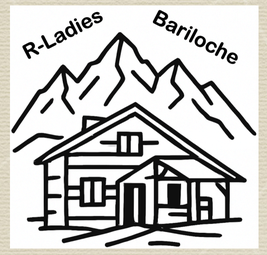
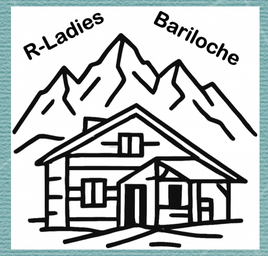


Para prepararte (MacBook):

1. Instala Ollama en tu ordenador (https://ollama.com/)
2. Ejecuta Ollama en tu ordenador ("ollama serve")
3. Descarga un modelo- en los ejemplos se usan "llama3.1" y "nomic-embed-text" ("ollama pull llama3:8b")
4. Ejecuta el modelo ("ollama run llama3:8b")
5. Chatea con el modelo

Asegúrate de tener:

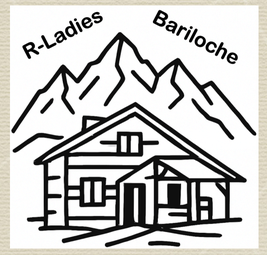
* python3 instala (https://www.python.org/downloads/)
* R instala (https://cran.r-project.org/)



Cómo ejecutar y personalizar un LLM para tu propio código

Integrating Applications and Code with LLMs

Kristin Tennessen
4 de Noviembre de 2025
R-Ladies Bariloche



Al final de esta charla usted…
At the end of this talk you will…

* Ejecutará un LLM localmente
  Run an LLM locally

* Aprenderá diferentes maneras de integrar su LLM local en su código usando Python y R
  Have learned different ways of integrating your local LLM into your code using Python and R

* Comprenderá mejor las aplicaciones que usan Docker, React y Postgres, y cómo crearlas desde cero usando IA
  Have a better understanding of applications using Docker, React, and Postgres, and how to build them from scratch using AI

* Comprenderá mejor las necesidades de análisis de los miembros del grupo
  Have a better understanding of the analysis needs of those of us in the group

* Entenderá las limitaciones de la integración de los LLM
  Understand the limitations of integrating LLMs

Quién es (who is) Kristin Tennessen?

- Tengo 20 años de experiencia en investigación y tecnología en las biociencias
  I have 20 years experience in research and technology in the biosciences

- Amo la nautraleza y la vida outdoor
  I love nature and the outdoors

- Tengo un insaciable apetito por viajar
  I have an insatiable appetite for travel

- Estoy viviendo en Bariloche por 6 meses mientras mis hijos van a la escuela
  I am living in Bariloche for 6 months while my kids go to school

- Soy originalmente de la bahia de San Francisco en California
  I am originally from the San Francisco Bay Area in California

- Me está tomando tiempo aprender a hablar y comprender español
  It is taking me awhile to learn how to speak and understand Spanish

- Mi contacto:
  WhatsApp: +1 925 979 8192
  ktenness@gmail.com

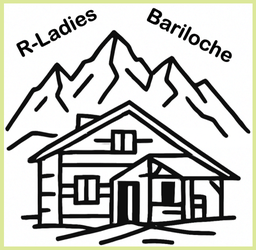
Horario de hoy
Schedule for today

* (20') Instalar Ollama y ejecutar un modelo
  Install Ollama and run a model

* (30') 3 ejemplos de integración de un LLM local en aplicaciones y código
  3 examples of integrating a local LLM into applications and code

* (20') Ejecutar un ejemplo en R localmente
  Run an R example locally

* (20') Crear una aplicación usando IA
  Create an application using AI

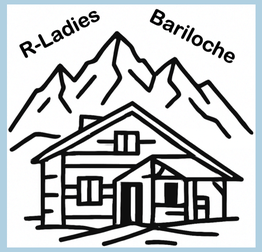


Ética de la IA
AI Ethics

* La IA plantea numerosos problemas éticos
  There are many ethical issues with AI

