`.
4. **Dashboard**
   - Emails displayed with filters (priority/sentiment).
   - Users can edit AI replies.
   - Button available to **stop backend loop gracefully**.

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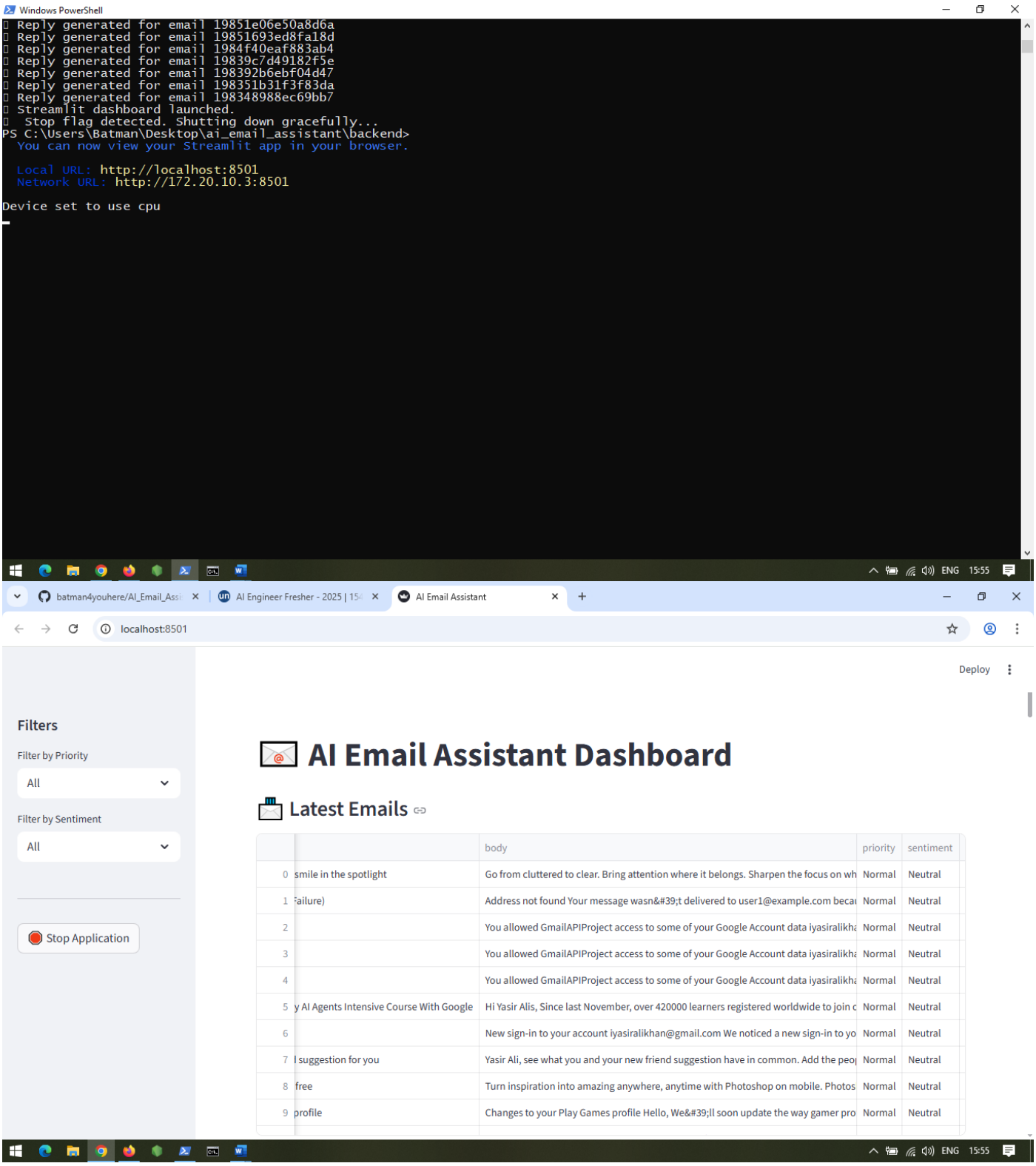
5. Key Design Choices

- ✅ **SQLite** for lightweight, resettable storage.
- ✅ **Stop flag file** (`stop_flag.txt`) for cross-process shutdown.
- ✅ **Streamlit** for rapid, interactive dashboard with minimal code.
