✏️ **Generate** | a slider using jupyter widgets | 🔍 | **Close**

```
!pip install kaggle xgboost scikit-learn pandas numpy matplotlib se
```

```
⥇  Requirement already satisfied: kaggle in /usr/local/lib/pythor
   Requirement already satisfied: xgboost in /usr/local/lib/pythc
   Requirement already satisfied: scikit-learn in /usr/local/lib/
   Requirement already satisfied: pandas in /usr/local/lib/pythor
   Requirement already satisfied: numpy in /usr/local/lib/python3
   Requirement already satisfied: matplotlib in /usr/local/lib/py
   Requirement already satisfied: seaborn in /usr/local/lib/pythc
   Requirement already satisfied: six>=1.10 in /usr/local/lib/pyt
   Requirement already satisfied: certifi>=2023.7.22 in /usr/loca
   Requirement already satisfied: python-dateutil in /usr/local/l
   Requirement already satisfied: requests in /usr/local/lib/pyth
   Requirement already satisfied: tqdm in /usr/local/lib/python3.
   Requirement already satisfied: python-slugify in /usr/local/li
   Requirement already satisfied: urllib3 in /usr/local/lib/pythc
   Requirement already satisfied: bleach in /usr/local/lib/pythor
   Requirement already satisfied: nvidia-nccl-cu12 in /usr/local/
   Requirement already satisfied: scipy in /usr/local/lib/python3
   Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib
   Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/lc
   Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/
   Requirement already satisfied: tzdata>=2022.7 in /usr/local/li
   Requirement already satisfied: contourpy>=1.0.1 in /usr/local/
   Requirement already satisfied: cycler>=0.10 in /usr/local/lib/
   Requirement already satisfied: fonttools>=4.22.0 in /usr/local
   Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local
   Requirement already satisfied: packaging>=20.0 in /usr/local/l
   Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib
   Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/
   Requirement already satisfied: webencodings in /usr/local/lib/
   Requirement already satisfied: text-unidecode>=1.3 in /usr/loc
   Requirement already satisfied: charset-normalizer<4,>=2 in /us
   Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/
```

```
import os
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split, cross_val_sc
from sklearn.preprocessing import StandardScaler, LabelEncoder
from sklearn.metrics import accuracy_score, classification_report,
import xgboost as xgb
from sklearn.ensemble import RandomForestClassifier
import warnings
warnings.filterwarnings('ignore')


from google.colab import files
print("Please upload your kaggle.json file")
files.upload()
```

```
⥇  Please upload your kaggle.json file
   [ Choose Files ] kaggle.json
   • kaggle.json(application/json) - 68 bytes, last modified: 1/5/2025 - 100%
     done
```

```
!mkdir -p ~/.kaggle
!cp kaggle.json ~/.kaggle/
!chmod 600 ~/.kaggle/kaggle.json
```

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](#).

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 the menu icons for all entries.
  - Surveys display over open dialogs.
  - Playground mode banner not shown on mobile.

Python package upgrades
- accelerate 0.34.2 -> 1.1.1
- arviz 0.19.0 -> 0.20.0
- bigframes 1.18.0 -> 1.25.0
- bigquery-magics 0.2.0 -> 0.4.0
- bokeh 3.4.3 -> 3.6.1
- blosc 2.0.0 -> 2.7.1
- cloudpickle 2.2.1 -> 3.1.0
- cudf-cu12 24.4.1 -> 24.10.1
- dask 2024.8.0 -> 24.10.0
- debugpy 1.6.6 -> 1.8.0
- earthengine-api 1.0.0 -> 1.2.0
- folium 0.17.0 -> 0.18.0
- gscfs 2024.6.1 -> 2024.10.0
- geemap 0.34.3 -> 0.35.1
- holidays 0.57 -> 0.60
- huggingface-hub 0.24.7 -> 0.26.2
- kagglehub 0.3.0 -> 0.3.3
- lightgbm 4.4.0 -> 4.5.0
- lxml 4.9.4 -> 5.3.0
- matplotlib 3.7.1 -> 3.8.0
- mizani 0.11.4 -> 0.13.0
- networkx 3.3 -> 3.4.2
- nltk 3.8.1 -> 3.9.1
- pandas 2.1.4 -> 2.2.2
- pillow 10.4.0 -> 11.0.0
- plotnine 0.13.6 -> 0.14.1
- polars 1.6.0 -> 1.9.0

```
# Cell 5: Download dataset
!kaggle datasets download -d laotse/credit-risk-dataset
!unzip credit-risk-dataset.zip
```