* Sin embargo, necesitamos una mayor diversidad de personas que desarrollen y trabajen con la IA
  However, we need a larger diversity of humans developing and working with AI

* Por eso nos centramos en la IA hoy en día
  Hence, why we are focusing on AI today



Instala Ollama
Install Ollama

Ollama es una herramienta de código abierto que permite ejecutar modelos de lenguaje de gran tamaño (LLM) directamente en tu máquina local.
Ollama is an open-source tool that allows you to run large language models (LLMs) directly on your local machine.

https://ollama.com/

¿Por qué ejecutarlos localmente?
Why run locally?

* Privacidad de datos
  Data privacy

* Personaliza los modelos según tus necesidades
  Customize the models for you needs

Descarga y ejecuta un modelo
Download and run a model

1. Elige un modelo de esta lista / Choose a model from this list:
   https://ollama.com/search
   Les mostraré llama3.1 (llama3:8b), un modelo de chat, y podrán integrarlo con un conjunto de datos en R.
   I will demonstrate llama3.1 (llama3:8b), a chat model, and you will be able to integrate it with a dataset into R.

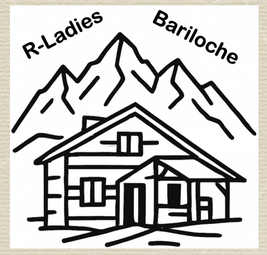
2. Obtén el modelo / Get the model: `ollama pull llama3.1:8b`

3. Ejecuta el modelo / Run the model: `ollama run llama3.1:8b`

Ejemplo 1: Freyoto (python)

- Problema: Las fotos personales no se pueden buscar fácilmente en Google Photos
  Problem: Personal photos aren't easily searchable on Google Photos

- Solución: Crear una aplicación personalizada para consultar fotos. Utilizar un modelo de lenguaje natural (LLM) para convertir texto en consultas a la base de datos.
  Solution: Build a personalized application for querying photos. Use an LLM to convert natural text into database queries.



localhost:3000

Freyoto

0,0









kristin in italy

Recent Searches

Photo Details

Date	August 12, 2025
Location	Unknown
Description	People

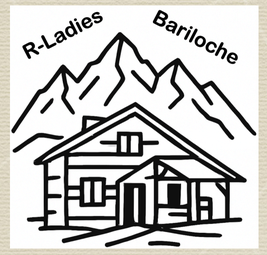
Ejemplo 1: Freyoto (python)

1. La búsqueda “kristin in italy” se envía al LLM
   The search input “kristin in italy” is sent to the LLM

2. El LLM está configurado para devolver una consulta Django (SQL)
   The LLM is configured to send back a django (SQL) query

3. Se consulta la base de datos y se devuelven las fotos coincidentes
   The database is queried and the photo matches are returned

```
backend-1    | INFO:     192.168.65.1:54786 - "POST /graphql HTTP/1.1" 200 OK
backend-1    | Initial photo queryset count: 232
backend-1    | kristin in italy
backend-1    | llm_response: Q(location__icontains="italy") & Q(face_names__icontains="kristin")
backend-1    | LLM filter: Q(location__icontains="italy") & Q(face_names__icontains="kristin")
backend-1    | INFO:     192.168.65.1:18102 - "POST /graphql HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47376 - "GET /2024%20July/IMG_6259.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47380 - "GET /2024%20July/IMG_6304.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47402 - "GET /2024%20July/IMG_6276.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47388 - "GET /2024%20July/IMG_6442.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47410 - "GET /2024%20July/IMG_6302.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47426 - "GET /2024%20July/IMG_6426.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47460 - "GET /2024%20July/IMG_5967.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47434 - "GET /2024%20July/IMG_6201.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47450 - "GET /2024%20July/IMG_6188.jpg HTTP/1.1" 200 OK
backend-1    | INFO:     172.19.0.4:47468 - "GET /2024%20July/IMG_5963.jpg HTTP/1.1" 200 OK
```