- ✅ **Modular separation** for Gmail, DB tasks, and UI.

6. References

- Gmail API: https://developers.google.com/gmail/api
- OpenAI API: https://platform.openai.com/docs/api-reference
- Streamlit: https://docs.streamlit.io
- Hugging Face Transformers: https://huggingface.co/transformers

7. Screenshots


Windows PowerShell
Reply generated for email 19851e06e50a8d6a
Reply generated for email 19851693ed8fa18d
Reply generated for email 1984f40eaf883ab4
Reply generated for email 19839c7d49182f5e
Reply generated for email 198392b6ebf04d47
Reply generated for email 198351b31f3f83da
Reply generated for email 198348988ec69bb7
Streamlit dashboard launched.
Stop flag detected. Shutting down gracefully...
PS C:\Users\Batman\Desktop\ai_email_assistant\backend>
You can now view your Streamlit app in your browser.
Local URL: http://localhost:8501
Network URL: http://172.20.10.3:8501
Device set to use cpu
ENG 15:55
batman4youhere/AI_Email_Assi
AI Engineer Fresher - 2025 | 15
AI Email Assistant
localhost:8501
Deploy
Filters
Filter by Priority
All
Filter by Sentiment
All
Stop Application
AI Email Assistant Dashboard
Latest Emails
body
priority
sentiment
0 smile in the spotlight Go from cluttered to clear. Bring attention where it belongs. Sharpen the focus on wh Normal Neutral
1 ailure) Address not found Your message wasn't delivered to user1@example.com beca Normal Neutral
2 You allowed GmailAPIProject access to some of your Google Account data iyasiralikha Normal Neutral