> Dataset URL: https://www.kaggle.com/datasets/laotse/credit-ris
> License(s): CC0-1.0
> Downloading credit-risk-dataset.zip to /content
>   0% 0.00/368k [00:00<?, ?B/s]
> 100% 368k/368k [00:00<00:00, 116MB/s]
> Archive: credit-risk-dataset.zip
>   inflating: credit_risk_dataset.csv

```
df = pd.read_csv('credit_risk_dataset.csv')
print("Dataset Shape:", df.shape)
print("\nColumns:", df.columns.tolist())
print("\nSample of the data:")
display(df.head())
```

> Dataset Shape: (32581, 12)
>
> Columns: ['person_age', 'person_income', 'person_home_ownershi
>
> Sample of the data:

	person_age	person_income	person_home_ownership	person_er
0	22	59000	RENT	
1	21	9600	OWN	
2	25	9600	MORTGAGE	
3	23	65500	RENT	
4	24	54400	RENT	

```
print("Basic information about the dataset:")
df.info()

print("\nMissing values:")
print(df.isnull().sum())

print("\nSummary statistics:")
print(df.describe())
```

```
 2   person_home_ownership    32581 non-null  object
 3   person_emp_length        31686 non-null  float64
 4   loan_intent              32581 non-null  object
 5   loan_grade               32581 non-null  object
 6   loan_amnt                32581 non-null  int64
 7   loan_int_rate            29465 non-null  float64
 8   loan_status              32581 non-null  int64
 9   loan_percent_income      32581 non-null  float64
 10  cb_person_default_on_file  32581 non-null  object
 11  cb_person_cred_hist_length 32581 non-null  int64
dtypes: float64(3), int64(5), object(4)
memory usage: 3.0+ MB
```

- protobuf 3.20.3 -> 4.25.5
- pyarrow 14.0.2 -> 17.0.0
- pydrive2 1.20.0 -> 1.21.1
- pymc 5.16.2 -> 5.18.0
- torch 2.4.1 -> 2.5.0
- torchaudio 2.4.1 -> 2.5.0
- torchvision 0.19.1 -> 0.20.0
- transformers 4.44.2 -> 4.46.2
- xarray 2024.9.0 -> 2024.10.0

Python package inclusions

- diffusers 0.31.0
- gitpython 3.1.43
- langchain 0.3.7
- openai 1.54.3
- pygit2 1.16.0
- pyspark 3.5.3
- sentence-transformers 3.2.1
- timm 1.0.11
- wandb 0.18.6

