**You said:**

Okay I am a digital humanities student and im doing topic modelling using python but before i write my code can you please explain what topic modelling is and what is does all the basic

**ChatGPT said:**

Absolutely! Topic modeling is a powerful technique used in **Natural Language Processing (NLP)** and **Digital Humanities** to uncover hidden themes or topics in a large collection of texts (called a **corpus**). Let’s break it down simply:

**🧠 What Is Topic Modeling?**

**Topic modeling** is an **unsupervised machine learning** method that automatically identifies groups of words (called **topics**) that frequently occur together in documents. These topics help summarize and understand the large corpus without needing to read every single document.

**📚 What Is a "Topic"?**

A **topic** is not a label like "sports" or "politics" — instead, it's a **group of words** that appear together often. For example:

* Topic 1: ['ball', 'team', 'goal', 'score', 'player']
* Topic 2: ['election', 'vote', 'government', 'president', 'policy']

The human analyst (you!) interprets these word clusters and gives them meaning like “sports” or “politics”.

**🔍 What Does Topic Modeling Do?**

* **Discovers hidden themes** in a corpus.
* **Groups similar documents** based on shared topics.
* **Shows how topics change over time** or differ across authors, publications, etc.
* Helps in **summarizing, organizing, and exploring** textual data.

**🧰 Common Algorithms for Topic Modeling**

The most popular one (and probably what you're using) is:

**LDA – Latent Dirichlet Allocation**

* It assumes each document is made of a **mixture of topics**, and each topic is a **distribution over words**.
* It tries to "reverse engineer" the topics by analyzing which words appear together in documents.

**🗃️ Inputs and Outputs of LDA**

| **Step** | **What It Is** | **Example** |
| --- | --- | --- |
| **Input** | Corpus of text documents | News articles, tweets, academic papers |
| **Preprocessing** | Clean text (remove stopwords, punctuation, lemmatize) | "The cat is sleeping" → "cat sleep" |
| **Model Output** | Topics and their top words | Topic 1: ['war', 'army', 'soldier'] |
| **Document Output** | Topic distribution for each document | Doc A: 70% Topic 1, 30% Topic 2 |

**🧑🏽‍🏫 Why Use Topic Modeling in Digital Humanities?**

* To explore **themes in historical archives** or **literature**.
* To track how **discourse changes** over time (e.g., “freedom” in newspapers from 1800–2000).
* To categorize **media, blogs, interviews**, or **social media posts**.
* To support **qualitative analysis** with quantitative evidence.

**🛠️ Tools in Python**

* gensim: Library for building topic models, especially LDA.
* scikit-learn: For alternative models like NMF (Non-negative Matrix Factorization).
* BERTopic: Uses BERT embeddings + clustering for more semantic topic modeling.
* pyLDAvis: Visualizes topic-word relationships interactively.

Let me know if you want me to walk you through:

* Preprocessing text for topic modeling,
* Writing an LDA model in Python,
* Interpreting or visualizing the output,
* Or using BERTopic for a more modern approach.

Would you like to start coding next?

**You said:**

stop\_words = { 'i', 'me', 'my', 'myself', 'we', 'our', 'ours', 'ourselves', 'you', 'your', 'yours', 'yourself', 'yourselves', 'he', 'him', 'his', 'himself', 'she', 'her', 'hers', 'herself', 'it', 'its', 'itself', 'they', 'them', 'their', 'theirs', 'themselves', 'what', 'which', 'who', 'whom', 'this', 'that', 'these', 'those', 'am', 'is', 'are', 'was', 'were', 'be', 'been', 'being', 'have', 'has', 'had', 'having', 'do', 'does', 'did', 'doing', 'a', 'an', 'the', 'and', 'but', 'if', 'or', 'because', 'as', 'until', 'while', 'of', 'at', 'by', 'for', 'with', 'about', 'against', 'between', 'into', 'through', 'during', 'before', 'after', 'above', 'below', 'to', 'from', 'up', 'down', 'in', 'out', 'on', 'off', 'over', 'under', 'again', 'further', 'then', 'once', 'here', 'there', 'when', 'where', 'why', 'how', 'all', 'any', 'both', 'each', 'few', 'more', 'most', 'other', 'some', 'such', 'no', 'nor', 'not', 'only', 'own', 'same', 'so', 'than', 'too', 'very', 's', 't', 'can', 'will', 'just', 'don', 'should', 'now' } okay o now ive stated to write my code first i need to remove the stop words from my csv file and this is the stop words im using dont give me the code but tell me methords on how i can remove stop words