Freyoto: Arquitectura / Architecture

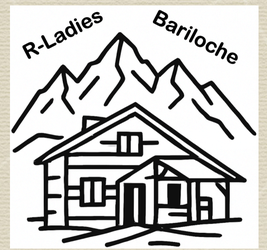
Frontend: React

Backend: Python/django

Base de datos / Database: Postgres

API: GQL (Graph Query Language)

Contenerización / Containerization: Docker




```
async def llama3_to_django_filter(search_query: str) -> str | None:
    prompt = f"""
You are an assistant that converts natural language photo search queries into Django ORM Q filter expressions for the Photo model.
The Photo model has fields: title, location, description, date_taken, and face_names (a comma-separated string of names, e.g. "kristin,danny" or "kristin").
- The family members are: parents: danny and kristin; kids (oldest to youngest): brock, sage, skye.
- "The oldest kid" means brock. "The youngest kid" means skye. "The oldest two kids" means brock and sage. "All kids" means brock, sage, and skye.
- To check if a photo contains a face, use Q(face_names__icontains="name").
- To check if a photo contains only one face (e.g. "only kristin"), use Q(face_names__icontains="kristin") & ~Q(face_names__contains=",") (no comma means only one name).
- The number of faces in a photo can be inferred from the number of commas in face_names: 0 commas = 1 face, 1 comma = 2 faces, 2 commas = 3 faces, etc.
- To check if a photo contains only two specific people (e.g. "only brock and skye"), match face_names exactly to "brock,skye" or "skye,brock" (since order may vary):
Q(face_names="brock,skye") | Q(face_names="skye,brock")
- If the search says a name without "only", find photos where that person appears, even if others are present: Q(face_names__icontains="name").
- If the search says a name with "only", find photos where that person(s) appears by so the the number of commas will be the number of persons minus 1.
- If the search contains portrait or people, search in description: Q(description__icontains="portrait")
- If the search contains alpine, search in description: Q(description__icontains="alpine")
- To check for a place (like "argentina"), use a fuzzy search: Q(location__icontains="argentina")
- For years, use Q(date_taken__year=YYYY)
- For activities or keywords, use Q(description__icontains="keyword") or Q(title__icontains="keyword")

Examples:
Query: all photos of kristin skiing from 2024
Output: Q(description__icontains="skiing") & Q(face_names__icontains="kristin") & Q(date_taken__year=2024)

Query: photos of only kristin by herself
Output: Q(face_names__icontains="kristin") & ~Q(face_names__contains=",")

Query: photos of kristin and danny and sage only
Output: Q(face_names="kristin,danny,sage") | Q(face_names="danny,kristin,sage") | Q(face_names="sage,kristin,danny") | Q(face_names="kristin,sage,danny") |
Q(face_names="danny,sage,kristin") | Q(face_names="sage,danny,kristin")

Query: photos from argentina
Output: Q(location__icontains="argentina")

Query: photos of the oldest two kids
Output: Q(face_names__icontains="brock") & Q(face_names__icontains="sage") & ~Q(face_names__icontains="skye")

Query: photos of only oldest and youngest kid
Output: Q(face_names="brock") & Q(face_names="skye")

Now answer ONLY for the following query. Output ONLY the Django Q filter expression(s) for this query, and nothing else.

Query: {search_query}
Output:
"""
    async with httpx.AsyncClient() as client:
        response = await client.post(
            "http://host.docker.internal:11434/api/generate",
            json={
                "model": "llama3:8b",
                "prompt": prompt,
                "stream": False
            },
            timeout=60,
        )
        result = response.json()
        llm_response = result["response"].strip()
        print("llm_response:", llm_response)
        if llm_response.startswith("Q(") or llm_response.startswith("~Q("):
            return llm_response
        raise ValueError("No valid Q expressions found in LLM response")
```

