```
import pandas as pd
import matplotlib.pyplot as plt
import
import
from                                              lit
from                                          tandard
from                                      , confu
from
from
```

Locate in Drive				
Open in playground mode				
New notebook in Drive				
Open notebook	Ctrl+O			
Upload notebook				

```
df = p                                    Fn-UseC

df.hea
```

Rename				
Move				
Move to trash				

```
                                              Depe
```

Save a copy in Drive		s
Save a copy as a GitHub Gist		o
Save a copy in GitHub		
Save	Ctrl+S	o
Save and pin revision	Ctrl+M S	
Revision history		o
Download	▶	o
Print	Ctrl+P	

```
5
```

```
df.tail()
```

	customerID	gender	SeniorCitizen	Partner	D
7038	6840-RESVB	Male	0	Yes	
7039	2234-XADUH	Female	0	Yes	
7040	4801-JZAZL	Female	0	Yes	
7041	8361-LTMKD	Male	1	Yes	
7042	3186-AJIEK	Male	0	No	

5 rows × 21 columns

Release notes ✕   ⋯

Please follow our [blog](#) to see more information about new features, tips and tricks, and featured notebooks such as [Analyzing a Bank Failure with Colab](#).

2025-04-09

- Colab Data Science Agent [launched](#)!
- Julia language runtimes available with GPU and TPU support [GitHub](#).
- Now your popular Kaggle datasets are cached for quick retrieval.
- Upgraded Colab runtimes to Python 3.11.

Python package upgrades

- bigframes 1.29.0 -> 1.42.0
- TensorFlow 2.17.1 -> 2.18.0
- tensorboard 2.17.1 -> 2.18.0
- keras 3.5.0 -> 3.8.0
- torch 2.5.1 -> 2.6.0
- torchaudio 2.5.1 -> 2.6.0
- torchvision 0.20.1 -> 0.21.0
- fastai 2.7.18 -> 2.7.19
- ipykernel 5.5.6 -> 6.17.1
- google-genai 0.3.0 -> 1.9.0
- google-auth 2.27.0 -> 2.38.0
- Tornado 6.3.3 -> 6.4.2
- jax 0.4.33 -> 0.5.2
- accelerate 1.2.1 -> 1.5.2
- transformers 4.47.1 -> 4.50.3
- openai 1.57.4 -> 1.70.0
- kagglehub 0.3.6 -> 0.3.11
- earthengine-api 1.4.3 -> 1.5.9
- google-cloud-bigquery 3.29.0 -> 3.31.0
- bigquery-magics 0.8.1 -> 0.9.0
- NumPy 1.26.4 -> 2.0.2

Python package inclusions

- cuml-cu12 24.12.0

2025-01-13

- Released version 1.2.0 of the ([Open in Colab Chrome Extension](#)).
- Released minimizable comments with indicators next to cell.
- TPU v5e-1 Runtimes are now available for selection ([tweet](#)).
- GPU prices were decreased ([tweet](#)).

Python package upgrades

- accelerate 1.1.1 -> 1.2.1
- aiohttp 3.10.10 -> 3.11.11
- altair 4.2.2 -> 5.5.0
- bigframes 1.25.0 -> 1.29.0

```python
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7043 entries, 0 to 7042
Data columns (total 21 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   customerID        7043 non-null   object
 1   gender            7043 non-null   object
 2   SeniorCitizen     7043 non-null   int64
 3   Partner           7043 non-null   object
 4   Dependents        7043 non-null   object
 5   tenure            7043 non-null   int64
 6   PhoneService      7043 non-null   object
 7   MultipleLines     7043 non-null   object
 8   InternetService   7043 non-null   object
 9   OnlineSecurity    7043 non-null   object
 10  OnlineBackup      7043 non-null   object
 11  DeviceProtection  7043 non-null   object
 12  TechSupport       7043 non-null   object
 13  StreamingTV       7043 non-null   object
 14  StreamingMovies   7043 non-null   object
 15  Contract          7043 non-null   object
 16  PaperlessBilling  7043 non-null   object
 17  PaymentMethod     7043 non-null   object
 18  MonthlyCharges    7043 non-null   float64
 19  TotalCharges      7043 non-null   object
 20  Churn             7043 non-null   object
dtypes: float64(1), int64(2), object(18)
memory usage: 1.1+ MB
```

```python
df.shape
```

```
(7043, 21)
```

```python
df.describe()
```

	SeniorCitizen	tenure	MonthlyCharges
count	7043.000000	7043.000000	7043.000000
mean	0.162147	32.371149	64.761692
std	0.368612	24.559481	30.090047
min	0.000000	0.000000	18.250000
25%	0.000000	9.000000	35.500000
50%	0.000000	29.000000	70.350000
75%	0.000000	55.000000	89.850000
max	1.000000	72.000000	118.750000

```python
df.isnull().sum()
```

```
customerID       0
gender           0
SeniorCitizen    0
```

- cmake 3.30.5 -> 3.31.2
- cvxpy 1.5.3 -> 3.6.0
- earthengine-api 1.2.0 -> 1.4.3
- folium 0.18.0 -> 0.19.3
- holidays 0.60 -> 0.63
- huggingface-hub 0.26.2 -> 0.27.0
- jsonpickle 3.4.2 -> 4.0.1
- kagglehub 0.3.3 -> 0.3.6
- keras 3.4.1 -> 3.5.0
- matplotlib 3.8.0 -> 3.10.0
- openai 1.54.3 -> 1.57.4
- pymc 5.18.0 -> 5.19.1
- safetensors 0.4.5 -> 0.5.0
- scikit-image 0.24.0 -> 0.25.0
- scikit-learn 1.5.2 -> 1.6.0
- sentence-transformers 3.2.1 -> 3.3.1
- tensorflow 2.17.0 -> 2.17.1
- torch 2.5.0 -> 2.5.1
- torchaudio 2.5.0 -> 2.5.1
- torchvision 0.20.0 -> 0.20.1
- transformers 4.46.2 -> 4.47.1
- wandb 0.18.6 -> 0.19.1
- xarray 2024.10.0 -> 2024.11.0