**ChatGPT said:**

Great! You're off to a solid start with your list of stop words. Since you're working with a CSV file and want to remove stop words from text data using Python (likely with pandas), here are **three main methods** you can use — not code, just the ideas:

**✅ 1. Tokenization + Filtering**

* **What:** Break each sentence into words (tokens), then filter out the ones in your stop\_words set.
* **How:** For each row (or column with text), split the text into a list of words → remove words that exist in your stop\_words set → join the list back into a string if needed.
* **Tools:** Native Python .split() or libraries like nltk.word\_tokenize() or spacy.

**✅ 2. Vectorization with Built-In Stop Word Removal**

* **What:** If you plan to use a tool like CountVectorizer or TfidfVectorizer from sklearn, you can either pass your stop\_words set directly or use "english" to remove common stop words during vectorization.
* **Why Useful:** This skips the manual cleaning step if you're jumping straight into modeling.

**✅ 3. Apply a Cleaning Function in a DataFrame**

* **What:** Write a function that:
  1. Lowercases the text
  2. Removes punctuation (optional)
  3. Splits it into words
  4. Removes stop words
  5. Joins it back
* Then **apply** this function to the text column in your DataFrame using .apply().

**🧠 Bonus Tips:**

* Make sure you **normalize** the text first (e.g., lowercase) so your stop words match.
* You can expand your stop words list if you notice other common but non-informative words in your specific corpus.
* If you're using multiple columns or very long documents, consider working with **lemmatization** or **stemming** before filtering stop words.

Let me know when you're ready for a code walkthrough or want to move on to the next step like vectorizing or topic modeling!

**You said:**

### 1\. \*\*Tokenization + Filtering\*\* \* \*\*What:\*\* Break each sentence into words (tokens), then filter out the ones in your `stop\_words` set. \* \*\*How:\*\* For each row (or column with text), split the text into a list of words → remove words that exist in your `stop\_words` set → join the list back into a string if needed. \* \*\*Tools:\*\* Native Python `.split()` or libraries like `nltk.word\_tokenize()` or `spacy`.

for this can BERT be used?

**ChatGPT said:**

Great question!

When it comes to the **"Tokenization + Filtering"** method specifically (breaking a sentence into words and removing stop words), **BERT is generally *not* used for that step** — here's why:

**🧠 BERT is Not Meant for Basic Tokenization + Filtering**

**BERT (Bidirectional Encoder Representations from Transformers)** is a **deep learning model** designed to understand the context and meaning of words in a sentence. It's **not meant for simple text cleaning tasks** like:

* Removing stop words
* Lowercasing
* Removing punctuation
* Basic word tokenization

These are **preprocessing steps** that happen **before** you ever input text into BERT.

**🛠 What Does BERT Actually Do?**

* BERT uses **subword tokenization** (WordPiece), which breaks text into chunks like ["play", "##ing"].
* It's used when you want **semantic embeddings** (vector representations that capture meaning/context), **not** just word lists.
* Example: In **BERTopic**, BERT is used to create embeddings for entire documents which are then clustered to discover topics.

**✅ So What Should You Use for Stop Word Removal?**

Use tools like:

* nltk
* spaCy
* re for regex-based cleaning
* Python's built-in split() + your stop\_words set

These are **lightweight** and fast for stop word filtering.

**When to Use BERT Instead?**

Use BERT when you are ready for:

* Semantic search
* Sentence/document embeddings
* Context-aware topic modeling (like with BERTopic)
* Advanced classification tasks

**Summary**

| **Task** | **Use BERT?** | **Better Tool** |
| --- | --- | --- |
| Removing stop words | ❌ No | nltk, spaCy, Python |
| Word-level tokenization | ❌ No | nltk, spaCy |
| Getting semantic embeddings | ✅ Yes | BERT |
| Topic modeling with meaning | ✅ Yes | BERTopic (uses BERT) |

Let me know if you’d like to see how to combine BERT embeddings with topic modeling next!

**You said:**

Python's built-in `split()` + your `stop\_words` set

how should i use this?

