USO DE HERRAMIENTA PARA DESPLEGAR UN MODELO DE IA

Universidad Técnica Particular de Loja

MAESTRIA EN INTELIGENCIA ARTIFICIAL APLICADA

HERRAMIENTAS PARA INTELIGENCIA ARTIFICIAL

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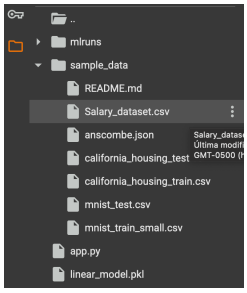
USO DE UNA HERRAMIENTA PARA DESPLEGAR UN MODELO DE IA

Instrucciones:

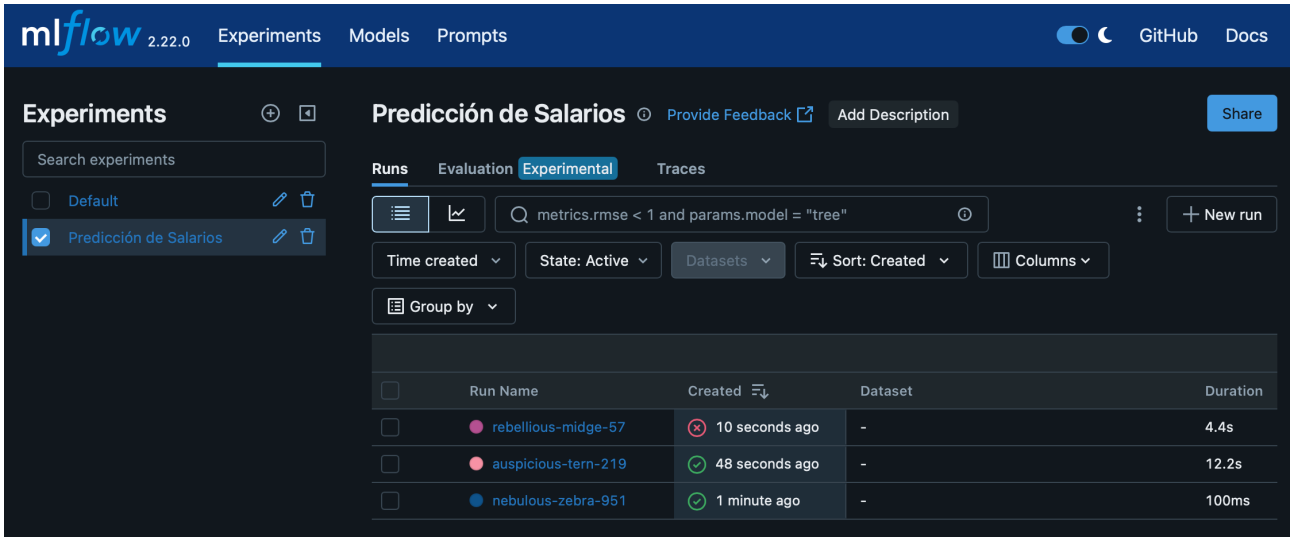
- Obtener un dataset de libre acceso.
- En el notebook, usar MlFlow como herramienta para el manejo del ciclo de vida.
- Aplicar algún algoritmo de aprendizaje automático o aprendizaje profundo en función del dataset seleccionado.
- Gestionar el código de tal manera que se graben los experimentos en MlFlow.
- El servidor de MlFlow deberá ejecutarse en el puerto 9090.
- Generar un modelo de machine learning.
- Consumir el modelo a través de un servicio web, a través de Flask.

Desarrollo:

Dataset: https://www.kaggle.com/datasets/abhishek14398/salary-dataset-simple-linear-regression



MlFlow:



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Práctica 1: Uso de una herramienta para desplegar un modelo de inteligencia artificial

Dataset: Google Play Store

Dataset descargado desde: https://www.kaggle.com/datasets/abhishek14398/salary-dataset-simple-linear-regression

Enlace compartido para acceder a este notebook:

https://drive.google.com/file/d/1hRpbwE6ndoQ-YZfFpxYUJ4cX1qTry_6V/view?usp=sharing

```
# Importar las librerías
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_absolute_error, r2_score
from sklearn.model_selection import train_test_split


# Cargar el archivo googleplaystore.csv
df = pd.read_csv('/content/sample_data/Salary_dataset.csv')
```

+ Código + Texto

```
# Visualizar los primeros registros
print(df.head())
```

```
   Unnamed: 0  YearsExperience   Salary
0           0              1.2  39344.0
1           1              1.4  46206.0
2           2              1.6  37732.0
3           3              2.1  43526.0
4           4              2.3  39892.0
```

```
# Separar las variables independiente (X) y dependiente (y)
X = df[['YearsExperience']]
y = df['Salary']


# Dividir el conjunto de datos en entrenamiento y prueba
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_
```

```
# Crear y entrenar el modelo de regresión lineal
model = LinearRegression()
model.fit(X_train, y_train)
```

```
▾ LinearRegression
LinearRegression()
```

