# Assignment 2: Road Accident Severity Prediction

This project builds a linear regression model to predict road accident severity using relevant features from a dataset.  
  
- Dependent variable: Accident\_severity  
- Independent variables: Number\_of\_vehicles\_involved, Number\_of\_casualties, Weather\_conditions, Light\_conditions, Road\_surface\_conditions  
  
Steps:  
1. Load and clean the dataset  
2. Train the linear regression model  
3. Save the trained model for future use  
4. Use the model to predict accident severity with sample data  
5. Show how this model can support road safety efforts in underdeveloped countries

## Python Code

accident\_model.py  
  
import pandas as pd  
from sklearn.model\_selection import train\_test\_split  
from sklearn.linear\_model import LinearRegression  
from sklearn.metrics import r2\_score  
import joblib  
  
 Load the dataset  
df = pd.read\_csv("rta\_dataset.csv")  
  
 Select important columns  
df = df[['Accident\_severity', 'Number\_of\_vehicles\_involved',  
 'Number\_of\_casualties', 'Weather\_conditions',  
 'Light\_conditions', 'Road\_surface\_conditions']]  
  
 Clean and preprocess  
df.dropna(inplace=True)  
df = pd.get\_dummies(df, drop\_first=True)  
  
 Define X and y  
X = df.drop('Accident\_severity', axis=1)  
y = df['Accident\_severity']  
  
 Split into training and test sets  
X\_train, X\_test, y\_train, y\_test = train\_test\_split(X, y, test\_size=0.2, random\_state=42)  
  
 Train the model  
model = LinearRegression()  
model.fit(X\_train, y\_train)  
  
 Evaluate and save  
y\_pred = model.predict(X\_test)  
print("R² Score:", r2\_score(y\_test, y\_pred))  
joblib.dump(model, 'accident\_severity\_model.pkl')  
print("✅ Model saved successfully!")  
  
 Sample prediction  
sample\_input = X.iloc[[0]].copy()  
sample\_input.iloc[0] = [2] \* len(X.columns)  
loaded\_model = joblib.load('accident\_severity\_model.pkl')  
prediction = loaded\_model.predict(sample\_input)  
print("📌 Predicted Accident Severity (sample):", prediction)