UNIVERSIDAD DEL VALLE DE GUATEMALA

CC3105 - Machine learning engineering

Sección 10

Ejercicio 5

SEBASTIAN ARISTONDO PEREZ 20880

PABLO DANIEL GONZALEZ RAMOS 20362

JOSE DANIEL GONZALEZ CARRILLO 20293

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Usamos django rest para generar la API. Creamos dos servicios, uno para entreno y otro para predicción.

```
import os
import logging

from rest_framework import status
from urllib.parse import urlparse

import pandas as pd
import numpy as np
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.feature_selection import SelectKBest, f_classif
from sklearn.pipeline import Pipeline
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report,
confusion_matrix
import pickle


base_path = os.getcwd()
data_path=os.path.normpath(base_path+os.sep+'data')
pickle_path=os.path.normpath(base_path+os.sep+'models')
log_path=os.path.normpath(base_path+os.sep+'logs')

if not os.path.exists(log_path):
    os.makedirs(log_path)

log_file = os.path.join(log_path, 'training.log')
logging.basicConfig(
    filename=log_file,
    level=logging.INFO,
    format='%(asctime)s - %(levelname)s - %(message)s',
)

class Training:

    def accuracy_measures(self, y_test, y_pred):
        accuracy = accuracy_score(y_test, y_pred)
        logging.info(f"Precisión del modelo: {accuracy * 100:.2f}%")

        # Mostrar el reporte de clasificación
```

```
        logging.info("Reporte de clasificación:")
        logging.info(classification_report(y_test, y_pred))

        # Mostrar la matriz de confusión
        logging.info("Matriz de confusión:")
        logging.info(confusion_matrix(y_test, y_pred))

        return accuracy

    def best_features(self, pipeline, X):
        selector = pipeline.named_steps['selector']
        mask = selector.get_support()  # Array booleano de las
características seleccionadas
        selected_features = X.columns[mask]
        logging.info("Características seleccionadas: %s",
selected_features)

    def train(self, request):
        return_dict=dict()
        try:
            data = pd.read_csv(data_path + '/train_data.csv')
            data['categoria_precio'] = pd.qcut(data['Price'], q=4,
labels=['Bajo', 'Medio Bajo', 'Medio Alto', 'Alto'])
            df_numerico =
data.select_dtypes(include=['number']).dropna(axis=1)
            df_numerico = df_numerico.drop(columns=['Longtitude',
'Lattitude'])
            X = df_numerico.drop(columns=['Price'])
            y = data['categoria_precio']
            X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.3, random_state=42)
            pipeline = Pipeline([
                ('scaler', StandardScaler()),
                ('selector', SelectKBest(score_func=f_classif, k=7)),
                ('classifier', RandomForestClassifier(n_estimators=100,
random_state=42))
            ])
            pipeline.fit(X_train, y_train)
            y_pred = pipeline.predict(X_test)

            accuracy = self.accuracy_measures(y_test, y_pred)
            self.best_features(pipeline, X)
```

```
            pickle_file =
os.path.normpath(pickle_path+os.sep+'model.pkl')
            pickle.dump(pipeline, open(pickle_file, 'wb'))

            selector = pipeline.named_steps['selector']
            selected_columns = X.columns[selector.get_support()]
            columns_file = os.path.normpath(pickle_path + os.sep +
'selected_columns.pkl')
            with open(columns_file, 'wb') as f:
                pickle.dump(selected_columns.tolist(), f)

            return_dict['response'] = 'Model Trained Successfully'
            return_dict['status']=status.HTTP_200_OK
            return return_dict

        except Exception as e:
            return_dict['response']="Exception when training the
module: "+str(e.__str__)
            return_dict['status']=status.HTTP_500_INTERNAL_SERVER_ERROR
            return return_dict
```

```
# prediction.py
import os
import pickle
import pandas as pd

base_path = os.getcwd()
pickle_path = os.path.normpath(base_path + os.sep + 'models')

class Predictor:
    def __init__(self):
        # Cargar el modelo y las columnas seleccionadas al inicializar
la clase
        self.model = self.load_model()
        self.selected_columns = self.load_selected_columns()

    def load_model(self):
        try:
            pickle_file = os.path.normpath(pickle_path + os.sep +
'model.pkl')
            with open(pickle_file, 'rb') as f:
                model = pickle.load(f)
            return model
```