3 You allowed GmailAPIProject access to some of your Google Account data iyasiralikha Normal Neutral
4 You allowed GmailAPIProject access to some of your Google Account data iyasiralikha Normal Neutral
5 y AI Agents Intensive Course With Google Hi Yasir Alis, Since last November, over 420000 learners registered worldwide to join c Normal Neutral
6 New sign-in to your account iyasiralikhan@gmail.com We noticed a new sign-in to yo Normal Neutral
7 l suggestion for you Yasir Ali, see what you and your new friend suggestion have in common. Add the peo Normal Neutral
8 free Turn inspiration into amazing anywhere, anytime with Photoshop on mobile. Photos Normal Neutral
9 profile Changes to your Play Games profile Hello, We'll soon update the way gamer pro Normal Neutral
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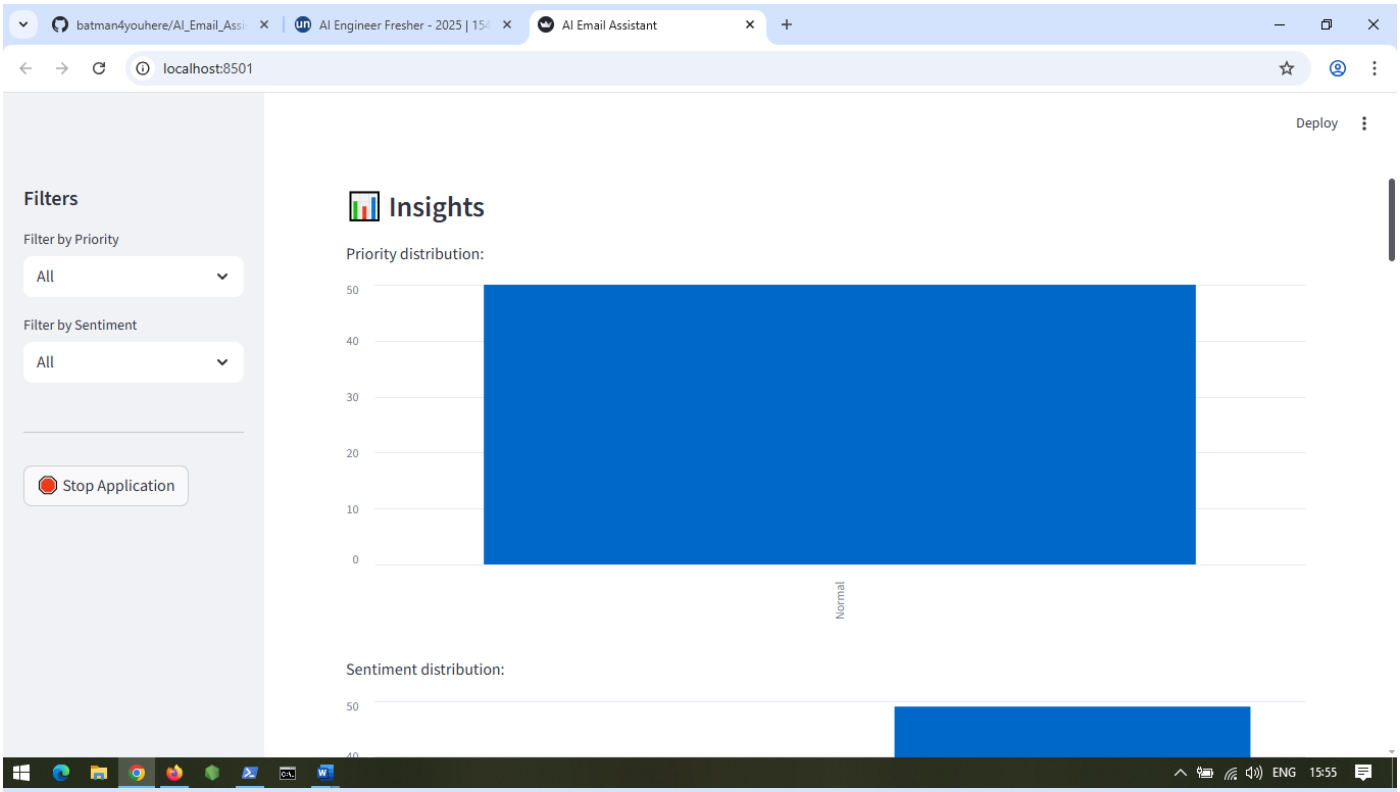
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AI Email Assistant
localhost:8501
Deploy
Filters
Filter by Priority
All
Filter by Sentiment
All
Stop Application
Insights
Priority distribution:
50
40
30
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10
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Normal
Sentiment distribution:
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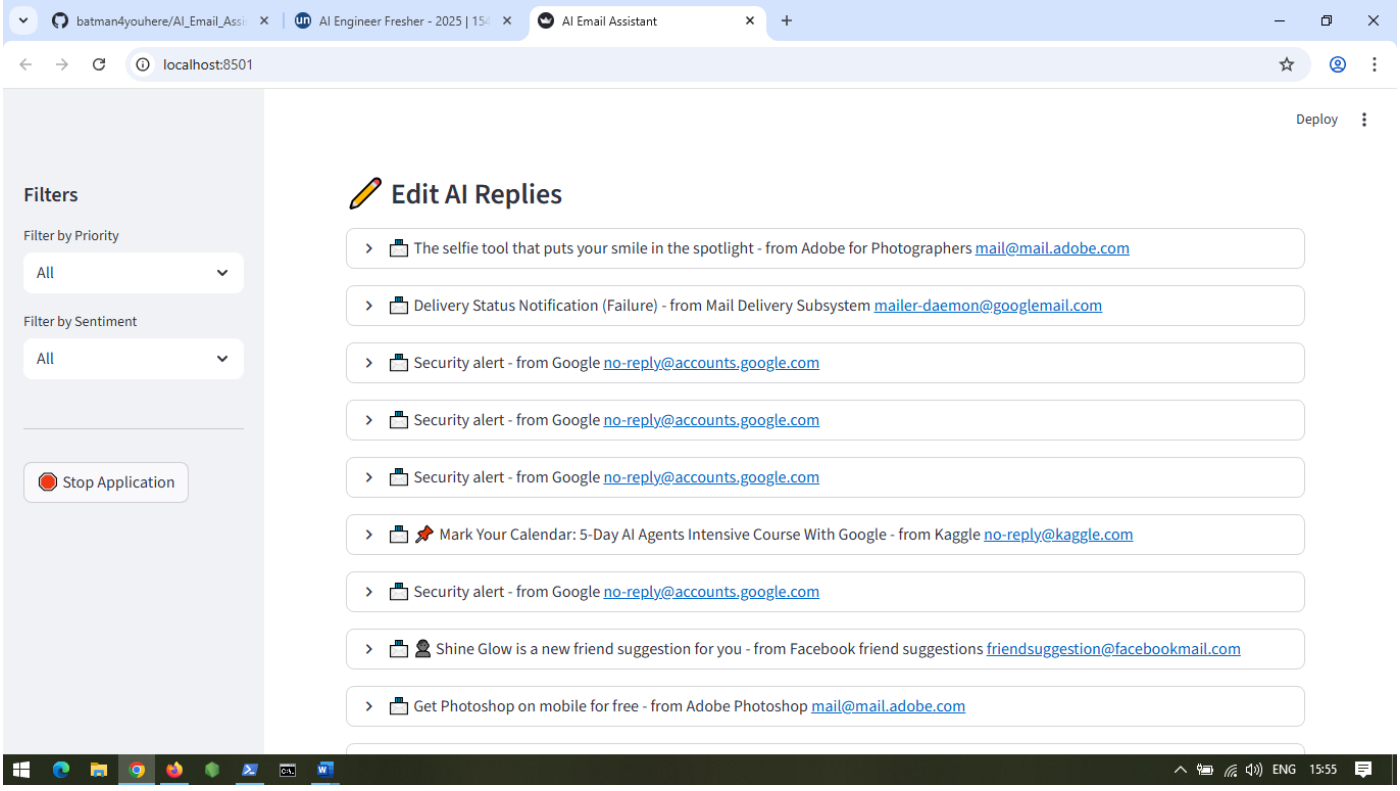
batman4youhere/AI_Email_Assi
AI Engineer Fresher - 2025 | 15
AI Email Assistant
localhost:8501
Deploy
Filters
Filter by Priority
All
Filter by Sentiment
All
