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# # Internship Task 1: Big Data Analysis using PySpark
# This notebook analyzes a large fraud detection dataset using PySpark to demonstrate scalability.
# 🖋 Step 1: Install Java (Spark needs Java runtime)
!apt-get install openjdk-11-jdk-headless -qq > /dev/null
# # Step 2: Download Spark 3.5.1 (you can change version if needed)
!wget -q https://archive.apache.org/dist/spark/spark-3.5.1/spark-3.5.1-bin-hadoop3.tgz
# // Step 3: Extract Spark package
!tar -xzf spark-3.5.1-bin-hadoop3.tgz
# # Step 4: Install findspark to connect Python with Spark
!pip install -q findspark
import os
import findspark
\mbox{\tt\#} Set environment paths for Java and Spark
os.environ["JAVA_HOME"] = "/usr/lib/jvm/java-11-openjdk-amd64"
os.environ["SPARK_HOME"] = "/content/spark-3.5.1-bin-hadoop3"
# Initialize findspark
findspark.init()
Double-click (or enter) to edit
from google.colab import files
uploaded = files.upload()
      Choose Files fraud detec...dataset.csv
       fraud_detection_bank_dataset.csv(text/csv) - 5010367 bytes, last modified: 8/8/2021 - 100% done
     Source froud detection bank detect any to froud detection bank detect any
from pyspark.sql import SparkSession
# Start or get the SparkSession
spark = SparkSession.builder \
    .appName("My Fraud Detection Analysis") \
    .getOrCreate()
df = spark.read.csv("fraud_detection_bank_dataset.csv", header=True, inferSchema=True)
df.printSchema()
df.show(5)
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print("Row count:", df.count())
print("Column count:", len(df.columns))
    Row count: 20468
    Column count: 114
df.describe().show()
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from pyspark.sql.functions import sum
# Get columns where all values = 0
zero_cols = []
for col name in df.columns:
   if df.select(sum(col_name)).first()[0] == 0:
      zero_cols.append(col_name)
# Drop them
df_clean = df.drop(*zero_cols)
print("Dropped columns:", zero_cols)
```

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Tropped columns: ['col_8', 'col_9', 'col_10', 'col_11', 'col_12', 'col_18', 'col_19', 'col_20', 'col_21', 'col_35', 'col_51', 'col_52',
df_clean.columns
                  'col_50',
                  'col_54',
                  'col 55',
                  'col_56',
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                  'col_105',
                  'col_106',
                  'col_107',
                  'col_108',
                  'col_109',
                  'col_110',
                  'col_111',
                  'targets']
new_names = [
            "amount", "oldbalanceOrg", "newbalanceOrig", "type", # first few known fields
           # Add generic names for the rest
 ] + [f"feature_{i}" for i in range(len(df_clean.columns) - 5)] + ["isFraud"] # assuming last column is the target
df_clean = df_clean.toDF(*new_names)
df_clean.show(5)
               | amount| oldbalance Org| newbalance Orig| type| feature\_0| feature\_1| feature\_2| feature\_3| feature\_4| feature\_5| feature\_6| feature\_7| feature\_8| feature\_6| feature\_7| feature\_8| feature\_9| feat
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only showing top 5 rows
print("Rows:", df_clean.count())
print("Columns:", len(df_clean.columns))
    Rows: 20468
    Columns: 99
df_clean.printSchema()
      |-- feature_38: integer (nullable = true)
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      -- feature_39: integer (nullable = true)
      |-- feature_40: integer (nullable = true)
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      -- feature_91: integer (nullable = true)
      -- feature_92: integer (nullable = true)
      -- feature_93: integer (nullable = true)
      |-- isFraud: integer (nullable = true)
```

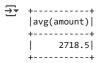
 ${\tt df_clean.groupBy("isFraud").count().show()} \ \ \, {\tt \#count farud transaction}$

```
+----+
|isFraud|count|
+----+
| 1| 5438|
```

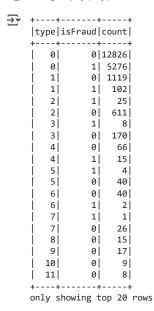
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df_clean.filter("isFraud == 1").groupBy().avg("amount").show() # avg transation amount for fraud



df_clean.groupBy("type", "isFraud").count().orderBy("type").show() # fraud count by transaction



Double-click (or enter) to edit

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# Insights:
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- # Transaction Type 0 had the highest volume and most frauds.
- # Fraud was present across nearly all types.
- # Type 1 had a significant fraud rate.
- # 15 columns were dropped due to containing only 0s.
- # This shows the dataset had redundant information, and PySpark allowed fast filtering and analysis even for large structured data.