**ChatGPT said:**

Perfect! You want to use **Python's built-in**split() along with your stop\_words set to clean up text by removing common, unhelpful words. Here’s a **step-by-step guide** on how to **think through and structure this** in your code — without jumping straight to syntax.

**🧠 Goal:**

For each piece of text (e.g., a document, sentence, or paragraph):

1. Break the text into words.
2. Remove any word that appears in your stop\_words set.
3. Join the cleaned words back into a string (optional, but helpful for further processing).

**🪜 Step-by-Step Logic:**

**🔹 Step 1: Load your CSV**

* Use pandas to load your CSV into a DataFrame.
* Identify which column contains the text you want to clean.

**🔹 Step 2: Define a Cleaning Function**

* The function should:
  + Lowercase the text (to match your stop words)
  + Use .split() to tokenize (basic space-based splitting)
  + Use a list comprehension or loop to remove stop words
  + Optionally: rejoin the cleaned words using " ".join()

**🔹 Step 3: Apply to Your DataFrame**

* Use df['your\_column'].apply(cleaning\_function) to apply it to your text data.

**🔍 Example Input and Output**

**Input:**

text

CopyEdit

"This is a very important piece of historical writing about the war."

**After**.split()**+ stop word removal:**

python

CopyEdit

['important', 'piece', 'historical', 'writing', 'war']

**Optional final string:**

text

CopyEdit

"important piece historical writing war"

**🧼 Bonus Cleaning Tips:**

* Strip punctuation using string.punctuation or regex.
* Remove numbers if they aren’t important.
* Consider lemmatizing (using nltk or spacy) if your project needs normalized word forms.

Would you like help writing the actual cleaning function or seeing how this fits into a full topic modeling pipeline?

**You said:**

i have a code from my dh class which is used to clear up stop words this is the code "df = df[~df['1-gram'].isin(custom\_stopwords)]" i modified this code so it could remove the stop words from my code and this was the code i wrote "cols = ["topic\_1", "topic\_2", "topic\_3", "topic\_4"] for col in cols: df = df[~df[col].isin(stop\_words)]" but there is just one problem that when im running the code its removing the whole row where there are any stop words and i dont want my code to do that i only want to replace/remove the stop words what should i do how can i make my code better

**ChatGPT said:**

You're very close! The problem comes from this line:

python

CopyEdit

df = df[~df[col].isin(stop\_words)]

**❗ What it’s doing:**

This code **removes the entire row** from your DataFrame if the cell in that column matches a stop word **exactly**.

That made sense in your original class example, where '1-gram' contained **just one word per row**. But in your case — where each cell in "topic\_1" to "topic\_4" contains **text strings** — you don't want to delete the row, you want to **edit the cell content**.

**✅ What you want instead:**

You want to:

* **Look inside each cell** of those "topic\_\*" columns,
* **Find words** that are in stop\_words,
* **Remove or blank out** those stop words,
* **Keep everything else (especially the row itself)**.

**✅ How to do it without deleting rows:**

Let’s use a method that keeps your rows intact and just **replaces stop words with empty strings** inside the cells — using str.replace() and regular expressions:

python

CopyEdit

import re def remove\_stopwords(text): if not isinstance(text, str): return text for word in stop\_words: # \b = word boundary, to avoid deleting partial matches text = re.sub(rf'\b{re.escape(word)}\b', '', text, flags=re.IGNORECASE) # Clean up extra spaces return re.sub(r'\s+', ' ', text).strip() cols = ["topic\_1", "topic\_2", "topic\_3", "topic\_4"] for col in cols: df[col] = df[col].apply(remove\_stopwords)

**🔍 What This Fix Does:**

* **Keeps all your rows** — no deletion.
* Removes only **exact word matches** from inside strings.
* Ignores case ("The" and "the" are treated the same).
* Cleans up extra spaces.

Let me know if your columns contain **lists** instead of **text strings** — the solution is a little different in that case!

**You said:**

i was searching on google what i can use to modify my homework code and i saw that people use "lambda" what is that and how is it used and can it be used to modify my code?

**(Entry 1)ChatGPT said:**

Great question! You're now stepping into **intermediate Python** — and yes, lambda can definitely help **clean up or simplify** your code!

**💡 What is a**lambda**Function?**

A lambda is a **short, anonymous function** in Python. It’s used when you need a function **for a very short time** — especially inside methods like .apply(), .map(), or sorted().