<- El servidor Ollama se está ejecutando en el puerto 11434

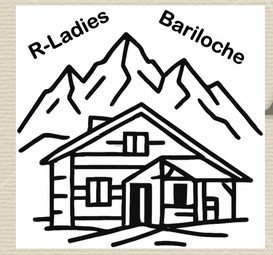
<- Modelo utilizado llama3:8b

<- Configure el modelo con la prompt anterior

Ejemplo 2: ToFa (python)

* Problema: Tengo más de 7000 publicaciones en mi blog personal. Al ser privado, no está indexado ni se puede buscar en Google. Quiero poder buscar en mi blog.
  Problem: I have over 7,000 posts on my personal blog. Because it is private, it is not indexed and searchable via google. I want to search my blog.

* Solución: Vectorizar el texto para que se pueda buscar mediante un modelo lógico de aprendizaje (LLM).
  1. Script de Python para descargar todas las publicaciones a archivos JSON locales.
  2. Ejecutar el modelo usando Llama.
  3. Usar una función de Python para consultar al LLM sobre los datos.
  Solution: Vectorize the text so it can be searched via an LLM
  1. Python script to download all posts into local JSON files
  2. Run model using llama
  3. Use a python function to ask the LLM questions about the data



Archivo JSON para una entrada de blog

JSON file for a blog post


```
{
  "id": "9131436707890795435",
  "title": "Danny teaching Brock how to move the car",
  "content": "<p class=\"mobile-photo\"><a href=\"https://blogger.googleuserconten
t.com/img/a/AVvXs\"><img src=\"https://blogger.googleusercontent.com/img/a/AVvXTtV
NVOjP=s320\"  border=\"0\" alt=\"\" id=\"BLOGGER_PHOTO_ID_7366326754\" /></a></p>S
o the driveway is free for kick ball",
  "published": "2024-05-07T10:46:00-07:00",
  "updated": "2024-05-07T10:46:15-07:00",
  "url": "http://tortinafavola.blogspot.com/2024/05/how-to-move-car.html",
  "status": "LIVE",
  "author": {
    "id": "08839414854593131318",
    "displayName": "ktenness",
    "url": "https://www.blogger.com/profile/088394148545913l8"
  },
  "replies_total": "0",
  "labels": [],
  "custom_meta_data": "",
  "location": {}
}
```


vectorizar

vectorize

[0.36, 0.38, 0.4, ...]

Ej 2: Buscar en el blog
Ex 2: Search the blog

* Utilice chromadb para insertar archivos JSON
  Use chromadb to embed JSON files

  * ChromaDB es una base de datos vectorial. En lugar de guardar texto, números o filas como una base de datos SQL tradicional, ChromaDB almacena vectores — listas largas de números que representan el significado del texto.
    ChromaDB is a vector database — a special kind of database built for AI applications. Instead of storing text, numbers, or rows like a normal SQL database, it stores vectors — long lists of numbers that represent the meaning of text.

* Utilice las coincidencias vectoriales como contexto al consultar el LLM
  Use the vector matches as a context when querying the LLM

* El código está aquí / Code is here

Ej 2: Resultado de la consulta

Ex 2: Query results

```
ask_question("what did i write about mountains”)
```

Blog post 1:
Refugio Otto Meiling on Cerro Tronador - The hike up the mountain was challenging and the wind almost blew down our tent on the summit....
Blog post 2:
Danny carried Skye up to Mt Tallac - We arrived at the summit and had snacks. We could see all the way to...

Result of querying the LLM with the above context:
What a lovely collection of mountain-related posts you have! From these posts, it appears that you've written about mountains in various contexts:
1. **Hiking and exploring**: You've shared photos and stories about your hikes, including the scenic views, challenging climbs, and enjoyable moments with family and friends.
2. **Mountain culture**: Your posts have touched on aspects of mountain culture, such as appreciating cool breezes and finding joy in nature's beauty.
It seems that mountains hold a special place in your heart, and you've shared these experiences with your blog readers to inspire and share the joys of exploring the great outdoors!