Python package inclusions

- google-genai 0.3.0

2024-11-11

- Users can now import Gemini API keys from AI Studio into their user secrets, all in Colab (tweet).
- Increased limit to 1000 characters for requests to Gemini in Chat and Generate windows.
- Improved saving notebook to GitHub flow.
- Updated Gemini spark icon to be colorful.
- uv is pre-installed on the PATH for faster package installs.
- Fixed bugs
  - Dropdown text for GitHub repository not visible #4901.
  - Pre-installed California housing dataset README not correct #4862.
  - Backend execution error for scheduled notebook #4850.
  - Drive File Stream issues #3441.
  - Linking to the signup page does not preserve the authuser parameter.
  - Error messages in Gemini chat are not polished.
  - Clicking in Gemini chat feedback causes jitters the UI.
  - Hovering over a table of contents entry would show

```
        Partner                0
        Dependents             0
        tenure                 0
        PhoneService           0
        MultipleLines          0
        InternetService        0
        OnlineSecurity         0
        OnlineBackup           0
        DeviceProtection       0
        TechSupport            0
        StreamingTV            0
        StreamingMovies        0
        Contract               0
        PaperlessBilling       0
        PaymentMethod          0
        MonthlyCharges         0
        TotalCharges           0
        Churn                  0
        dtype: int64
```

```python
df.dropna(inplace=True)
```

```python
df['TotalCharges'] = pd.to_numeric(df['TotalCharges'],
df.dropna(inplace=True)
```

```python
df.drop('customerID', axis=1, inplace=True)
```

```python
categorical_cols = df.select_dtypes(include='object').
numerical_cols = df.select_dtypes(include=['int64', 'f]
print("\nCategorical columns:", categorical_cols)
print("Numerical columns:", numerical_cols)
```

```
        Categorical columns: ['gender', 'Partner', 'Depend(
        Numerical columns: ['SeniorCitizen', 'tenure', 'Mor
```

```python
binary_cols = [
    'gender',
    'Partner',
    'Dependents',
    'PhoneService',
    'PaperlessBilling',
    'Churn'
]
```

```python
multi_class_cols = [
    'MultipleLines',
    'InternetService',
    'OnlineSecurity',
    'OnlineBackup',
```

```
        'DeviceProtection',
        'TechSupport',
        'StreamingTV',
        'StreamingMovies',
        'Contract',
        'PaymentMethod'
]


le = LabelEncoder()
for col in binary_cols:
    le = LabelEncoder()
for col in binary_cols:
    df[col] = le.fit_transform(df[col])
    df['Churn'] = le.fit_transform(df['Churn'])


df = pd.get_dummies(df, columns=multi_class_cols, drop_


sns.countplot(data=df, x='Churn')
plt.title("Customer Churn Count")
plt.show()
```
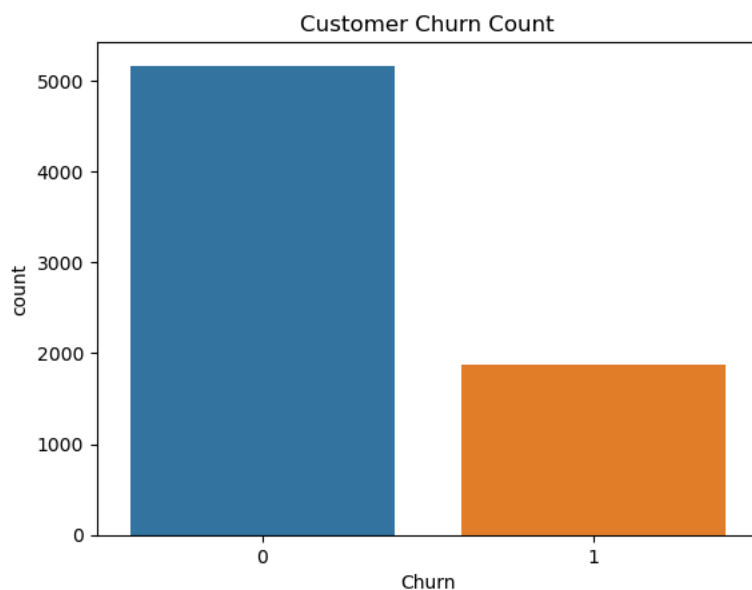

Customer Churn Count

```
sns.histplot(df['tenure'], kde=True, bins=30)
plt.title("Distribution of Customer Tenure")
plt.xlabel("Tenure (months)")
plt.ylabel("Frequency")
plt.show()
```

- Updated Marketplace image and public local runtime container
- Improved the look-and-feel of interactive form dropdowns and checkboxes
- Fixed bugs
  - activating the skip link caused the notebook to scroll out of view
  - toggling a checkbox too much caused the page to crash
  - lightning fast drags could cause orphaned tabs
  - custom widgets snippet would show for local runtimes
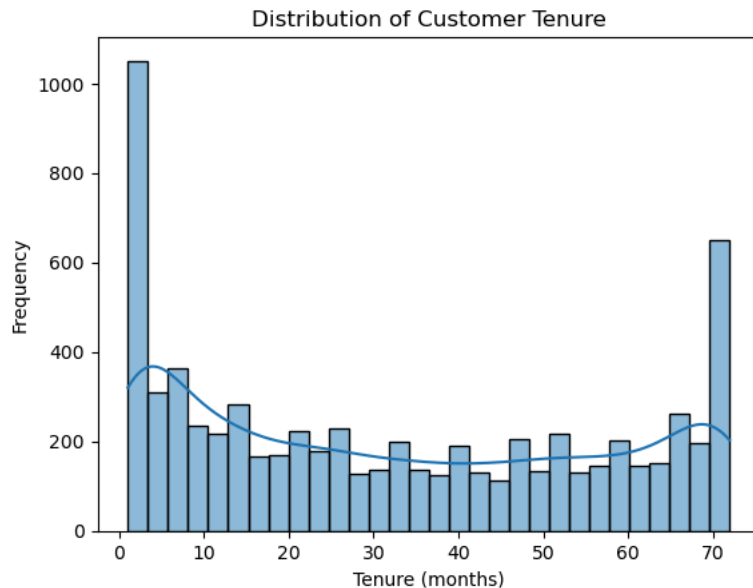
Python package upgrades

- accelerate 0.32.1 -> 0.34.2
- arviz 0.18.0 -> 0.19
- autograd 1.6.2 -> 1.7.0
- bigframes 1.14.0 -> 1.18.0
- dask 2024.7.1 -> 2024.8.0
- distributed 2024.7.1 -> 2024.8.0
- duckdb 0.10.3 -> 1.1.0
- earthengine-api 0.1.416 -> 1.0.0
- flax 0.8.4 -> 0.8.5
- gdown 5.1.0 -> 5.2.0
- geemap 0.33.1 -> 0.34.3
- geopandas 0.14.4 -> 1.0.1
- google-cloud-aiplatform 1.59.0 -> 1.67.1
- google-cloud-bigquery-storage 2.25.0 -> 2.26.0
- holidays 0.54 -> 0.57
- huggingface-hub 0.23.5 -> 0.24.7
- ibis-framework 8.0.0 -> 9.2.0
- jax 0.4.26 -> 0.4.33
- jaxlib 0.4.26 -> 0.4.33
- kagglehub 0.2.9 -> 0.3.0
- lightgbm 4.4.0 -> 4.5.0
- matplotlib-venn 0.11.10 -> 1.1.1
- mizani 0.9.3 -> 0.11.4
- Pillow 9.4.0 -> 10.4.0
- plotly 5.15.0 -> 5.24.1
- plotnine 0.12.4 -> 0.13.6
- polars 0.20.2 -> 1.6.0
- progressbar2 4.2.0 -> 4.5.0
- PyDrive2 1.6.3 -> 1.20.0
- pymc 5.10.4 -> 5.16.2
- pytensor 2.18.6 -> 2.25.4
- scikit-image 0.23.2 -> 0.24.0
- scikit-learn 1.3.2 -> 1.5.2
- torch 2.3.1 -> 2.4.1
- torchaudio 2.3.1 -> 2.4.1
- torchvision 0.18.1 -> 0.19.1
- transformers 4.42.4 -> 4.44.2
- urllib3 2.0.7 -> 2.2.3
- xarray 2024.6.0 -> 2024.9.0

Python package inclusions
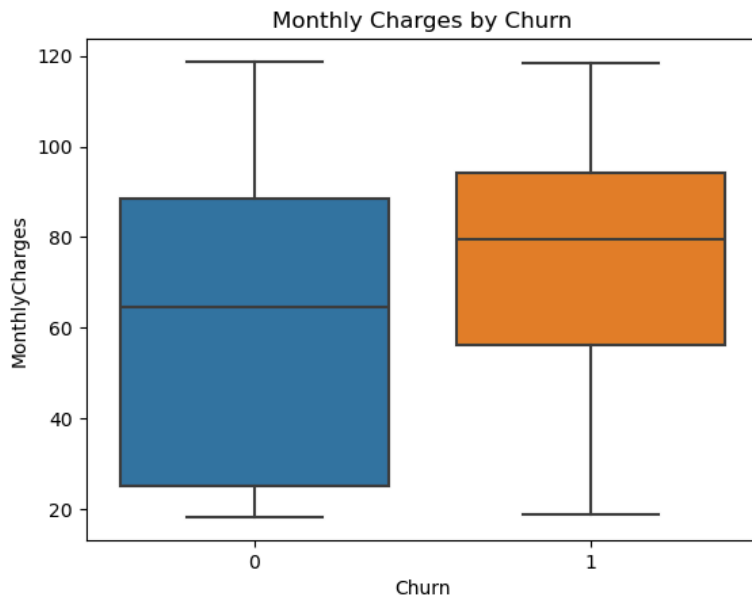
- bigquery-magics 0.2.0

```
C:\Users\R Y Z E N\.matplotlib\ana1\Lib\site-packag
    with pd.option_context('mode.use_inf_as_na', Tru
```



```python
sns.boxplot(data=df, x='Churn', y='MonthlyCharges')
plt.title("Monthly Charges by Churn")
plt.show()
```