Library and driver upgrades

- drivefs upgraded from 89.0.2 to 98.0.0

2024-09-23

- Improved code snippet search
- 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

```
loan_int_rate             3116
loan_status                  0
loan_percent_income          0
cb_person_default_on_file    0
cb_person_cred_hist_length   0
dtype: int64

Summary statistics:
          person_age   person_income   person_emp_length        l
count    32581.000000    3.258100e+04       31686.000000     3258
mean        27.734600    6.607485e+04           4.789686      958
std          6.348078    6.198312e+04           4.142630      632
min         20.000000    4.000000e+03           0.000000       50
25%         23.000000    3.850000e+04           2.000000      500
50%         26.000000    5.500000e+04           4.000000      800
75%         30.000000    7.920000e+04           7.000000     1220
max        144.000000    6.000000e+06         123.000000     3500

          loan_int_rate   loan_status   loan_percent_income  \
count     29465.000000   32581.000000          32581.000000
mean         11.011695       0.218164              0.170203
std           3.240459       0.413006              0.106782
min           5.420000       0.000000              0.000000
25%           7.900000       0.000000              0.090000
50%          10.990000       0.000000              0.150000
75%          13.470000       0.000000              0.230000
max          23.220000       1.000000              0.830000

          cb_person_cred_hist_length
count                   32581.000000
mean                        5.804211
std                         4.055001
min                         2.000000
25%                         3.000000
50%                         4.000000
75%                         8.000000
```

```python
plt.figure(figsize=(15, 10))

# Plot histograms for numerical columns
numerical_cols = ['person_age', 'person_income', 'person_emp_length'
                  'loan_amnt', 'loan_int_rate', 'loan_percent_income'

for i, col in enumerate(numerical_cols, 1):
    plt.subplot(2, 3, i)
    sns.histplot(df[col], kde=True)
    plt.title(f'Distribution of {col}')
    plt.xticks(rotation=45)

plt.tight_layout()
plt.show()
```
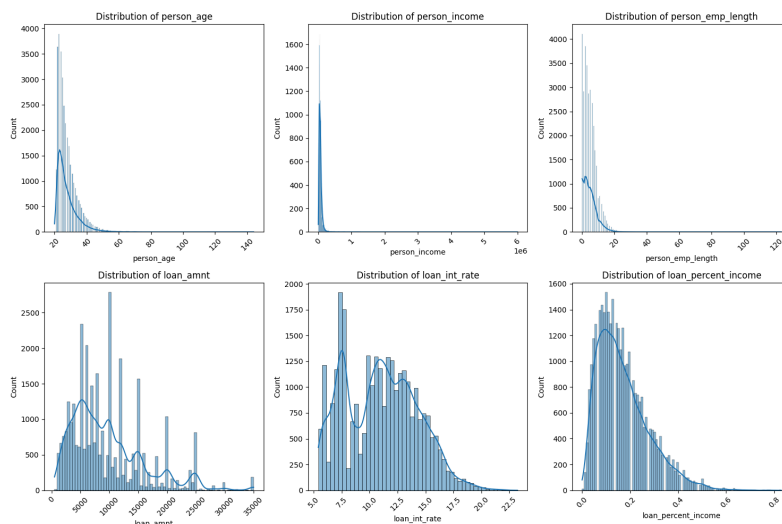
- pytensor 2.18.6 -> 2.25.4
- scikit-image 0.23.2 -> 0.24.0
- scikit-learn 1.3.2 -> 1.5.2
- torch 2.3.1 -> 2.4.1
- torchaudio 2.3.1 -> 2.4.1
- torchvision 0.18.1 -> 0.19.1
- transformers 4.42.4 -> 4.44.2
- urllib3 2.0.7 -> 2.2.3
- xarray 2024.6.0 -> 2024.9.0

Python package inclusions

- bigquery-magics 0.2.0

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
  - 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

```
plt.figure(figsize=(12, 8))
sns.heatmap(df.select_dtypes(include=[np.number]).corr(),
            annot=True, cmap='coolwarm', center=0)
plt.title('Correlation Matrix')
plt.show()
```
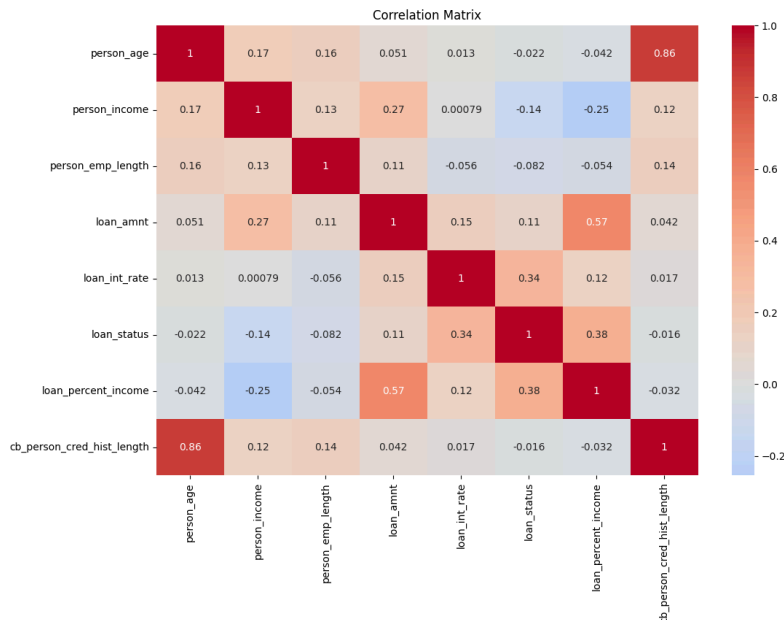
- einops 0.8.0

2024-07-22

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

```
from google.colab import sheets
sh = sheets.InteractiveSheet()
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
  - 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

Correlation Matrix