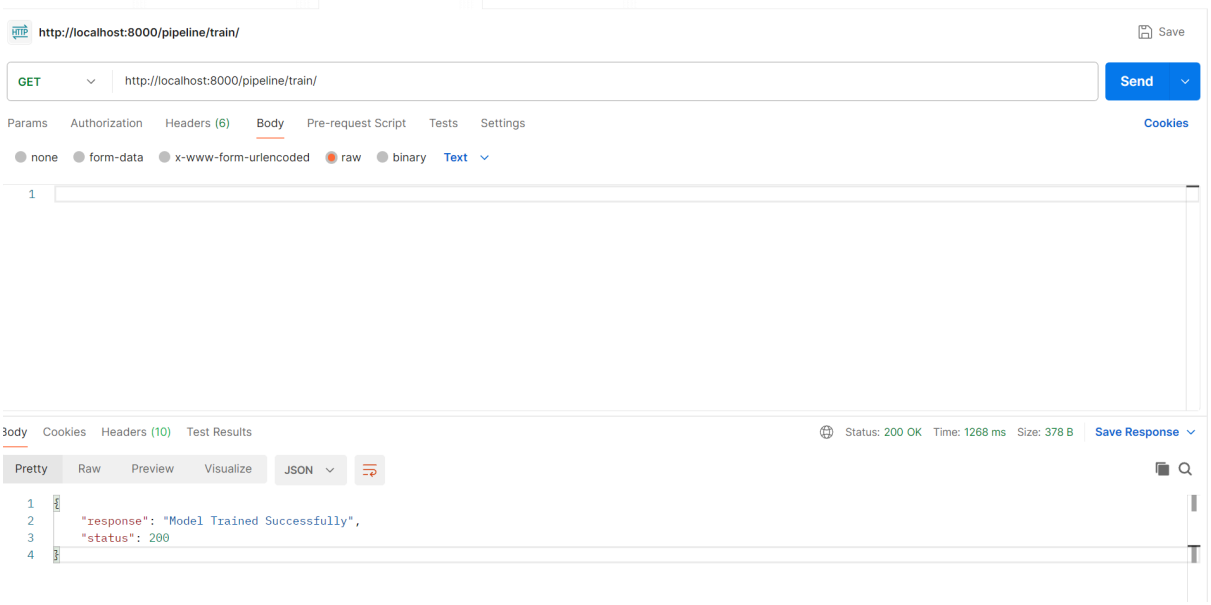
```
        except Exception as e:
            raise Exception(f"Error loading model: {str(e)}")

    def load_selected_columns(self):
        try:
            columns_file = os.path.normpath(pickle_path + os.sep +
'selected_columns.pkl')
            with open(columns_file, 'rb') as f:
                selected_columns = pickle.load(f)
            return selected_columns
        except Exception as e:
            raise Exception(f"Error loading selected columns:
{str(e)}")

    def predict(self, data):
        """
        Método para predecir una o muchas observaciones.
        `data` puede ser un diccionario de una observación o una lista
de diccionarios.
        """
        try:
            if isinstance(data, dict):  # Si es un solo diccionario,
convertir a DataFrame
                input_data = pd.DataFrame([data])
            elif isinstance(data, list):  # Si es una lista de
diccionarios, convertir a DataFrame
                input_data = pd.DataFrame(data)
            else:
                raise ValueError("Invalid data format. Must be a dict
or list of dicts.")

            # Usar solo las columnas seleccionadas para la predicción
            input_data = input_data[self.selected_columns]

            # Realizar la predicción
            predictions = self.model.predict(input_data)
            return predictions.tolist()  # Devolver la predicción como
lista para mayor flexibilidad
        except Exception as e:
            raise Exception(f"Error during prediction: {str(e)}")
```