2024-08-20

- TPU memory usage and utilization can now be checked with `!tpu-info`
- Gemini Chat responses are now grounded in relevant sources
- Added a new "Create Gemini API key" link in the user secrets panel
- Added a new "Gemini: Creating a prompt" snippet and touched up the existing "Gemini: Connecting to Gemini" snippet
- Added the ability to specify custom placeholder text for various interactive form params (see examples)
- Keyboard navigation a11y improvements to comments UI
- Various minor rendering improvements to interactive forms UI
- A11y improvements for the run button and header
- Updated tooltip styling
- A11y improvements for the file browser's disk usage bar
- On mobile, tooltips now trigger on long press
- On mobile, release notes updates will no longer display automatically
- Python package upgrades
  - astropy 5.3.4 -> 6.1.2
  - bigframes 1.11.1 -> 1.14.0
  - bokeh 3.3.4 -> 3.4.3
  - dask 2023.8.1 -> 2024.7.1
  - earthengine-api 0.1.412 -> 0.1.416
  - geopandas 0.13.2 -> 0.14.4
  - kagglehub 0.2.8 -> 0.2.9
  - keras 2.15.0 -> 3.4.1
  - lightgbm 4.1.0 -> 4.4.0
  - malloy 2023.1067 -> 2024.1067
  - numba 0.58.1 -> 0.60.0
  - numpy 1.25.2 -> 1.26.4
  - opencv-python 4.8.0.76 -> 4.10.0.84
  - pandas 2.0.3 -> 2.1.4
  - pandas-gbq 0.19.2 -> 0.23.1
  - panel 1.3.8 -> 1.4.5
  - requests 2.31.0 -> 2.32.3
  - scikit-learn 1.2.2. -> 1.3.2
  - scipy 1.11.4 -> 1.13.1
  - tensorboard 2.15.2 -> 2.17.0
  - tensorflow 2.15.0 -> 2.17.0

Monthly Charges by Churn


```
X = df.drop('Churn', axis=1)
y = df['Churn']
```

```
X.shape
```

(7032, 30)

```
y.shape
```

(7032,)

```
X_train,X_test,y_train,y_test=train_test_split(X,y,test
```

```
scaler = StandardScaler()
X_train=scaler.fit_transform(X_train)
X_test=scaler.fit_transform(X_test)
```

```
knn = KNeighborsClassifier(n_neighbors=5)
knn.fit(X_train, y_train)
y_pred_knn = knn.predict(X_test)
```

```
print("KNN Report:\n", classification_report(y_test, y_
print("KNN Confusion Matrix:\n", confusion_matrix(y_tes
print("KNN ACcuracy:", accuracy_score(y_test, y_pred_kr
```

- tf-keras 2.15.1 -> 2.17.0
- xarray 2023.7.0 -> 2024.6.0
- xgboost 2.0.3 -> 2.1.1
- Python package inclusions
  - einops 0.8.0

2024-07-22

- You can now embed Google sheets directly into Colab to streamline interactions with data with InteractiveSheet.

  Example:

```
from google.colab import sh
sh = sheets.InteractiveShee
df = sh.as_df()
```

- Fixed multiple rendering bugs in cell editors with wide text content (i.e. text is no longer hidden or clipped)
- Fixed multiple accessibility issues in Colab's comments feature (e.g. proper keyboard focus management, added accessibility landmarks, etc)
- Fixed bug where AI code generation would fail for extremely long broken code snippets
- Fixed multiple scrollbar bugs in the user secrets panel
- Added the ability for workspace admin to purchase Colab Pro and Pro+ Subscriptions for users
- Fixed bug where user secrets couldn't be moved to a tab
- Fixed several focus management accessibility issues in tabs, the table of contents, the left toolbar, and the run button
- Fixed bug where overflowing cells may be omitted when pasting from Google Sheets
- Fixed bug where the generate code button did not activate on touch
- Python package upgrades
  - bigframes 1.9.0 -> 1.11.1
  - cvxpy 1.3.4 -> 1.5.2
  - earthengine-api 0.1.408 -> 0.1.412
  - google-api-core 2.11.1 -> 2.19.1
  - google-api-python-client 2.84.0 -> 2.137.0
  - google-cloud-aiplatform 1.56.0 -> 1.59.0
  - google-cloud-bigquery 3.21.0 -> 3.25.0

```
KNN Report:
               precision    recall  f1-score   sup
           0       0.83      0.85      0.84        1!
           1       0.56      0.52      0.54         !

    accuracy                           0.76        2:
   macro avg       0.69      0.69      0.69        2:
weighted avg       0.76      0.76      0.76        2:

KNN Confusion Matrix:
 [[1316  233]
 [ 267  294]]
KNN ACcuracy: 0.7630331753554502
```

```
nb = GaussianNB()
nb.fit(X_train, y_train)
y_pred_nb = nb.predict(X_test)

print("Naive Bayes Report:\n", classification_report(y_
print("Naive Bayes Confusion Matrix:\n", confusion_matr
print("Naive Bayes  Accuracy:", accuracy_score(y_test,
```

```
Naive Bayes Report:
               precision    recall  f1-score   sup
           0       0.92      0.58      0.72        1!
           1       0.43      0.86      0.57         !

    accuracy                           0.66        2:
   macro avg       0.68      0.72      0.64        2:
weighted avg       0.79      0.66      0.68        2:

Naive Bayes Confusion Matrix:
 [[905 644]
 [ 76 485]]
Naive Bayes  Accuracy: 0.6587677725118484
```

```
import joblib

joblib.dump(knn, 'knn_model.pkl')

joblib.dump(nb, 'nb_model.pkl')

joblib.dump(scaler, 'scaler.pkl')
```

```
['scaler.pkl']
```

```
with open("X_columns.txt", "w") as f:
    f.write("\n".join(X.columns))
```

```
import pandas as pd
import joblib
import gradio as gr
```

- google-cloud-core 2.3.3 -> 2.4.1
- google-cloud-datastore 2.15.2 -> 2.19.0
- google-cloud-firestore 2.11.1 -> 2.16.1
- google-cloud-functions 1.13.3 -> 1.16.4
- google-generativeai 0.5.4 -> 0.7.2
- kagglehub 0.2.5 -> 0.2.8
- pip 23.1.2 -> 24.1.2
- setuptools 67.7.2 -> 71.0.4
- sympy 1.12.1 -> 1.13.1
- torch 2.3.0 -> 2.3.1
- transformers 4.41.2 -> 4.42.4
- Python package inclusions
  - accelerate 0.32.1

2024-06-18
- Inline AI completions are now available to users on the free-of-charge tier
- Reduced latency for LSP and terminal connections
- Improved quality of inline completions
- Visual improvements to switch controls across Colab
- Various bug fixes, performance and a11y improvements to the user secrets panel
- Improved tooltip UX behavior
- Improved behavior when copying data from Google Sheets and pasting in Colab
- Scroll to cell fixes for single tabbed view and jump to cell command
- Improved tab header behavior
- A11y improvements for notebook-focused cells
- Python package upgrades
  - torch 2.2.1 -> 2.3.0
  - torchaudio 2.2.1 -> 2.3.0
  - torchvision 0.17.1 -> 0.18.0
  - torchtext 0.17.1 -> 0.18.0
  - google-cloud-aiplatform 1.51.0 -> 1.56.0
  - bigframes 1.5.0 -> 1.8.0
  - regex 2023.12.25 -> 2024.5.15