Ejemplo 3: Conjunto de datos climáticos de ARG (R)

Example 3: ARG climate dataset (R)

Conjunto de datos climáticos / Climate dataset:
https://ssl.smn.gob.ar/dpd/observaciones/estadisticas.txt

Descripción / Description:
https://datos.gob.ar/dataset/smn-estadisticas-climaticas-normales/archivo/smn_8.1

Estadísticas climatológicas normales del período 1981-2010, valores medios mensuales de:
Temperatura, Temperatura máxima, Temperatura mínima, Humedad relativa,
Velocidad del viento, Nubosidad total,
Frecuencia de días con precipitación superior a 0.1 mm y Precipitación.

Normal climatological statistics for the period 1981-2010, average monthly values of: Temperature, Maximum temperature, Minimum temperature, Relative humidity, Wind speed, Total cloud cover, Frequency of days with precipitation greater than 0.1 mm and Precipitation.

Estación	Valor Medio de	Ene	Feb
LA QUIACA OBS.	Temperatura (°C)	12.8	12.5
LA QUIACA OBS.	Temperatura máxima (°C)	20.1	19.9
LA QUIACA OBS.	Temperatura mínima (°C)	7.4	7.0
LA QUIACA OBS.	Humedad relativa (%)	65.3	64.1
LA QUIACA OBS.	Velocidad del Viento (km/h)	6.9	7.1
LA QUIACA OBS.	Nubosidad total (octavos)	5.2	4.8
LA QUIACA OBS.	Precipitación (mm)	97.5	68.4
LA QUIACA OBS.	Frecuencia de días con Precipitación superior a 0.1 mm	15.9	12.2
ORÁN AERO	Temperatura (°C)	N/A	25.1
ORÁN AERO	Temperatura máxima (°C)	32.3	31.1

Ejemplo 3: Conjunto de datos climáticos de ARG (R)

Example 3: ARG climate dataset (R)

Ejecuta un script de R para resumir los datos (el código está aquí).

Run an R Script to summarize data (code is here)

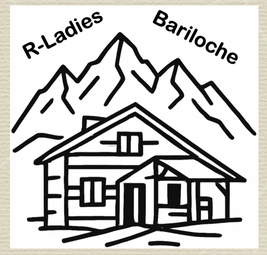
Resultados:

* ¡Bariloche es frío!
* ¡La Antártida (Base *) es más fría!

Results:

* Bariloche is cold!
* Antarctica (Base *) is colder!

	Estación	TMAX_mean
	<chr>	<dbl>
1	AEROPARQUE AERO	21.4
2	BAHÍA BLANCA AERO	22.2
3	BARILOCHE AERO	14.7
4	BASE BELGRANO II	-9.91
5	BASE ESPERANZA	-0.9
6	BASE MARAMBIO	-4.51
7	BASE ORCADAS	-0.183
8	BASE SAN MARTÍN	-1.35
9	BUENOS AIRES	22.7
10	CATAMARCA AERO	28.2



Ej 3: Conjunto de datos climáticos de ARG (R)

Ex 3: ARG climate dataset (R)