**🔍 Regular Function vs Lambda**

python

CopyEdit

# Regular function def square(x): return x \* x # Lambda version lambda x: x \* x

Both do the same thing — take an input x and return x \* x. But with lambda, you don’t name it — you just define it and use it immediately.

**✅ How You Might Use It in Your Case**

You’re applying a function to each value in columns like "topic\_1", "topic\_2"...

Instead of defining a full function like this:

python

CopyEdit

def remove\_stopwords(text): ...

You can use lambda like this:

python

CopyEdit

df[col] = df[col].apply(lambda text: your\_logic\_here)

**🛠️ Example for Your Homework**

Let’s say your homework is to **remove stop words from each cell** in a column. Here's how you could do it with a lambda:

**✨ With**lambda**+ regex:**

python

CopyEdit

import re cols = ["topic\_1", "topic\_2", "topic\_3", "topic\_4"] for col in cols: df[col] = df[col].apply( lambda text: re.sub( r'\b(?:' + '|'.join(re.escape(word) for word in stop\_words) + r')\b', '', text, flags=re.IGNORECASE ).strip() )

**🔍 What this does:**

* Builds a regex like \b(this|is|a|stop|word)\b to match any stop word.
* Replaces them with "" (empty string).
* Works **inside**.apply(), with lambda handling each cell.
* It’s a **compact** way of doing what we did earlier with a named function.

**✅ When to Use**lambda

Use it when:

* You’re applying a **simple function**.
* You don’t need to reuse the function elsewhere.
* You want to keep your code short and readable.

Avoid it if:

* The logic is complex (then a named def function is better for clarity).

Would you like me to rewrite your full stop-word-removal code with a lambda approach from top to bottom?

**You said:**

what does .copy() do in a code?

**ChatGPT said:**

Great question! .copy() is a very **important** tool in Python, especially when you're working with **Pandas DataFrames** or **lists**. It helps you **avoid accidental changes** to your original data.

**🧠 Basic Idea:**

When you write something like:

python

CopyEdit

df2 = df1

You're not creating a **new DataFrame** — you're just creating a **second name for the same thing**. So if you change df2, df1 also changes, because they both point to the **same object**.

**✅ What**.copy()**Does:**

python

CopyEdit

df2 = df1.copy()

This makes a **true copy** — a completely **separate object** in memory. Now you can safely edit df2 without touching df1.

**🔍 Visual Example:**

**Without**.copy()**:**

python

CopyEdit

df2 = df1 df2['col'] = df2['col'] \* 2 # df1 is also changed 😱

**With**.copy()**:**

python

CopyEdit

df2 = df1.copy() df2['col'] = df2['col'] \* 2 # df1 stays the same 😎

**🔬 When to Use**.copy()

Use .copy() when:

* You want to **preserve the original** data.
* You're **cleaning or transforming** data for analysis.
* You're making a **temporary version** for visualization or testing.

**💡 Bonus Tip:**

For deep structures (like nested lists or DataFrames with objects inside), .copy() does a **shallow copy** — which is usually enough. But for very deep structures, you can use:

python

CopyEdit

import copy deep\_copy = copy.deepcopy(original)

Let me know if you want an example with nested lists or DataFrames!

**You said:**

if i want to make multiple small graphs what do i use?

**ChatGPT said: (entry 2)**

If you want to make **multiple small graphs** (often called **"small multiples"** or **"faceted plots"**), the best tools depend on the library you're using in Python.

Here are your **best options**:

**✅ 1. Matplotlib — Manually control layout using**plt.subplots()

If you want full control over each graph:

python

CopyEdit

import matplotlib.pyplot as plt fig, axes = plt.subplots(nrows=2, ncols=2, figsize=(10, 8)) # 2x2 grid = 4 small graphs # Example usage: axes[0, 0].plot(data1) axes[0, 1].bar(data2) axes[1, 0].scatter(x, y) axes[1, 1].hist(data3) plt.tight\_layout() plt.show()

**✅ 2. Seaborn — Easy faceted plots using**FacetGrid**or**catplot()

This is great for **categorical comparisons** or visualizing a column split by another column.

python

CopyEdit

import seaborn as sns g = sns.FacetGrid(df, col="category") # one plot per category g.map(sns.histplot, "value\_column")

Or:

python

CopyEdit

sns.catplot(data=df, x="x", y="y", col="group", kind="bar")