2024-05-13
- Code actions are now supported to automatically improve and refactor code. Code actions can be

```python
# Load models and scaler
knn = joblib.load("knn_model.pkl")
nb = joblib.load("nb_model.pkl")
scaler = joblib.load("scaler.pkl")

# Load expected column structure
with open("X_columns.txt", "r") as f:
    training_columns = f.read().splitlines()

# Preprocessing function
def preprocess_input(input_data):
    # Binary categorical columns to numerical
    binary_cols = ['gender', 'Partner', 'Dependents',
    for col in binary_cols:
        input_data[col] = input_data[col].apply(lambda

    # One-hot encode multiclass categorical columns
    multi_class_cols = ['MultipleLines', 'InternetServi
                        'DeviceProtection', 'TechSuppor
                        'Contract', 'PaymentMethod']
    input_data = pd.get_dummies(input_data, columns=mul

    # Add any missing columns
    for col in training_columns:
        if col not in input_data.columns:
            input_data[col] = 0

    # Ensure column order matches training
    input_data = input_data[training_columns]
    return scaler.transform(input_data)

# Prediction function
def predict_churn(model_choice, *args):
    try:
        col_names = ['gender', 'SeniorCitizen', 'Partne
                     'PhoneService', 'PaperlessBilling
                     'Contract', 'PaymentMethod', 'Inte
                     'OnlineBackup', 'DeviceProtection
                     'StreamingMovies', 'MultipleLines

        input_dict = dict(zip(col_names, args))
        input_df = pd.DataFrame([input_dict])

        processed_input = preprocess_input(input_df)

        model = knn if model_choice == "KNN" else nb
        pred = model.predict(processed_input)[0]
        return "✅ Prediction: Churn" if pred == 1 els

    except Exception as e:
        return f"❌ Error: {str(e)}"

# Gradio input components
inputs = [
    gr.Dropdown(["KNN", "Naive Bayes"], label="Choose
    gr.Radio(["Male", "Female"], label="Gender"),
```

triggered by the keyboard shortcut "Ctrl/⌘ + ."
- Python package upgrades
  - bigframes 1.0.0 -> 1.5.0
  - google-cloud-aiplatform 1.47.0 -> 1.51.0
  - jax[tpu] 0.4.23 -> 0.4.26
- Python package inclusions
  - cudf 24.4.1

2024-04-15

- TPU v2 runtime is now available
- L4 runtime is now available for paid users
- New distributed fine-tuning Gemma tutorial on TPUs ([GitHub](#))
- Symbol rename is now supported with keyboard shortcut F2
- Fixed bug causing inability to re-upload deleted files
- Fixed breaking bug in colabtools %upload_files_async
- Added syntax highlighting to %%writefile cells
- Cuda dependencies that come with Torch are cached for faster downloads for packages that require Torch and its dependencies ([GitHub issue](#))
- Python package upgrades
  - bigframes 0.24.0 -> 1.0.0
  - duckdb 0.9.2 -> 0.10.1
  - google-cloud-aiplatform 1.43.0 -> 1.47.0
  - jax 0.4.23 -> 0.4.26

2024-03-13

- Fixed bug that sometimes caused UserSecrets to move / disappear
- Improved messaging for mounting drive in an unsupported environment ([GitHub issue](#))
- Python package upgrades
  - torch 2.1.0 -> 2.2.1
  - torchaudio 2.1.0 -> 2.2.1
  - torchvision 0.16.0 -> 0.17.1
  - torchtext 0.16.0 -> 0.17.1
  - PyMC 5.7.2 -> 5.10.4
  - BigFrames 0.21.0 -> 0.24.0
  - google-cloud-aiplatform 1.42.1 -> 1.43.0
  - tornado 6.3.2 -> 6.3.3

2024-02-21

- Try out Gemma on [Colab](#)!

```python
    gr.Radio([0, 1], label="Senior Citizen"),
    gr.Radio(["Yes", "No"], label="Partner"),
    gr.Radio(["Yes", "No"], label="Dependents"),
    gr.Slider(0, 72, step=1, label="Tenure"),
    gr.Radio(["Yes", "No"], label="Phone Service"),
    gr.Radio(["Yes", "No"], label="Paperless Billing"),
    gr.Number(label="Monthly Charges"),
    gr.Number(label="Total Charges"),
    gr.Radio(["Month-to-month", "One year", "Two year"]
    gr.Radio(["Electronic check", "Mailed check", "Ban
    gr.Radio(["DSL", "Fiber optic", "No"], label="Inter
    gr.Radio(["Yes", "No", "No internet service"], labe
    gr.Radio(["Yes", "No", "No internet service"], labe
    gr.Radio(["Yes", "No", "No internet service"], labe
    gr.Radio(["Yes", "No", "No internet service"], labe
    gr.Radio(["Yes", "No", "No internet service"], labe
    gr.Radio(["Yes", "No", "No internet service"], labe
    gr.Radio(["Yes", "No", "No phone service"], label="
]


# Launch Gradio app
gr.Interface(fn=predict_churn, inputs=inputs, outputs=
```

```
* Running on local URL:  http://127.0.0.1:7862
* To create a public link, set `share=True` in `lau
```

- Allow unicode in form text inputs
- Display documentation and link to source when displaying functions
- Display image-like ndarrays as images
- Improved UX around quick charts and execution error suggestions
- Released Marketplace image for the month of February (GitHub issue)
- Python package upgrades
  - bigframes 0.19.2 -> 0.21.0
  - regex 2023.6.3 -> 2023.12.25
  - spacy 3.6.1 -> 3.7.4
  - beautifulsoup4 4.11.2 -> 4.12.3
  - tensorflow-probability 0.22.0 -> 0.23.0
  - google-cloud-language 2.9.1 -> 2.13.1
  - google-cloud-aiplatform 1.39.0 -> 1.42.1
  - transformers 4.35.2 -> 4..37.2
  - pyarrow 10.0.1 -> 14.0.2

2024-01-29

- New Kaggle Notebooks <> Colab updates! Now you can:
  - Import directly from Colab without having to download/re-upload
  - Upload via link, by pasting Google Drive or Colab URLs
  - Export & run Kaggle Notebooks on Colab with 1 click
- Try these notebooks that talk to Gemini:
  - Gemini and Stable Diffusion
  - Learning with Gemini and ChatGPT
  - Talk to Gemini with Google's Speech to Text API
  - Sell lemonade with Gemini and Sheets
  - Generate images with Gemini and Vertex
- Python package upgrades
  - google-cloud-aiplatform 1.38.1 -> 1.39.0
  - bigframes 0.18.0 -> 0.19.2
  - polars 0.17.3 -> 0.20.2
  - gdown 4.6.6 -> 4.7.3 (GitHub issue)
  - tensorflow-hub 0.15.0 -> 0.16.0

```
import joblib

joblib.dump(knn, 'knn_model.pkl')
```

�=' ['knn_model.pkl']

```
joblib.dump(nb, 'nb_model.pkl')
```

�=' ['nb_model.pkl']

```
joblib.dump(scaler, 'scaler.pkl')
```

�=' ['scaler.pkl']

- flax 0.7.5 -> 0.8.0
- Python package inclusions
  - sentencepiece 0.1.99

2024-01-08

- Avoid nested scrollbars for large outputs by using `google.colab.output.no_vert` [Example notebook](#)
- Fix [bug](#) where downloading models from Hugging Face could freeze
- Python package upgrades
  - huggingface-hub 0.19.4 -> 0.20.2
  - bigframes 0.17.0 -> 0.18.0

2023-12-18

- Expanded access to AI coding has arrived in Colab across 175 locales for all tiers of Colab users
- Improvements to display of ML-based inline completions (for eligible Pro/Pro+ users)
- Started a series of [notebooks](#) highlighting Gemini API capabilities
- Enable ⌘/Ctrl+L to select the full line in an editor
- Fixed [bug](#) where we weren't correctly formatting output from multiple execution results
- Python package upgrades
  - CUDA 11.8 to CUDA 12.2
  - tensorflow 2.14.0 -> 2.15.0
  - tensorboard 2.14.0 -> 2.15.0
  - keras 2.14.0 -> 2.15.0
  - Nvidia drivers 525.105.17 -> 535.104.05
  - tensorflow-gcs-config 2.14.0 -> 2.15.0
  - bigframes 0.13.0 -> 0.17.0
  - geemap 0.28.2 -> 0.29.6
  - pyarrow 9.0.0 -> 10.0.1
  - google-generativeai 0.2.2 -> 0.3.1
  - jax 0.4.20 —> 0.4.23
  - jaxlib 0.4.20 —> 0.4.23
- Python package inclusions
  - kagglehub 0.1.4
  - google-cloud-aiplatform 1.38.1