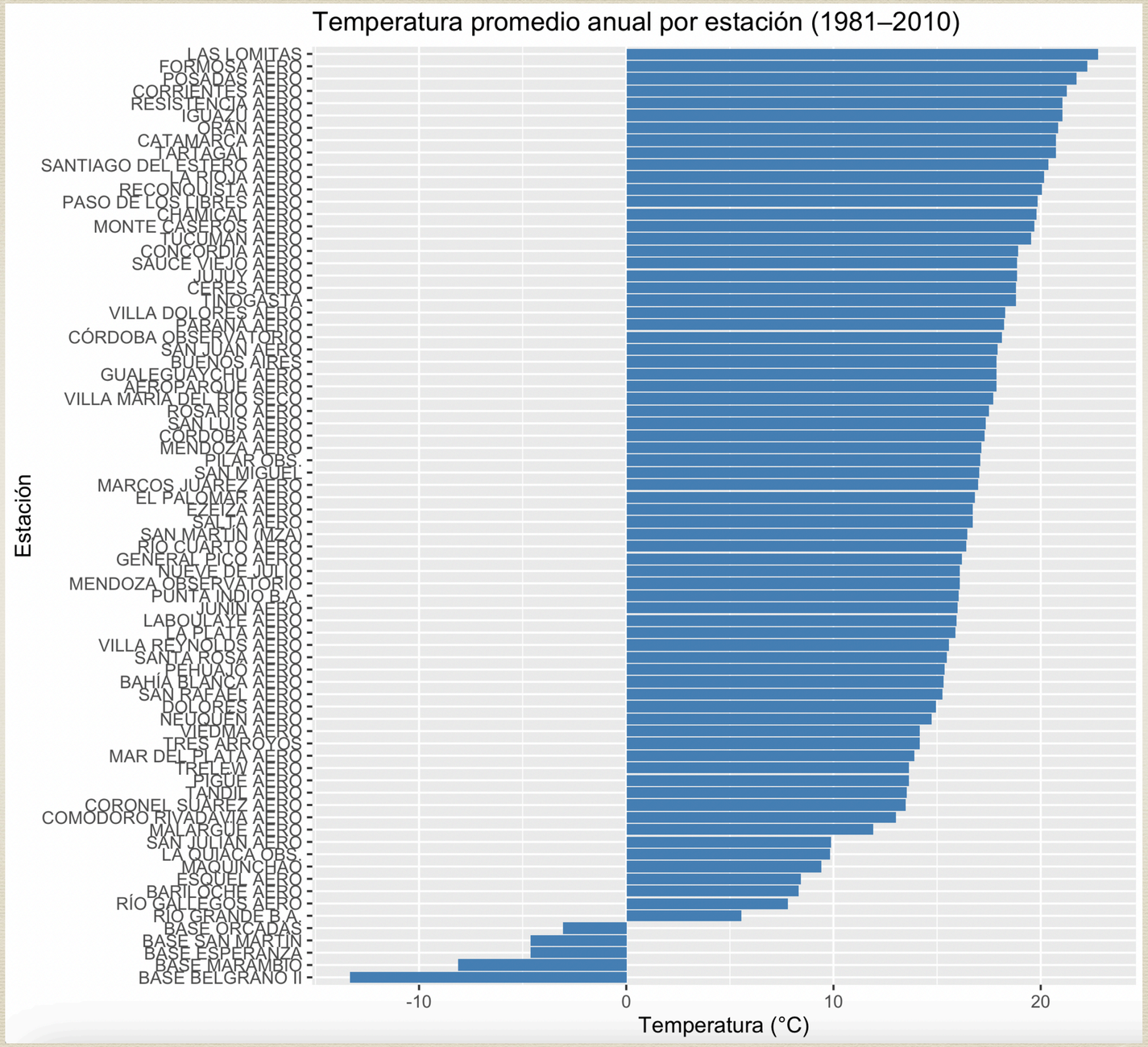
¿Podemos usar llama3 para generar un gráfico en R?
Can we use llama3 to generate an R plot?

Script de Python para generar código R
Python script to generate R code

Código R generado con llama3 que no funciona
Generated R Code from llama3 that does not work

Código R corregido de llama3 para crear el gráfico
Fixed R Code from llama3 to create plot