**✅ 3. Plotly — For interactive subplots**

If you’re using Plotly and want interactive small graphs:

python

CopyEdit

from plotly.subplots import make\_subplots import plotly.graph\_objects as go fig = make\_subplots(rows=2, cols=2) fig.add\_trace(go.Scatter(y=[1, 3, 2]), row=1, col=1) fig.add\_trace(go.Bar(y=[5, 3, 6]), row=1, col=2) fig.add\_trace(go.Box(y=[7, 8, 5]), row=2, col=1) fig.add\_trace(go.Histogram(x=[1,2,2,3]), row=2, col=2) fig.show()

**🧠 Summary: What to Use Based on Style**

| **Want...** | **Use** |
| --- | --- |
| Simple, static plots | matplotlib |
| Automatic faceting by category | seaborn.FacetGrid |
| Interactive small multiples | plotly.subplots |

Let me know your data type or goal (e.g. "I want to plot topic frequency per year in small graphs"), and I can suggest a more tailored approach!

**You said:**

which one would be the best fit if i were to make multiple graphs

**ChatGPT said:**

Great — here’s a direct answer based on **your context** as a Digital Humanities student working with **text analysis and topic modeling**:

**🎯 If you're making multiple small graphs to compare things like:**

* Topic frequency across different documents
* Keyword trends over time
* Word distributions per topic
* TF-IDF values per topic
* BERTopic topic trends

**✅ Best Fit: Plotly with**make\_subplots()

Because:

* It's **interactive** (you can hover, zoom, etc.)
* Easy to arrange small graphs in **custom grids**
* Great for **presentations and dashboards**
* Works well with **text-heavy or time-series data**

**➕ Bonus: You can link it with**BERTopic**'s interactive outputs if needed.**

**🟢 Also Great: Seaborn with**FacetGrid()

If:

* You want **quick comparisons** across categories (like topics or years)
* You don’t need interactivity
* Your data is in a tidy DataFrame (e.g., one row per document, with topic/year/etc.)

**❌ Probably Not Ideal:**

* matplotlib by itself → Too manual and not beautiful by default.
* pandas.plot() → Good for fast checks, but limited for layout and customization.

**🔧 Recommendation:**

If you’re creating something for a **report, class project, or interactive story** → use **Plotly**.

If you're exploring data quickly or making a **static report** → use **Seaborn**.

If you tell me **what exactly you want to compare** (e.g. topic frequency per year), I can show you a Plotly or Seaborn code snippet to get started.

**You said:**

I have a dataset with topics and it has day, year and moth in that data set. I want to visualize column with year and month so it would later help me group them as month and then i also want to convert the year and month to strings, adds a dash and makes sure that month is of two digits. How do I approach this task using Python visualization tools like Plotly Express? Please teach the process conceptually and explain what steps I should take to prepare the data and create an effective bar chart,

**ChatGPT said: (entry 3)**

That's a great data storytelling and visualization goal — you're working toward understanding **how topics or data trends change over time**, grouped **by month and year**. Here's how to do it **conceptually step-by-step**, using **Plotly Express**, which is a powerful, easy-to-use tool for quick visualizations.

**🧠 GOAL:**

Make a **bar chart** with x-axis = "Year-Month" and y-axis = some count/value (e.g., topic frequency), using **Plotly Express**, and **format the date nicely** like "2024-05".

**🧱 STEP 1: Understand Your Data**

Let’s assume your dataset looks like this:

| **topic** | **year** | **month** | **day** | **count** |
| --- | --- | --- | --- | --- |
| topic\_1 | 2024 | 5 | 12 | 4 |
| topic\_2 | 2024 | 5 | 15 | 2 |
| topic\_1 | 2024 | 6 | 3 | 7 |

You want to group this data **by**year**and**month to show **total counts per topic** per month.

**🪄 STEP 2: Format the**year-month**column**

Conceptually:

* Convert month to a 2-digit string: "05" instead of "5".
* Convert both year and month to strings and **concatenate** with a -.

python

CopyEdit

df['year'] = df['year'].astype(str) df['month'] = df['month'].astype(str).str.zfill(2) # ensures 2 digits like '05' df['year\_month'] = df['year'] + '-' + df['month']

Now df['year\_month'] will look like: "2024-05", "2024-06", etc.