2023-11-27

- Removed warning when calling `await` to make it render as code
- Added "Run selection" to the cell context menu
- Added highlighting for the `%%python` cell magic
- Launched AI coding features for Pro/Pro+ users in more locales
- Python package upgrades
    - bigframes 0.12.0 -> 0.13.0
- Python package inclusions
    - transformers 4.35.2
    - google-generativeai 0.2.2

2023-11-08

- Launched Secrets, for safe storage of private keys on Colab ([tweet](#))
- Fixed issue where TensorBoard would not load ([#3990](#))
- Python package upgrades
    - lightgbm 4.0.0 -> 4.1.0
    - bigframes 0.10.0 -> 0.12.0
    - bokeh 3.2.2 -> 3.3.0
    - duckdb 0.8.1 -> 0.9.1
    - numba 0.56.4 -> 0.58.1
    - tweepy 4.13.0 -> 4.14.0
    - jax 0.4.16 -> 0.4.20
    - jaxlib 0.4.16 -> 0.4.20

2023-10-23

- Updated the **Open notebook** dialog for better usability and support for smaller screen sizes
- Added smart paste support for data from Google Sheets for R notebooks
- Enabled showing release notes in a tab
- Launched AI coding features for Pro/Pro+ users in Australia AU Canada CA India IN and Japan JP ([tweet](#))
- Python package upgrades
    - earthengine-api 0.1.357 -> 0.1.375
    - flax 0.7.2 -> 0.7.4
    - geemap 0.27.4 -> 0.28.2
    - jax 0.4.14 -> 0.4.16
    - jaxlib 0.4.14 -> 0.4.16
    - keras 2.13.1 -> 2.14.0
    - tensorboard 2.13.0 -> 2.14.1
    - tensorflow 2.13.0 -> 2.14.0
    - tensorflow-gcs-config 2.13.0 -> 2.14.0

- tensorflow-hub 0.14.0 -> 0.15.0
- tensorflow-probability 0.20.1 -> 0.22.0
- torch 2.0.1 -> 2.1.0
- torchaudio 2.0.2 -> 2.1.0
- torchtext 0.15.2 -> 0.16.0
- torchvision 0.15.2 -> 0.16.0
- xgboost 1.7.6 -> 2.0.0
- Python package inclusions
  - bigframes 0.10.0
  - malloy 2023.1056

2023-09-22

- Added the ability to scope an AI generated suggestion to a specific Pandas dataframe ([tweet](#))
- Added Colab link previews to Docs ([tweet](#))
- Added smart paste support for data from Google Sheets
- Increased font size of dropdowns in interactive forms
- Improved rendering of the notebook when printing
- Python package upgrades
  - tensorflow 2.12.0 -> 2.13.0
  - tensorboard 2.12.3 -> 2.13.0
  - keras 2.12.0 -> 2.13.1
  - tensorflow-gcs-config 2.12.0 -> 2.13.
  - scipy 1.10.1-> 1.11.2
  - cython 0.29.6 -> 3.0.2
- Python package inclusions
  - geemap 0.26.0

2023-08-18

- Added "Change runtime type" to the menu in the connection button
- Improved auto-reconnection to an already running notebook ([#3764](#))
- Increased the specs of our highmem machines for Pro users
- Fixed `add-apt-repository` command on Ubuntu 22.04 runtime ([#3867](#))
- Python package upgrades
  - bokeh 2.4.3 -> 3.2.2
  - cmake 3.25.2 -> 3.27.2
  - cryptography 3.4.8 -> 41.0.3
  - dask 2022.12.1 -> 2023.8.0
  - distributed 2022.12.1 -> 2023.8.0
  - earthengine-api 0.1.358 -> 0.1.364
  - flax 0.7.0 -> 0.7.2
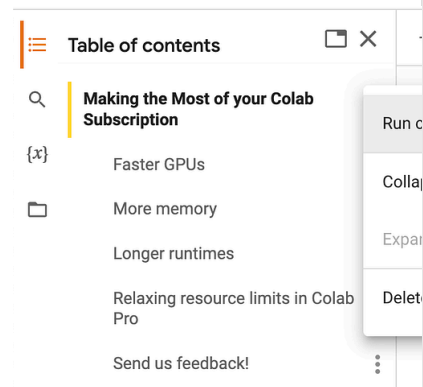 - ipython-sql 0.4.0 -> 0.5.0

- jax 0.4.13 -> 0.4.14
- jaxlib 0.4.13 -> 0.4.14
- lightgbm 3.3.5 -> 4.0.0
- mkl 2019.0 -> 2023.2.0
- notebook 6.4.8 -> 6.5.5
- numpy 1.22.4 -> 1.23.5
- opencv-python 4.7.0.72 -> 4.8.0.76
- pillow 8.4.0 -> 9.4.0
- plotly 5.13.1 -> 5.15.0
- prettytable 0.7.2 -> 3.8.0
- pytensor 2.10.1 -> 2.14.2
- spacy 3.5.4 -> 3.6.1
- statsmodels 0.13.5 -> 0.14.0
- xarray 2022.12.0 -> 2023.7.0
- Python package inclusions
  - PyDrive2 1.6.3

2023-07-21

- Launched auto-plotting for dataframes, available using the chart button that shows up alongside datatables ([post](#))

- Added a menu to the table of contents to support running a section or collapsing/expanding sections ([post](#))

- Added an option to automatically run the first cell or section, available under Edit -> Notebook settings ([post](#))

- Launched Pro/Pro+ to Algeria, Argentina, Chile, Ecuador, Egypt, Ghana, Kenya, Malaysia, Nepal, Nigeria, Peru, Rwanda, Saudi

Arabia, South Africa, Sri Lanka, Tunisia, and Ukraine ([tweet](#))

- Added a command, "Toggle tab moves focus" for toggling tab trapping in the editor (Tools -> Command palette, "Toggle tab moves focus")

- Fixed issue where `files.upload()` was sometimes returning an incorrect filename ([#1550](#))

- Fixed f-string syntax highlighting bug ([#3802](#))

- Disabled ambiguous characters highlighting for commonly used LaTeX characters ([#3648](#))

- Upgraded Ubuntu from 20.04 LTS to [22.04 LTS](#)

- Updated the Colab Marketplace VM image

- Python package upgrades:
  - autograd 1.6.1 -> 1.6.2
  - drivefs 76.0 -> 77.0
  - flax 0.6.11 -> 0.7.0
  - earthengine-api 0.1.357 -> 0.1.358
  - GDAL 3.3.2->3.4.3
  - google-cloud-bigquery-storage 2.20.0 -> 2.22.2
  - gspread-dataframe 3.0.8 -> 3.3.1
  - holidays 0.27.1 -> 0.29
  - jax 0.4.10 -> jax 0.4.13
  - jaxlib 0.4.10 -> jax 0.4.13
  - jupyterlab-widgets 3.0.7 -> 3.0.8
  - nbformat 5.9.0 -> 5.9.1
  - opencv-python-headless 4.7.0.72 -> 4.8.0.74
  - pygame 2.4.0 -> 2.5.0
  - spacy 3.5.3 -> 3.5.4
  - SQLAlchemy 2.0.16 -> 2.0.19
  - tabulate 0.8.10 -> 0.9.0
  - tensorflow-hub 0.13.0 -> 0.14.0