```
df = df.dropna()

# Encode categorical variables
le = LabelEncoder()
categorical_columns = ['person_home_ownership', 'loan_intent', 'lo
                       'cb_person_default_on_file']

for col in categorical_columns:
    df[col] = le.fit_transform(df[col])

# Split features and target
X = df.drop('loan_status', axis=1)
y = df['loan_status']

# Split the data
X_train, X_test, y_train, y_test = train_test_split(X, y, test_siz
                                                    random_state=4

# Scale features
scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)


rf_model = RandomForestClassifier(n_estimators=100, random_state=42
rf_model.fit(X_train_scaled, y_train)

# Make predictions
rf_predictions = rf_model.predict(X_test_scaled)
```

- 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 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

```
rf_predictions = rf_model.predict(X_test_scaled)

# Print Random Forest results
print("Random Forest Results:")
print("\nAccuracy:", accuracy_score(y_test, rf_predictions))
print("\nClassification Report:")
print(classification_report(y_test, rf_predictions))

# Cell 12: Train XGBoost model
xgb_model = xgb.XGBClassifier(random_state=42)
xgb_model.fit(X_train_scaled, y_train)

# Make predictions
xgb_predictions = xgb_model.predict(X_test_scaled)

# Print XGBoost results
print("XGBoost Results:")
print("\nAccuracy:", accuracy_score(y_test, xgb_predictions))
print("\nClassification Report:")
print(classification_report(y_test, xgb_predictions))
```

```
Random Forest Results:

Accuracy: 0.92981843575419

Classification Report:
              precision    recall  f1-score   support

           0       0.92      0.99      0.96      4443
           1       0.97      0.71      0.82      1285

    accuracy                           0.93      5728
   macro avg       0.95      0.85      0.89      5728
weighted avg       0.93      0.93      0.93      5728

XGBoost Results:

Accuracy: 0.9347067039106145

Classification Report:
              precision    recall  f1-score   support

           0       0.93      0.99      0.96      4443
           1       0.96      0.74      0.84      1285

    accuracy                           0.93      5728
   macro avg       0.95      0.86      0.90      5728
weighted avg       0.94      0.93      0.93      5728
```
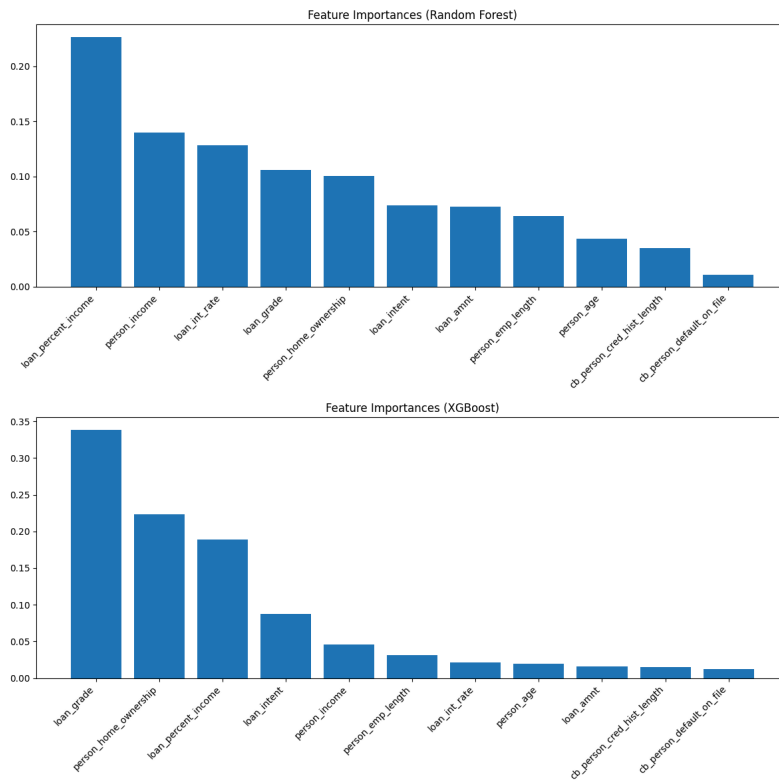
```
def plot_feature_importance(model, title):
    importance = model.feature_importances_
    feature_names = X.columns