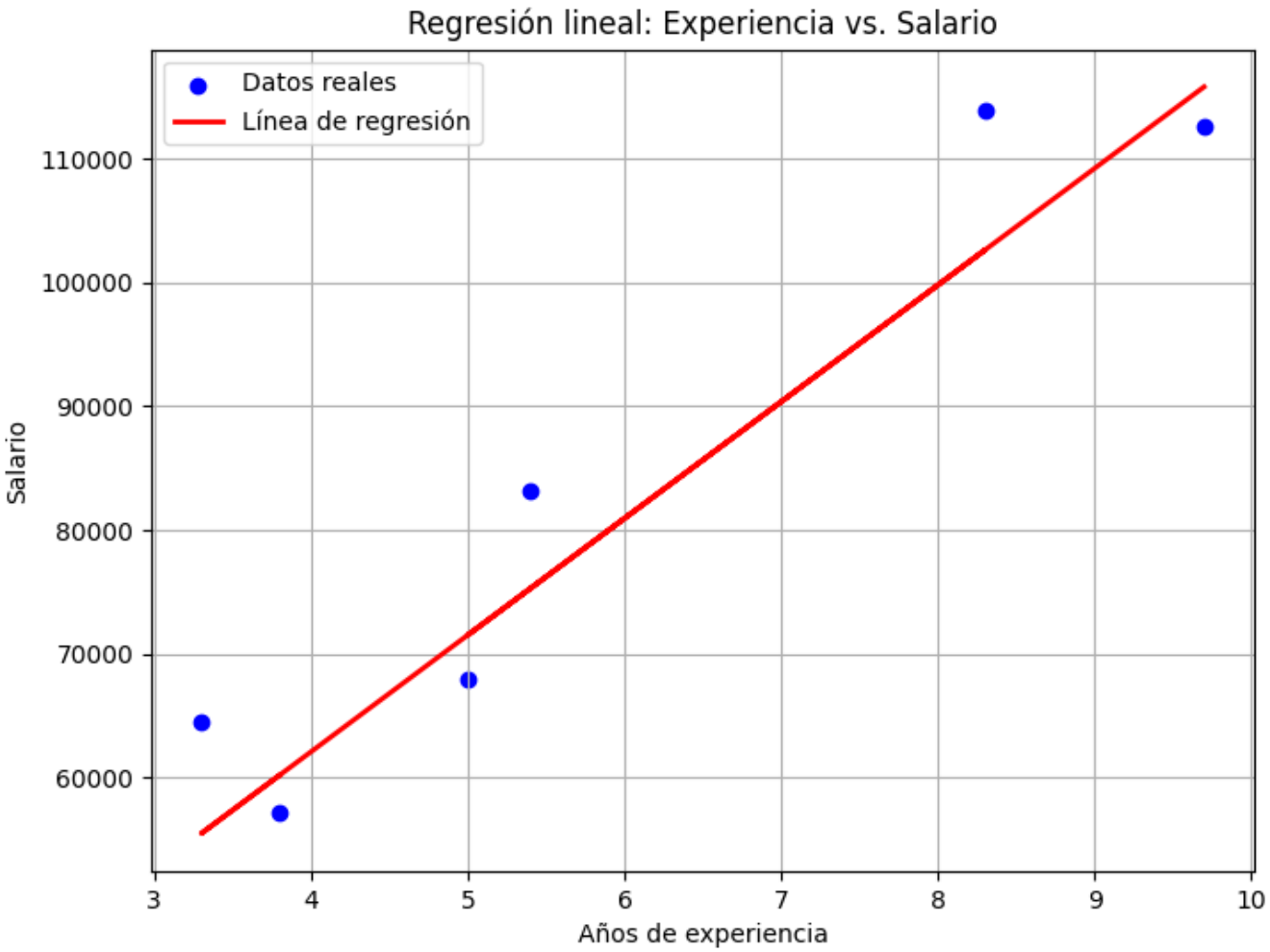
```
# Realizar predicciones sobre el conjunto de prueba
y_pred = model.predict(X_test)
```

```
# Evaluar el modelo
mae = mean_absolute_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)

print(f"MAE: {mae:.2f}")
print(f"R²: {r2:.2f}")
```

```
MAE: 6286.45
R²: 0.90
```

```
# Visualizar los resultados
plt.figure(figsize=(8, 6))
plt.scatter(X_test, y_test, color='blue', label='Datos reales')
plt.plot(X_test, y_pred, color='red', linewidth=2, label='Línea de regresión')
plt.xlabel('Años de experiencia')
plt.ylabel('Salario')
plt.title('Regresión lineal: Experiencia vs. Salario')
plt.legend()
plt.grid(True)
plt.show()
```




```
# Intalar librerías
!pip install mlflow --quiet
!pip install pyngrok --quiet
```

```
# Importar librerías
import mlflow
import mlflow.sklearn


mlflow.set_experiment("Predicción de Salarios")
```

```
<Experiment:
    artifact_location='file:///content/mlruns/577967795547298450',
    creation_time=1747627689751, experiment_id='577967795547298450',
    last_update_time=1747627689751, lifecycle_stage='active', name='Predicción
    de Salarios', tags={}>
```

```
from google.colab import userdata
Token = userdata.get('ngrok_key')


# Colocamos la solución en el puerto 9090
get_ipython().system_raw("mlflow ui --port 9090 &")
mlflow.set_tracking_uri("http://localhost:9090")


# Autenticación en la plataforma Ngrok
from pyngrok import ngrok
ngrok.set_auth_token(Token)


# Solicitar IP pública para revisar la tarea
public_url  = ngrok.connect(9090).public_url
print('mlflow UI URL: ', public_url)
```

```
mlflow UI URL:  https://867f-34-169-65-11.ngrok-free.app
```

```
# Configuración de parámetros que se muestran en Ngrok
with mlflow.start_run():
  mlflow.log_param('data-path', '/content/sample_data/Salary_dataset.csv')
  mlflow.log_param('train-test-split-size', 0.2)
  mlflow.log_param('random-state', 42)
  mlflow.sklearn.log_model(model, 'model')
  mlflow.log_metric('mae', mae)
  mlflow.log_metric('r2', r2)
  mlflow.log_artifact('/content/sample_data/Salary_dataset.csv')
```

```
2025/05/19 04:47:40 WARNING mlflow.models.model: Model logged without a sig
🏃 View run traveling-shad-502 at: http://localhost:9090/#/experiments/5779
🧪 View experiment at: http://localhost:9090/#/experiments/5779677955472984
```

```
%%writefile app.py
from flask import Flask, request, jsonify
import joblib
import numpy as np

# Cargar modelo
model = joblib.load('linear_model.pkl')

# Crear app Flask
app = Flask(__name__)

@app.route('/')
def home():
    return "Servicio activo para predicción de salarios"

@app.route('/predict', methods=['POST'])