2023-06-23

- Launched AI coding features to subscribed users starting with Pro+ users in the US ([tweet](#), [post](#))
- Added the Kernel Selector in the Notebook Settings ([tweet](#))
- Fixed double space trimming issue in markdown [#3766](#)
- Fixed run button indicator not always centered [#3609](#)
- Fixed inconsistencies for automatic indentation on multi-

line [#3697](#)
- Upgraded Python from 3.10.11 to 3.10.12
- Python package updates:
  - duckdb 0.7.1 -> 0.8.1
  - earthengine-api 0.1.350 -> 0.1.357
  - flax 0.6.9 -> 0.6.11
  - google-cloud-bigquery 3.9.0 -> 3.10.0
  - google-cloud-bigquery-storage 2.19.1 -> 2.20.0
  - grpcio 1.54.0 -> 1.56.0
  - holidays 0.25 -> 0.27.1
  - nbformat 5.8.0 -> 5.9.0
  - prophet 1.1.3 -> 1.1.4
  - pydata-google-auth 1.7.0 -> 1.8.0
  - spacy 3.5.2 -> 3.5.3
  - tensorboard 2.12.2 -> 2.12.3
  - xgboost 1.7.5 -> 1.7.6
- Python package inclusions:
  - gcsfs 2023.6.0
  - geopandas 0.13.2
  - google-cloud-bigquery-connection 1.12.0
  - google-cloud-functions 1.13.0
  - grpc-google-iam-v1 0.12.6
  - multidict 6.0.4
  - tensorboard-data-server 0.7.1

2023-06-02

- Released the new site [colab.google](#)
- Published Colab's Docker runtime image to us-docker.pkg.dev/colab-images/public/runtime ([tweet](#), [instructions](#))
- Launched support for Google children accounts ([tweet](#))
- Launched DagsHub integration ([tweet](#), [post](#))
- Upgraded to Monaco Editor Version 0.37.1
- Fixed various Vim keybinding bugs
- Fixed issue where the N and P letters sometimes couldn't be typed ([#3664](#))
- Fixed rendering support for compositional inputs ([#3660](#), [#3679](#))
- Fixed lag in notebooks with lots of cells ([#3676](#))
- Improved support for R by adding a Runtime type notebook setting (Edit -> Notebook settings)
- Improved documentation for connecting to a local runtime

(Connect -> Connect to a local runtime)
- Python package updates:

  - holidays 0.23 -> 0.25
  - jax 0.4.8 -> 0.4.10
  - jaxlib 0.4.8 -> 0.4.10
  - pip 23.0.1 -> 23.1.2
  - tensorflow-probability 0.19.0 -> 0.20.1
  - torch 2.0.0 -> 2.0.1
  - torchaudio 2.0.1 -> 2.0.2
  - torchdata 0.6.0 -> 0.6.1
  - torchtext 0.15.1 -> 0.15.2
  - torchvision 0.15.1 -> 0.15.2
  - tornado 6.2 -> 6.3.1

2023-05-05

- Released GPU type selection for paid users, allowing them to choose a preferred NVidia GPU
- Upgraded R from 4.2.3 to 4.3.0
- Upgraded Python from 3.9.16 to 3.10.11
- Python package updates:

  - attrs 22.2.0 -> attrs 23.1.0
  - earthengine-api 0.1.349 -> earthengine-api 0.1.350
  - flax 0.6.8 -> 0.6.9
  - grpcio 1.53.0 -> 1.54.0
  - nbclient 0.7.3 -> 0.7.4
  - tensorflow-datasets 4.8.3 -> 4.9.2
  - termcolor 2.2.0 -> 2.3.0
  - zict 2.2.0 -> 3.0.0

2023-04-14

- Python package updates:

  - google-api-python-client 2.70.0 -> 2.84.0
  - google-auth-oauthlib 0.4.6 -> 1.0.0
  - google-cloud-bigquery 3.4.2 -> 3.9.0
  - google-cloud-datastore 2.11.1 -> 2.15.1
  - google-cloud-firestore 2.7.3 -> 2.11.0
  - google-cloud-language 2.6.1 -> 2.9.1
  - google-cloud-storage 2.7.0 -> 2.8.0
  - google-cloud-translate 3.8.4 -> 3.11.1
  - networkx 3.0 -> 3.1
  - notebook 6.3.0 -> 6.4.8
  - jax 0.4.7 -> 0.4.8
  - pandas 1.4.4 -> 1.5.3
  - spacy 3.5.1 -> 3.5.2
  - SQLAlchemy 1.4.47 -> 2.0.9
  - xgboost 1.7.4 -> 1.7.5

2023-03-31

- Improve bash ! syntax highlighting ([GitHub issue](#))
- Fix bug where VIM keybindings weren't working in the file editor
- Upgraded R from 4.2.2 to 4.2.3
- Python package updates:
  - arviz 0.12.1 --> 0.15.1
  - astropy 4.3.1 --> 5.2.2
  - dopamine-rl 1.0.5 --> 4.0.6
  - gensim 3.6.0 --> 4.3.1
  - ipykernel 5.3.4 -> 5.5.6
  - ipython 7.9.0 -> 7.34.0
  - jax 0.4.4 -> 0.4.7
  - jaxlib 0.4.4 -> 0.4.7
  - jupyter_core 5.2.0 -> 5.3.0
  - keras 2.11.0 -> 2.12.0
  - lightgbm 2.2.3 -> 3.3.5
  - matplotlib 3.5.3 -> 3.7.1
  - nltk 3.7 -> 3.8.1
  - opencv-python 4.6.0.66 -> 4.7.0.72
  - plotly 5.5.0 -> 5.13.1
  - pymc 4.1.4 -> 5.1.2
  - seaborn 0.11.2 -> 0.12.2
  - spacy 3.4.4 -> 3.5.1
  - sympy 1.7.1 -> 1.11.1
  - tensorboard 2.11.2 -> 2.12.0
  - tensorflow 2.11.0 -> 2.12.0
  - tensorflow-estimator 2.11.0 -> 2.12.0
  - tensorflow-hub 0.12.0 -> 0.13.0
  - torch 1.13.1 -> 2.0.0
  - torchaudio 0.13.1 -> 2.0.1
  - torchtext 0.14.1 -> 0.15.1
  - torchvision 0.14.1 -> 0.15.1

2023-03-10

- Added the [Colab editor shortcuts](#) example notebook
- Fixed triggering of @-mention and email autocomplete for large comments ([GitHub issue](#))
- Added View Resources to the Runtime menu
- Made file viewer images fit the view by default, resizing to original size on click
- When in VIM mode, enable copy as well as allowing propagation to monaco-vim to escape visual mode ([GitHub issue](#))
- Upgraded CUDA 11.6.2 -> 11.8.0 and cuDNN 8.4.0.27 -> 8.7.0.84
- Upgraded Nvidia drivers 525.78.01 -> 530.30.02
- Upgraded Python 3.8.10 -> 3.9.16
- Python package updates:

- beautifulsoup4 4.6.3 -> 4.9.3
- bokeh 2.3.3 -> 2.4.3
- debugpy 1.0.0 -> 1.6.6
- Flask 1.1.4 -> 2.2.3
- jax 0.3.25 -> 0.4.4
- jaxlib 0.3.25 -> 0.4.4
- Jinja2 2.11.3 -> 3.1.2
- matplotlib 3.2.2 -> 3.5.3
- nbconvert 5.6.1 -> 6.5.4
- pandas 1.3.5 -> 1.4.4
- pandas-datareader 0.9.0 -> 0.10.0
- pandas-profiling 1.4.1 -> 3.2.0
- Pillow 7.1.2 -> 8.4.0
- plotnine 0.8.0 -> 0.10.1
- scikit-image 0.18.3 -> 0.19.3
- scikit-learn 1.0.2 -> 1.2.2
- scipy 1.7.3 -> 1.10.1
- setuptools 57.4.0 -> 63.4.3
- sklearn-pandas 1.8.0 -> 2.2.0
- statsmodels 0.12.2 -> 0.13.5
- urllib3 1.24.3 -> 1.26.14
- Werkzeug 1.0.1 -> 2.2.3
- wrapt 1.14.1 -> 1.15.0
- xgboost 0.90 -> 1.7.4
- xlrd 1.2.0 -> 2.0.1