    # Sort feature importances in descending order
    indices = np.argsort(importance)[::-1]

    plt.figure(figsize=(12, 6))
    plt.title(f"Feature Importances ({title})")
    plt.bar(range(len(importance)), importance[indices])
    plt.xticks(range(len(importance)), [feature_names[i] for i in i
               rotation=45, ha='right')
    plt.tight_layout()
    plt.show()

# Plot feature importance for both models
plot_feature_importance(rf_model, "Random Forest")
plot_feature_importance(xgb_model, "XGBoost")
```

- 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](#)!
- 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

Feature Importances (Random Forest)

Feature Importances (XGBoost)


```python
fig, (ax1, ax2) = plt.subplots(1, 2, figsize=(15, 5))

# Random Forest confusion matrix
sns.heatmap(confusion_matrix(y_test, rf_predictions), annot=True, f
ax1.set_title('Random Forest Confusion Matrix')
ax1.set_xlabel('Predicted')
ax1.set_ylabel('Actual')

# XGBoost confusion matrix
sns.heatmap(confusion_matrix(y_test, xgb_predictions), annot=True,
ax2.set_title('XGBoost Confusion Matrix')
ax2.set_xlabel('Predicted')
ax2.set_ylabel('Actual')

plt.tight_layout()
plt.show()
```

- polars 0.17.3 -> 0.20.2
- gdown 4.6.6 -> 4.7.3 (GitHub issue)
- tensorflow-hub 0.15.0 -> 0.16.0
- 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_vertical_s` 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 al 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
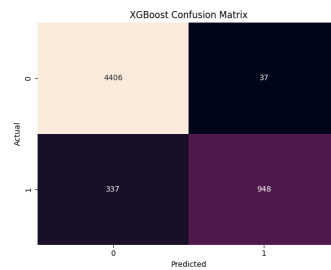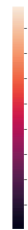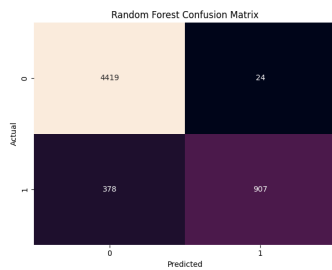 - google-cloud-aiplatform 1.38.1

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

Start coding or generate with AI.

```python
import pickle

# Save Random Forest model
with open('random_forest_model.pkl', 'wb') as f:
    pickle.dump(rf_model, f)

# Save XGBoost model
with open('xgboost_model.pkl', 'wb') as f:
    pickle.dump(xgb_model, f)

# Save scaler
with open('scaler.pkl', 'wb') as f:
    pickle.dump(scaler, f)

print("Models and scaler have been saved successfully!")
```

    Models and scaler have been saved successfully!

```python
def predict_credit_risk(data, model_path='random_forest_model.pkl',
                        scaler_path='scaler.pkl'):
    # Load model and scaler
    with open(model_path, 'rb') as f:
        model = pickle.load(f)
    with open(scaler_path, 'rb') as f:
        scaler = pickle.load(f)

    # Scale the data
    scaled_data = scaler.transform(data)

    # Make prediction
    prediction = model.predict(scaled_data)
    probability = model.predict_proba(scaled_data)

    return prediction, probability
```

- 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
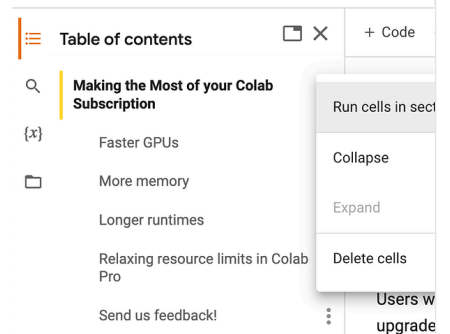   - geemap 0.26.0

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](#))

Notebook settings

Runtime type
Python 3 ⌄

Hardware accelerator
None ⌄ ⓘ

☑ Automatically run the first cell or section
☐ Omit code cell output when saving this notebook

Canc

- 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](#3664))
- Fixed rendering support for
    compositional inputs ([#3660](#3660), [#3679](#3679))
- Fixed lag in notebooks with lots of cells
    ([#3676](#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.authenticate_se` 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 usage tab
- Improved security for mounting Google Drive which disallows mounting Drive from accounts other than the one