```
!pip install gradio
```

```
Collecting semantic-version~=2.0 (from gradio)
  Downloading semantic_version-2.10.0-py2.py3-none-any.whl.metadata (9.7 kB)
Collecting starlette<1.0,>=0.40.0 (from gradio)
  Downloading starlette-0.46.2-py3-none-any.whl.metadata (6.2 kB)
Collecting tomlkit<0.14.0,>=0.12.0 (from gradio)
  Downloading tomlkit-0.13.2-py3-none-any.whl.metadata (2.7 kB)
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Downloading pydub-0.25.1-py2.py3-none-any.whl (32 kB)
Installing collected packages: pydub, uvicorn, tomlkit, semantic-version, ruff, python-multipart, groovy, ffmpy, aiofiles, starle
Successfully installed aiofiles-24.1.0 fastapi-0.115.12 ffmpy-0.5.0 gradio-5.29.0 gradio-client-1.10.0 groovy-0.1.2 pydub-0.25.1
```

```
import pandas as pd
from google.colab import files
uploaded= files.upload()
df=pd.read_csv("global_traffic_accidents.csv")
print(df)
print(df.isnull().sum())
```

Choose files global_traffi…ccidents.csv

- **global_traffic_accidents.csv**(text/csv) - 967468 bytes, last modified: 08/05/2025 - 100% done

```
Saving global_traffic_accidents.csv to global_traffic_accidents (2).csv
     Accident ID        Date   Time           Location   Latitude   Longitude  \
0       b0dd6f57  2023-04-19  06:39      Mumbai, India  13.488432  -73.290682   
1       debfad09  2023-01-17  02:47  São Paulo, Brazil -37.798317  -32.244242   
2       6d69aa36  2024-04-09  02:55  Sydney, Australia  33.767869  104.869018   
3       425bb1f0  2023-10-10  11:23       Tokyo, Japan  -0.378031 -165.825855   
4       90d5cf62  2023-01-02  12:07     Beijing, China  41.254879  -30.776959   
...          ...         ...    ...                ...        ...         ...   
9995    2d26c7e2  2023-01-10  18:41      Paris, France -41.344055  109.335620   
9996    4d236cfd  2023-04-04  16:48  São Paulo, Brazil -60.765148  -10.432225   
9997    1d32722f  2024-09-30  14:43     Beijing, China -11.161278  -72.164379   
9998    64722572  2024-10-27  18:34  Sydney, Australia -17.153524   20.803006   
9999    96272c1b  2024-10-26  10:30    Toronto, Canada  21.917486  100.486079   

     Weather Condition      Road Condition  Vehicles Involved  Casualties  \
0                 Snow               Snowy                  5           7   
1                Clear                 Icy                  4           1   
2                 Rain               Snowy                  1           7   
3                Storm                 Wet                  4           0   
4                Storm               Snowy                  3           9   
...                ...                 ...                ...         ...   
9995             Storm                 Wet                  3          10   
9996             Storm                 Dry                  3           9   
9997              Snow  Under Construction                  2           3   
9998             Storm  Under Construction                  4           3   
9999             Storm                 Icy                  5           4   

                   Cause  
0       Reckless Driving  
1          Drunk Driving  
2       Reckless Driving  
3          Drunk Driving  
4       Reckless Driving  
...                  ...  
9995  Distracted Driving  
9996  Weather Conditions  
9997  Weather Conditions  
9998       Drunk Driving  
9999  Mechanical Failure  

[10000 rows x 11 columns]
Accident ID          0
Date                 0
Time                 0
Location             0
Latitude             0
Longitude            0
Weather Condition    0
Road Condition       0
Vehicles Involved    0
Casualties           0
Cause                0
dtype: int64
```

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_absolute_error, r2_score
from sklearn.preprocessing import OneHotEncoder
from sklearn.compose import ColumnTransformer
from sklearn.pipeline import Pipeline
import gradio as gr

# Load dataset
df = pd.read_csv("global_traffic_accidents.csv")

# Drop irrelevant columns
df = df.drop(columns=["Accident ID", "Date", "Time", "Location"])

# Define features and target
X = df.drop(columns=["Casualties"])
y = df["Casualties"]

# Identify categorical and numerical features
categorical_features = ["Weather Condition", "Road Condition", "Cause"]
numerical_features = ["Latitude", "Longitude", "Vehicles Involved"]

# Preprocessing for categorical data
preprocessor = ColumnTransformer(
    transformers=[
        ("cat", OneHotEncoder(handle_unknown="ignore"), categorical_features)
    ],
    remainder="passthrough"  # Leave numerical features as-is
)

# Build model pipeline
model = Pipeline(steps=[
    ("preprocessor", preprocessor),
    ("regressor", RandomForestRegressor(n_estimators=100, random_state=42))
])

# Train-test split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Train the model
model.fit(X_train, y_train)

# Evaluate the model
y_pred = model.predict(X_test)
print("Mean Absolute Error:", mean_absolute_error(y_test, y_pred))
print("R² Score:", r2_score(y_test, y_pred))

# Gradio interface
def predict_casualties(weather, road, cause, lat, lon, vehicles):
    input_df = pd.DataFrame([{
        "Weather Condition": weather,
        "Road Condition": road,
        "Cause": cause,
        "Latitude": lat,
        "Longitude": lon,
        "Vehicles Involved": vehicles
    }])
    prediction = model.predict(input_df)[0]
    return round(prediction, 2)

iface = gr.Interface(
    fn=predict_casualties,
    inputs=[
        gr.Dropdown(choices=df["Weather Condition"].unique().tolist(), label="Weather Condition"),
        gr.Dropdown(choices=df["Road Condition"].unique().tolist(), label="Road Condition"),
        gr.Dropdown(choices=df["Cause"].unique().tolist(), label="Cause"),
        gr.Number(label="Latitude"),
        gr.Number(label="Longitude"),
        gr.Slider(1, 10, step=1, label="Vehicles Involved")
    ],
    outputs="number",
    title="Traffic Accident Casualty Predictor",
    description="Predicts number of casualties based on accident features."
)

if __name__ == "__main__":
    iface.launch()
```

```
Mean Absolute Error: 2.8124049999999996
R² Score: -0.06805900135838328
It looks like you are running Gradio on a hosted a Jupyter notebook. For the Gradio app to work, sharing must be enabled. Automatica

Colab notebook detected. To show errors in colab notebook, set debug=True in launch()
* Running on public URL: https://58c9fce2b8e0ad3f0f.gradio.live

This share link expires in 1 week. For free permanent hosting and GPU upgrades, run `gradio deploy` from the terminal in the workin
```