Gráfico generado de temperaturas promedio
Generated plot of average temperatures

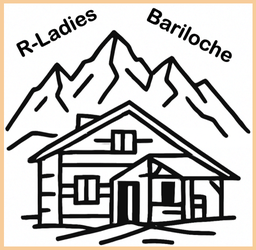

Temperatura promedio anual por estación (1981–2010)
Estación
LAS LOMITAS
FORMOSA AERO
POSADAS AERO
CORRIENTES AERO
RESISTENCIA AERO
IGUAZU AERO
ORAN AERO
CATAMARCA AERO
TARTAGAL AERO
SANTIAGO DEL ESTERO AERO
LA RIOJA AERO
RECONQUISTA AERO
PASO DE LOS LIBRES AERO
CHAMICAL AERO
MONTE CASEROS AERO
TUCUMAN AERO
CONCORDIA AERO
SAUCE VIEJO AERO
JUJUY AERO
CERES AERO
TINOGASTA
VILLA DOLORES AERO
PARANA AERO
CÓRDOBA OBSERVATORIO
SAN JUAN AERO
BUENOS AIRES
GUALEGUAYCHU AERO
AEROPARQUE AERO
VILLA MARIA DEL RIO SECO
ROSARIO AERO
SAN LUIS AERO
CORDOBA AERO
MENDOZA AERO
PILAR OBS.
SAN MIGUEL
MARCOS JUAREZ AERO
EL PALOMAR AERO
EZEIZA AERO
SALTA AERO
SAN MARTIN (MZA)
RIO CUARTO AERO
GENERAL PICO AERO
NUEVE DE JULIO
MENDOZA OBSERVATORIO
PUNTA INDIO B.A.
JUNIN AERO
LABOULAYE AERO
LA PLATA AERO
VILLA REYNOLDS AERO
SANTA ROSA AERO
PEHUAJO AERO
BAHÍA BLANCA AERO
SAN RAFAEL AERO
DOLORES AERO
NEUQUEN AERO
VIEDMA AERO
TRES ARROYOS
MAR DEL PLATA AERO
TRELEW AERO
PIGUE AERO
TANDIL AERO
CORONEL SUAREZ AERO
COMODORO RIVADAVIA AERO
MALARGUE AERO
SAN JULIAN AERO
LA QUIACA OBS.
MAQUINCHAO
ESQUEL AERO
BARILOCHE AERO
RÍO GALLEGOS AERO
RIO GRANDE B.A.
BASE ORCADAS
BASE SAN MARTIN
BASE ESPERANZA
BASE MARAMBIO
BASE BELGRANO II
-10
0
10
20
Temperatura (°C)

¡Práctica!: ¿Puedes generar un código R?
Hands-on: Can you generate R code?

1. Descarga el conjunto de datos climáticos de Argentina.
   Download the Argentina climate dataset

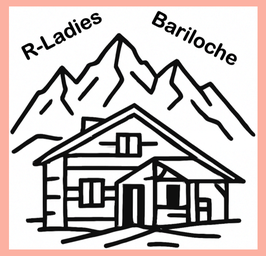
2. Copia el script de Python para generar el código R y modifica la instrucción LLM para adaptarla a tu pregunta de análisis.
   Copy the python script for generating R code and change the LLM prompt for your analysis question

3. Al ejecutar el script de Python, ¿se ejecuta el código R?
   Run the python script, does the R code run?



Creating an application with LLMs

1. Create the design with Stitch
2. Download the generated html file and input it into claude.ai
3. Copy the files locally and run
4. Use a chat (not local, it is too slow!) to fix the errors

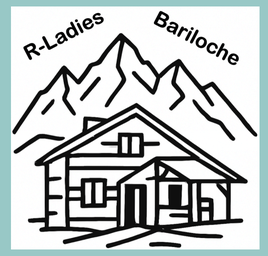


Conclusiones
Takeaways

* La IA, ahora mismo, no puede reemplazarte
  AI, right now, can not replace you

* La IA, ahora mismo, puede hacer tareas no especializadas. Entonces tu puedes concentrarte en recolectar la información correcta y en realizar las preguntas correctas
  AI, right now, can do menial tasks so you can concentrate on collecting the right data and asking the right questions

* La IA está mejorando, rápido. Hagámosla mas ética comprendiéndola y usándola.
  AI is getting better, fast. Let's contribute to making it more ethical by understanding it and using it.



Discusión
Discussion

¿Pueden los LLM locales ayudarte a resolver problemas técnicos?

Can local LLMs assist you in solving technical problems?