Stop Application
Edit AI Replies
The selfie tool that puts your smile in the spotlight - from Adobe for Photographers mail@mail.adobe.com
Delivery Status Notification (Failure) - from Mail Delivery Subsystem mailer-daemon@googlemail.com
Security alert - from Google no-reply@accounts.google.com
Security alert - from Google no-reply@accounts.google.com
Security alert - from Google no-reply@accounts.google.com
Mark Your Calendar: 5-Day AI Agents Intensive Course With Google - from Kaggle no-reply@kaggle.com
Security alert - from Google no-reply@accounts.google.com
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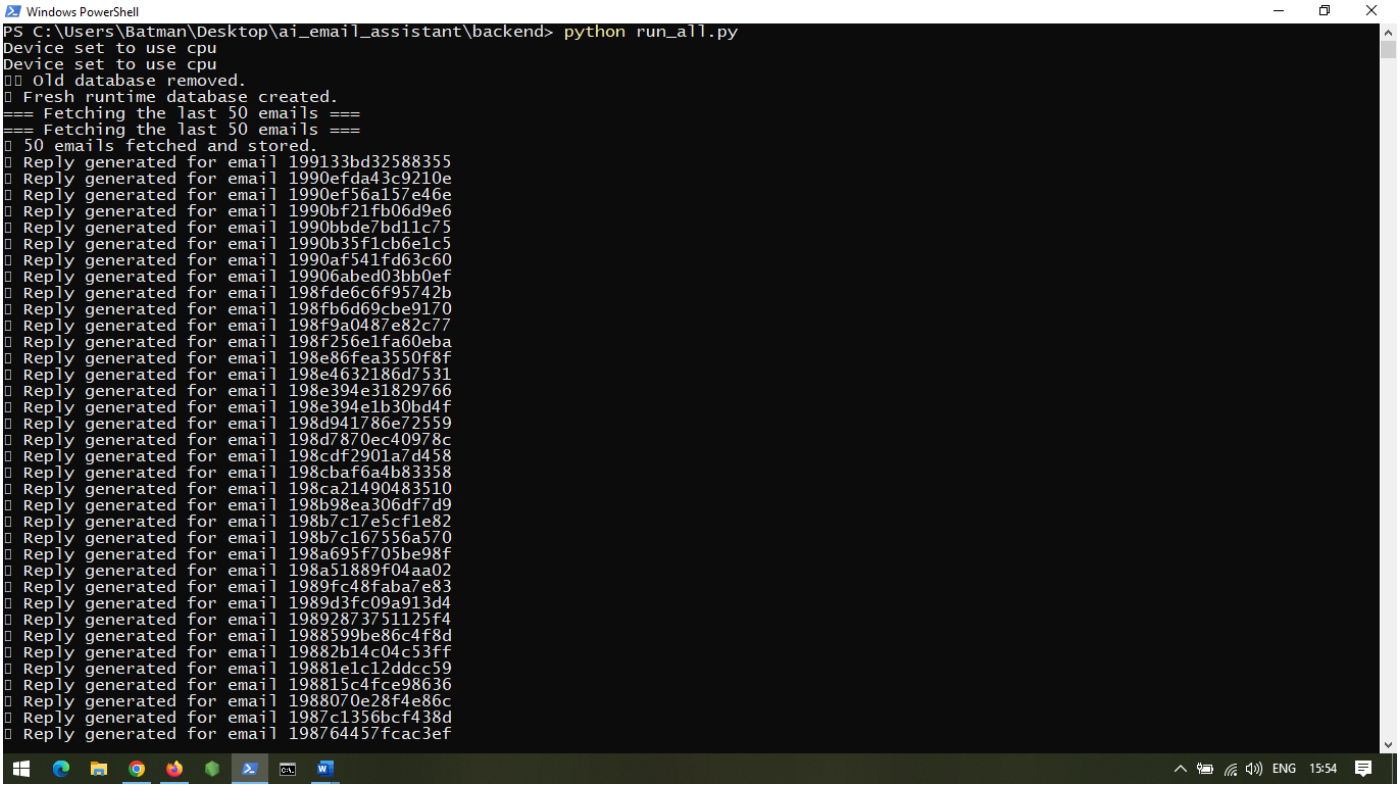
Windows PowerShell
PS C:\Users\Batman\Desktop\ai_email_assistant\backend> python run_all.py
Device set to use cpu
Device set to use cpu
Old database removed.
Fresh runtime database created.
=== Fetching the last 50 emails ===
=== Fetching the last 50 emails ===
50 emails fetched and stored.
Reply generated for email 199133bd32588355
Reply generated for email 1990efda43c9210e
Reply generated for email 1990ef56a157e46e
Reply generated for email 1990bf21fb06d9e6
Reply generated for email 1990bbde7bd11c75
Reply generated for email 1990b35f1cb6e1c5
Reply generated for email 1990af541fd63c60
Reply generated for email 19906abed03bb0ef
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Reply generated for email 198ca21490483510
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Reply generated for email 198764457fcac3ef