2023-02-17

- Show graphs of RAM and disk usage in notebook toolbar
- Copy cell links directly to the clipboard instead of showing a dialog when clicking on the link icon in the cell toolbar
- Updated the [Colab Marketplace VM image](#)
- Upgraded CUDA to 11.6.2 and cuDNN to 8.4.0.27
- Python package updates:
  - tensorflow 2.9.2 -> 2.11.0
  - tensorboard 2.9.1 -> 2.11.2
  - keras 2.9.0 -> 2.11.0
  - tensorflow-estimator 2.9.0 -> 2.11.0
  - tensorflow-probability 0.17.0 -> 0.19.0
  - tensorflow-gcs-config 2.9.0 -> 2.11.0
  - earthengine-api 0.1.339 -> 0.1.341
  - flatbuffers 1.12 -> 23.1.21
  - platformdirs 2.6.2 -> 3.0.0
  - pydata-google-auth 1.6.0 -> 1.7.0
  - python-utils 3.4.5 -> 3.5.2
  - tenacity 8.1.0 -> 8.2.1

- tifffile 2023.1.23.1 -> 2023.2.3
- notebook 5.7.16 -> 6.3.0
- tornado 6.0.4 -> 6.2
- aiohttp 3.8.3 -> 3.8.4
- charset-normalizer 2.1.1 -> 3.0.1
- fastai 2.7.0 -> 2.7.1
- soundfile 0.11.0 -> 0.12.1
- typing-extensions 4.4.0 -> 4.5.0
- widgetsnbextension 3.6.1 -> 3.6.2
- pydantic 1.10.4 -> 1.10.5
- zipp 3.12.0 -> 3.13.0
- numpy 1.21.6 -> 1.22.4
- drivefs 66.0 -> 69.0
- gdal 3.0.4 -> 3.3.2 [GitHub issue](#)
- Added libudunits2-dev for smoother R package installs [GitHub issue](#)

2023-02-03

- Improved tooltips for pandas series to show common statistics about the series object
- Made the forms dropdown behave like an autocomplete box when it allows input
- Updated the nvidia driver from 460.32.03 to 510.47.03
- Python package updates:

  - absl-py 1.3.0 -> 1.4.0
  - bleach 5.0.1 -> 6.0.0
  - cachetools 5.2.1 -> 5.3.0
  - cmdstanpy 1.0.8 -> 1.1.0
  - dnspython 2.2.1 -> 2.3.0
  - fsspec 2022.11.0 -> 2023.1.0
  - google-cloud-bigquery-storage 2.17.0 -> 2.18.1
  - holidays 0.18 -> 0.19
  - jupyter-core 5.1.3 -> 5.2.0
  - packaging 21.3 -> 23.0
  - prometheus-client 0.15.0 -> 0.16.0
  - pyct 0.4.8 -> 0.5.0
  - pydata-google-auth 1.5.0 -> 1.6.0
  - python-slugify 7.0.0 -> 8.0.0
  - sqlalchemy 1.4.46 -> 2.0.0
  - tensorflow-io-gcs-filesystem 0.29.0 -> 0.30.0
  - tifffile 2022.10.10 -> 2023.1.23.1
  - zipp 3.11.0 -> 3.12.0
  - Pinned sqlalchemy to version 1.4.46

2023-01-12

- Added support for @-mention and email autocomplete in comments
- Improved errors when GitHub notebooks can't be loaded
- Increased color contrast for colors used for syntax highlighting in the code editor
- Added terminal access for custom GCE VM runtimes
- Upgraded Ubuntu from 18.04 LTS to 20.04 LTS ([GitHub issue](#))
- Python package updates:
    - GDAL 2.2.2 -> 2.2.3.
    - NumPy from 1.21.5 to 1.21.6.
    - attrs 22.1.0 -> 22.2.0
    - chardet 3.0.4 -> 4.0.0
    - cloudpickle 1.6.0 -> 2.2.0
    - filelock 3.8.2 -> 3.9.0
    - google-api-core 2.8.2 -> 2.11.0
    - google-api-python-client 1.12.11 -> 2.70.0
    - google-auth-httplib2 0.0.3 -> 0.1.0
    - google-cloud-bigquery 3.3.5 -> 3.4.1
    - google-cloud-datastore 2.9.0 -> 2.11.0
    - google-cloud-firestore 2.7.2 -> 2.7.3
    - google-cloud-storage 2.5.0 -> 2.7.0
    - holidays 0.17.2 -> holidays 0.18
    - importlib-metadata 5.2.0 -> 6.0.0
    - networkx 2.8.8 -> 3.0
    - opencv-python-headless 4.6.0.66 -> 4.7.0.68
    - pip 21.1.3 -> 22.04
    - pip-tools 6.2.0 -> 6.6.2
    - prettytable 3.5.0 -> 3.6.0
    - requests 2.23.0 -> 2.25.1
    - termcolor 2.1.1 -> 2.2.0
    - torch 1.13.0 -> 1.13.1
    - torchaudio 0.13.0 -> 0.13.1
    - torchtext 0.14.0 -> 0.14.1
    - torchvision 0.14.0 -> 0.14.1

2022-12-06

- Made fallback runtime version available until mid-December ([GitHub issue](#))
- Upgraded to Python 3.8 ([GitHub issue](#))
- Python package updates:
    - jax from 0.3.23 to 0.3.25, jaxlib from 0.3.22 to 0.3.25
    - pyarrow from 6.0.1 to 9.0.0
    - torch from 1.12.1 to 1.13.0

- torchaudio from 0.12.1 to 0.13.0
- torchvision from 0.13.1 to 0.14.0
- torchtext from 0.13.1 to 0.14.0
- xlrd from 1.1.0 to 1.2.0
- DriveFS from 62.0.1 to 66.0.3
- Made styling of markdown tables in outputs match markdown tables in text cells
- Improved formatting for empty interactive table rows
- Fixed syntax highlighting for variables with names that contain Python keywords ([GitHub issue](#))

2022-11-11

- Added more dark editor themes for Monaco (when in dark mode, "Editor colorization" appears as an option in the Editor tab of the Tools → Settings dialog)
- Fixed bug where collapsed forms were deleted on mobile [GitHub issue](#)
- Python package updates:
  - rpy2 from 3.4.0 to 3.5.5 ([GitHub issue](#))
  - notebook from 5.5.0 to 5.7.16
  - tornado from 5.1.1 to 6.0.4
  - tensorflow_probability from 0.16.0 to 0.17.0
  - pandas-gbq from 0.13.3 to 0.17.9
  - protobuf from 3.17.3 to 3.19.6
  - google-api-core[grpc] from 1.31.5 to 2.8.2
  - google-cloud-bigquery from 1.21.0 to 3.3.5
  - google-cloud-core from 1.0.1 to 2.3.2
  - google-cloud-datastore from 1.8.0 to 2.9.0
  - google-cloud-firestore from 1.7.0 to 2.7.2
  - google-cloud-language from 1.2.0 to 2.6.1
  - google-cloud-storage from 1.18.0 to 2.5.0
  - google-cloud-translate from 1.5.0 to 3.8.4

2022-10-21

- Launched a single-click way to get from BigQuery to Colab to further explore query results ([announcement](#))

- Launched [Pro, Pro+, and Pay As You Go](#) to 19 additional countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Greece, Hungary, Latvia, Lithuania, Norway, Portugal, Romania, Slovakia, Slovenia, and Sweden ([tweet](#))
- Updated jax from 0.3.17 to 0.3.23, jaxlib from 0.3.15 to 0.3.22, TensorFlow from 2.8.2 to 2.9.2, CUDA from 11.1 to 11.2, and cuDNN from 8.0 to 8.1 ([backend-info](#))
- Added a `readonly` option to [drive.mount](#)
- Fixed bug where Xarray was not working ([GitHub issue](#))
- Modified Markdown parsing to ignore block quote symbol within MathJax ([GitHub issue](#))

2022-09-30

- Launched [Pay As You Go](#), allowing premium GPU access without requiring a subscription
- Added vim and tcllib to our runtime image
- Fixed bug where open files were closed on kernel disconnect ([GitHub issue](#))
- Fixed bug where the play button/execution indicator was not clickable when scrolled into the cell output ([GitHub issue](#))
- Updated the styling for form titles so that they avoid obscuring the code editor
- Created a GitHub repo, [backend-info](#), with the latest apt-list.txt and pip-freeze.txt files for the Colab runtime ([GitHub issue](#))
- Added `files.upload_file(filename)` to upload a file from the browser to the runtime with a specified filename