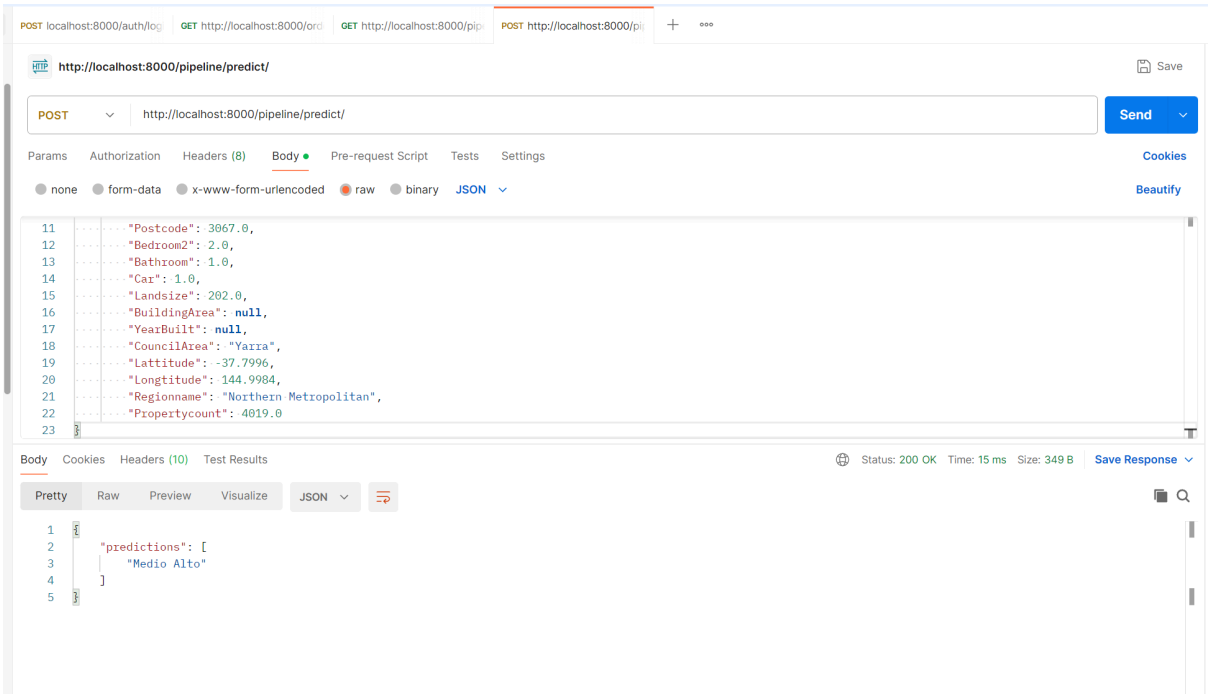
En el entreno se consumieron los datos que hemos estado usando en todos los labs y se realizó el pipeline de entrenamiento. En la predicción se usó el modelo generado en un .pkl.

Se crearon vistas para poder servir los endpoints:

```
 from django.shortcuts import render
from model_pipeline.services.training import Training
from model_pipeline.services.prediction import Predictor
from rest_framework.response import Response
from rest_framework import status
from rest_framework.views import APIView

predictor = Predictor()

class TrainModel(APIView):
    def get(self, request):
        training = Training()
        response_dict = training.train(request)
        print(response_dict)
        return Response(response_dict)

class PredictView(APIView):
    def post(self, request):
        try:
            # Obtener los datos del request
            data = request.data

            # Realizar la predicción utilizando el servicio de
predicción
            predictions = predictor.predict(data)

            response = {
                'predictions': predictions
            }

            return Response(response, status=status.HTTP_200_OK)
        except Exception as e:
            return Response({'error': str(e)},
status=status.HTTP_500_INTERNAL_SERVER_ERROR)
```

Este fue el resultado de los endpoints





Además, se creó un dockerfile para el proyecto

```
# Python runtime as a image
FROM python:3.10
# install dependencies
COPY requirements.txt requirements.txt
RUN pip install --no-cache-dir -r requirements.txt
#Mounts the application code to the image andexpose 8post 8000
COPY . code
```

```
WORKDIR /code
EXPOSE 8000
# runs the production server
ENTRYPOINT ["python", "manage.py"]
CMD ["runserver", "0.0.0.0:8000"]
```