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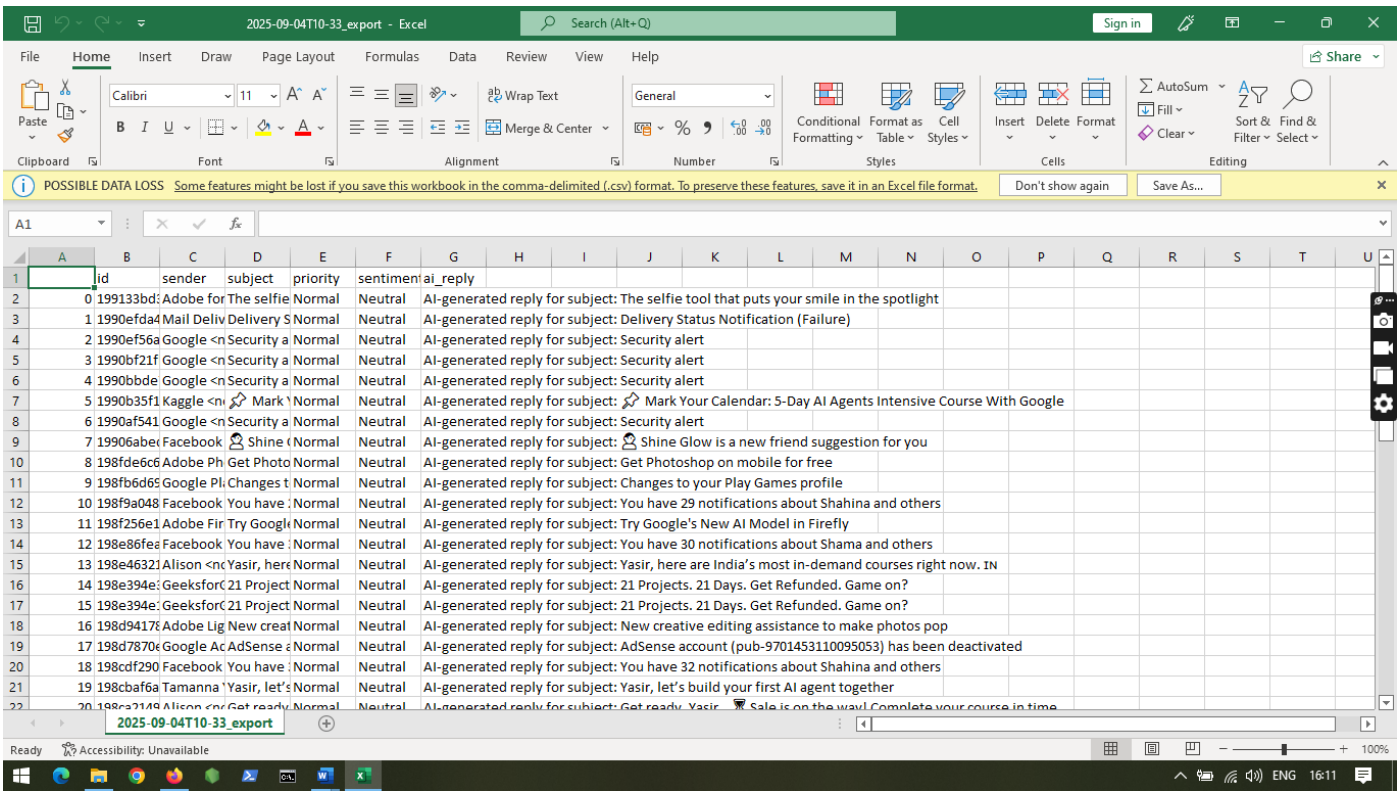
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Format as Table
Cell Styles
Insert Delete Format
AutoSum
Fill
Clear
Sort & Filter
Find & Select
Clipboard Font Alignment Number Styles Cells Editing
POSSIBLE DATA LOSS Some features might be lost if you save this workbook in the comma-delimited (.csv) format. To preserve these features, save it in an Excel file format.
Don't show again
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0 199133bd: Adobe for The selfie Normal Neutral AI-generated reply for subject: The selfie tool that puts your smile in the spotlight
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2 1990ef56a Google <n Security a Normal Neutral AI-generated reply for subject: Security alert
3 1990bf21f Google <n Security a Normal Neutral AI-generated reply for subject: Security alert
4 1990bbde Google <n Security a Normal Neutral AI-generated reply for subject: Security alert
5 1990b35f1 Kaggle <n Mark ' Normal Neutral AI-generated reply for subject: Mark Your Calendar: 5-Day AI Agents Intensive Course With Google
6 1990af541 Google <n Security a Normal Neutral AI-generated reply for subject: Security alert
7 19906abe(Facebook Shine (Normal Neutral AI-generated reply for subject: Shine Glow is a new friend suggestion for you
8 198fde6c6 Adobe Ph Get Photo Normal Neutral AI-generated reply for subject: Get Photoshop on mobile for free