2022-09-16

- Upgraded pymc from 3.11.0 to 4.1.4, jax from 0.3.14 to 0.3.17, jaxlib from 0.3.14 to 0.3.15, fsspec from 2022.8.1 to 2022.8.2
- Modified our save flow to avoid persisting Drive filenames as titles in notebook JSON
- Updated our [Terms of Service](#)
- Modified the `Jump to Cell` command to locate the cursor at the end of the command palette input (`Jump to cell` in Tools →

Command palette in a notebook with section headings)

- Updated the styling of the Drive notebook comment UI
- Added support for terminating your runtime from code: `python from google.colab import runtime runtime.unassign()`
- Added regex filter support to the Recent notebooks dialog
- Inline google.colab.files.upload JS to fix `files.upload()` not working ([GitHub issue](#))

2022-08-26

- Upgraded PyYAML from 3.13 to 6.0 ([GitHub issue](#)), drivefs from 61.0.3 to 62.0.1
- Upgraded TensorFlow from 2.8.2 to 2.9.1 and ipywidgets from 7.7.1 to 8.0.1 but rolled both back due to a number of user reports ([GitHub issue](#), [GitHub issue](#))
- Stop persisting inferred titles in notebook JSON ([GitHub issue](#))
- Fix bug in background execution which affected some Pro+ users ([GitHub issue](#))
- Fix bug where `Download as .py` incorrectly handled text cells ending in a double quote
- Fix bug for Pro and Pro+ users where we weren't honoring the preference (Tools → Settings) to use a temporary scratch notebook as the default landing page
- Provide undo/redo for scratch cells
- When writing ipynb files, serialize empty multiline strings as `[ ]` for better consistency with JupyterLab

2022-08-11

- Upgraded ipython from 5.5.0 to 7.9.0, fbprophet 0.7 to prophet 1.1, tensorflow-datasets from 4.0.1 to 4.6.0, drivefs from 60.0.2 to 61.0.3, pytorch from 1.12.0 to 1.12.1, numba from 0.51 to 0.56, and lxml from 4.2.0 to 4.9.1
- Loosened our `requests` version requirement ([GitHub issue](#))
- Removed support for TensorFlow 1
- Added Help → Report Drive abuse for Drive notebooks
- Fixed indentation for Python lines ending in [
- Modified styling of tables in Markdown to left-align them

rather than centering them
- Fixed special character replacement when copying interactive tables as Markdown
- Fixed ansi 8-bit color parsing ([GitHub issue](#))
- Configured logging to preempt transitive imports and other loading from implicitly configuring the root logger
- Modified forms to use a value of `None` instead of causing a parse error when clearing raw and numeric-typed form fields

2022-07-22

- Update scipy from 1.4.1 to 1.7.3, drivefs from 59.0.3 to 60.0.2, pytorch from 1.11 to 1.12, jax & jaxlib from 0.3.8 to 0.3.14, opencv-python from 4.1.2.30 to 4.6.0.66, spaCy from 3.3.1 to 3.4.0, and dlib from 19.18.0 to 19.24.0
- Fix `Open in tab` doc link which was rendering incorrectly ([GitHub issue](#))
- Add a preference for the default tab orientation to the Site section of the settings menu under Tools → Settings
- Show a warning for `USE_AUTH_EPHEM` usage when running authenticate_user on a TPU runtime ([code](#))

2022-07-01

- Add a preference for code font to the settings menu under Tools → Settings
- Update drivefs from 58.0.3 to 59.0.3 and spacy from 2.2.4 to 3.3.1
- Allow [display_data](#) and [execute_result](#) text outputs to wrap, matching behavior of JupyterLab (does not affect stream outputs/print statements).
- Improve LSP handling of some magics, esp. %%writefile ([GitHub issue](#)).
- Add a [FAQ entry](#) about the mount Drive button behavior and include link buttons for each FAQ entry.
- Fix bug where the notebook was sometimes hidden behind other tabs on load when in single pane view.
- Fix issue with inconsistent scrolling when an editor is in multi-select mode.

- Fix bug where clicking on a link in a form would navigate away from the notebook
- Show a confirmation dialog before performing Replace all from the Find and replace pane.

2022-06-10

- Update drivefs from 57.0.5 to 58.0.3 and tensorflow from 2.8.0 to 2.8.2
- Support more than 100 repos in the GitHub repo selector shown in the open dialog and the clone to GitHub dialog
- Show full notebook names on hover in the open dialog
- Improve the color contrast for links, buttons, and the `ipywidgets.Accordion` widget in dark mode

2022-05-20

- Support URL params for linking to some common pref settings: [force_theme=dark](), [force_corgi_mode=1](), [force_font_size=14](). Params forced by URL are not persisted unless saved using Tools → Settings.
- Add a class `markdown-google-sans` to allow Markdown to render in Google Sans
- Update monaco-vim from 0.1.19 to 0.3.4
- Update drivefs from 55.0.3 to 57.0.5, jax from 0.3.4 to 0.3.8, and jaxlib from 0.3.2 to 0.3.7

2022-04-29

- Added 🦀 mode (under Miscellaneous in Tools → Settings)
- Added "Disconnect and delete runtime" option to the menu next to the Connect button
- Improved rendering of filter options in an interactive table
- Added git-lfs to the base image
- Updated torch from 1.10.0 to 1.11.0, jupyter-core from 4.9.2 to 4.10.0, and cmake from 3.12.0 to 3.22.3
- Added more details to our [FAQ]() about unsupported uses (using proxies, downloading torrents, etc.)
- Fixed [issue]() with apt-get dependencies

2022-04-15

- Add an option in the file browser to show hidden files.
- Upgrade gdown from 4.2.0 to 4.4.0, google-api-core[grpc] from 1.26.0 to 1.31.5, and pytz from 2018.4 to 2022.1

2022-03-25

- Launched Pro/Pro+ to 12 additional countries: Australia, Bangladesh, Colombia, Hong Kong, Indonesia, Mexico, New Zealand, Pakistan, Philippines, Singapore, Taiwan, and Vietnam
- Added `google.colab.auth.authentic` to support using Service Account keys
- Update jax from 0.3.1 to 0.3.4 & jaxlib from 0.3.0 to 0.3.2
- Fixed an issue with Twitter previews of notebooks shared as GitHub Gists

2022-03-10

- Launched Pro/Pro+ to 10 new countries: Ireland, Israel, Italy, Morocco, the Netherlands, Poland, Spain, Switzerland, Turkey, and the United Arab Emirates
- Launched support for scheduling notebooks for Pro+ users
- Fixed bug in interactive datatables where filtering by number did not work
- Finished removing the python2 kernelspec

2022-02-25

- Made various accessibility improvements to the header
- Fix bug with forms run:auto where a form field change would trigger multiple runs
- Minor updates to the bigquery example notebook and snippet
- Include background execution setting in the sessions dialog for Pro+ users
- Update tensorflow-probability from 0.15 to 0.16
- Update jax from 0.2.25 to 0.3.1 & jaxlib from 0.1.71 to 0.3.0

2022-02-11

- Improve keyboard navigation for the open dialog
- Fix issue where nvidia-smi stopped reporting resource utilization for

some users who were modifying the version of nvidia used
- Update tensorflow from 2.7 to 2.8, keras from 2.7 to 2.8, numpy from 1.19.5 to 1.21.5, tables from 3.4.4 to 3.7.0

2022-02-04

- Improve UX for opening content alongside your notebook, such as files opened from the file browser. This includes a multi-pane view and drag-drop support
- Better Twitter previews when sharing example Colab notebooks and notebooks opened from GitHub Gists
- Update pandas from 1.1.5 to 1.3.5
- Update openpyxl from 2.5.9 to 3.0.0 and pyarrow from 3.0.0 to 6.0.0
- Link to the release notes from the Help menu

2022-01-28

- Add a copy button to data tables
- Python LSP support for better completions and code diagnostics This can be configured in the Editor Settings (Tools → Settings)
- Update gspread examples in our documentation
- Update gdown from 3.6 to 4.2

2022-01-21

- New documentation for the google.colab package
- Show GPU RAM in the resource