**📊 STEP 3: Group the data**

Conceptually:

* You likely want to **sum** or **count** something (e.g., number of documents per topic per month).

Example:

python

CopyEdit

grouped\_df = df.groupby(['year\_month', 'topic']).agg({'count': 'sum'}).reset\_index()

This gives you one row per topic per month with a total count.

**🎨 STEP 4: Plot it using Plotly Express**

Conceptually:

* X-axis = year\_month (time)
* Y-axis = count (frequency)
* color='topic' to show multiple topics

python

CopyEdit

import plotly.express as px fig = px.bar( grouped\_df, x='year\_month', y='count', color='topic', title='Topic Frequency Over Time (Grouped by Month)', labels={'year\_month': 'Year-Month', 'count': 'Frequency'} ) fig.update\_layout(xaxis\_tickangle=-45) # make x-axis labels readable fig.show()

**✅ Summary of the Full Process**

| **Step** | **Description** |
| --- | --- |
| 1. | Convert year and month to strings |
| 2. | Format them as "YYYY-MM" |
| 3. | Group by year\_month and topic (or just year\_month) |
| 4. | Sum counts or calculate values |
| 5. | Plot using plotly.express.bar() |

**🔁 Example Use Cases:**

* Track topic mentions per month
* Track article counts or word counts by time
* Visualize sentiment or keyword usage over months

If you give me a few sample rows of your data or tell me what your y value should be (e.g. count, frequency, TF-IDF score), I can give you tailored code too.

**You said:**

.zfill(2)

what is this used for?

**ChatGPT said:**

Great question!

**🔤**.zfill(2)**is a string method in Python used to pad a number (as a string) with leading zeros until it's 2 digits long.**

**🧠 Why it’s used:**

In date formatting, you often want months like:

* "05" instead of "5"
* "09" instead of "9"

This is important for:

* **Sorting** (so "05" comes before "10" properly)
* **Standard formatting** (like YYYY-MM)
* **Consistency** in time series visualizations

**✅ Example:**

python

CopyEdit

month = "5" month.zfill(2) # Output: '05'

Another one:

python

CopyEdit

"9".zfill(2) → '09' "12".zfill(2) → '12' (unchanged because it's already 2 digits)

**📌 In Your Case:**

You’d use it like this to make sure all months are two digits before combining with the year:

python

CopyEdit

df['month'] = df['month'].astype(str).str.zfill(2)

This guarantees that "5" becomes "05", which is perfect for creating a clean YYYY-MM format.

Let me know if you want to see how it behaves with a list of months!

**You said:**

on my x axis the labels are getting crowded is there any way i can lessen the clutter?

**ChatGPT said: (entry 4)**

Yes! When you're plotting time-series data (like year-month) on the x-axis and the labels get **too crowded**, you can reduce clutter using several smart techniques — especially with **Plotly Express**.

**✅ Here are the best ways to fix crowded x-axis labels:**

**1. Rotate the Labels**

Makes them readable without overlapping.

python

CopyEdit

fig.update\_layout(xaxis\_tickangle=-45)

You can change -45 to -30, -90, or 0 depending on your preference.

**2. Show Fewer Ticks**

Reduces how many labels are actually shown on the x-axis.

python

CopyEdit

fig.update\_xaxes(tickmode='linear', dtick=2)

🔹 dtick=2 shows every 2nd tick.  
🔹 You can also try dtick=3 or higher depending on how many months/years you have.

**3. Increase Figure Width**

Gives more room for labels to spread out.

python

CopyEdit

fig.update\_layout(width=1000)

**4. Group by Quarter or Year (optional)**

If monthly is too detailed, consider grouping by **quarter** or just **year** to reduce the number of labels.

**5. Use Range Sliders (interactive!)**

Let users zoom in on the x-axis:

python

CopyEdit

fig.update\_layout( xaxis=dict( rangeslider=dict(visible=True), type="category" ) )

**🔁 Combine These for Best Results**

Here’s an example putting it together:

python

CopyEdit

fig.update\_layout( xaxis\_tickangle=-45, width=1000, xaxis=dict( tickmode='linear', dtick=2, rangeslider=dict(visible=True) ) )

Let me know what your x-axis looks like (e.g. how many months?) and I can suggest the most suitable combination!

Top of Form

Tools

Bottom of Form

ChatGPT can make mistakes. Check important info.