9 198fb6d65 Google Pl Changes t Normal Neutral AI-generated reply for subject: Changes to your Play Games profile
10 198f9a048 Facebook You have Normal Neutral AI-generated reply for subject: You have 29 notifications about Shahina and others
11 198f256e1 Adobe Fir Try Google Normal Neutral AI-generated reply for subject: Try Google's New AI Model in Firefly
12 198e86fea Facebook You have Normal Neutral AI-generated reply for subject: You have 30 notifications about Shama and others
13 198e46321 Alison <nc Yasir, here Normal Neutral AI-generated reply for subject: Yasir, here are India's most in-demand courses right now. IN
14 198e394e: Geeksfor(21 Project Normal Neutral AI-generated reply for subject: 21 Projects. 21 Days. Get Refunded. Game on?
15 198e394e: Geeksfor(21 Project Normal Neutral AI-generated reply for subject: 21 Projects. 21 Days. Get Refunded. Game on?
16 198d9417& Adobe Lig New creat Normal Neutral AI-generated reply for subject: New creative editing assistance to make photos pop
17 198d7870(Google Ac AdSense a Normal Neutral AI-generated reply for subject: AdSense account (pub-9701453110095053) has been deactivated
18 198cdf290 Facebook You have Normal Neutral AI-generated reply for subject: You have 32 notifications about Shahina and others
19 198cbaf6a Tamanna ' Yasir, let's Normal Neutral AI-generated reply for subject: Yasir, let's build your first AI agent together
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