def predict():
    data = request.get_json()
    years_experience = data.get('YearsExperience')

    # Validación simple
    if years_experience is None:
        return jsonify({'error': 'YearsExperience no proporcionado'}), 400

    # Convertir la entrada a un formato que el modelo pueda usar (NumPy array)
    # Ensure the input is a 2D array as expected by sklearn models
    try:
        years_experience_array = np.array([[float(years_experience)]])
    except ValueError:
        return jsonify({'error': 'YearsExperience debe ser un número válido'}),

    # Realizar predicción
    predicted_salary = model.predict(years_experience_array)

    # Devolver el resultado como JSON
    return jsonify({'predicted_salary': predicted_salary[0]})

if __name__ == '__main__':
    # This is typically used when running the script directly
    # In a Colab environment with ngrok, you might not need this block to run t
    # Instead, you would run the Flask app using a command line tool or a separ
    # For simplicity and demonstration, you might keep it if you were running a
    pass
```

```
Overwriting app.py
```

```
!pip install flask-ngrok
```

```
Requirement already satisfied: flask-ngrok in /usr/local/lib/python3.11/dis
Requirement already satisfied: Flask>=0.8 in /usr/local/lib/python3.11/dist
Requirement already satisfied: requests in /usr/local/lib/python3.11/dist-p
Requirement already satisfied: blinker>=1.9.0 in /usr/local/lib/python3.11/
Requirement already satisfied: click>=8.1.3 in /usr/local/lib/python3.11/di
Requirement already satisfied: itsdangerous>=2.2.0 in /usr/local/lib/python
Requirement already satisfied: jinja2>=3.1.2 in /usr/local/lib/python3.11/d
Requirement already satisfied: markupsafe>=2.1.1 in /usr/local/lib/python3.
Requirement already satisfied: werkzeug>=3.1.0 in /usr/local/lib/python3.11
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/p
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.11/di
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3
```

```
from flask_ngrok import run_with_ngrok
from app import app

run_with_ngrok(app)  # Inicia Flask y lo expone con ngrok
app.run()
```

```
 * Serving Flask app 'app'
 * Debug mode: off
INFO:werkzeug:WARNING: This is a development server. Do not use it in a pro
 * Running on http://127.0.0.1:5000
INFO:werkzeug:Press CTRL+C to quit
 * Running on http://867f-34-169-65-11.ngrok-free.app
 * Traffic stats available on http://127.0.0.1:4040
```

```
!curl -X POST https://7c82-34-169-65-11.ngrok-free.app/predict \
    -H "Content-Type: application/json" \
    -d '{"YearsExperience": 3.5}'
```

```
...
```