

CIS-4560 Term Project Tutorial

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Lab Tutorial

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Objective:

- Download Data
- Unzip and Relocate Data
- Create Tables
- Clean Up Data
- Download Data to the Local Machine
- Analyze Data & Visualization

Platform Specs:

- **CPU:** Intel(R) Xeon(R) Platinum 8167M
- **CPU Speed:** 2.00GHz
- **# CPU Cores:** 8
- **Memory Size:** 4000 Gib

Downloading Data

1. Download the tripdata zip and zones file from Dropbox

```
wget https://www.dropbox.com/s/4yrui8y6gumd6s1/fhvh_tripdata_2021_CSV.zip
wget https://www.dropbox.com/s/q6rvxp3a4t8apfm/taxi_zone_lookup.csv
```

2. Create a directory tripdata to put the file to HDFS

```
hdfs dfs -mkdir tripdata
hdfs dfs -mkdir taxi_zone
hdfs dfs -mkdir tip_data_export
```

Unzip and Relocate Data

3. Unzip the tripdata file

```
unzip fhvh_tripdata_2021_CSV.zip -d tripdata
```

4. Next, you can run the following shell command to put the files we unzipped into HDFS DFS

```
hdfs dfs -put tripdata/fhvh_tripdata_2021_CSV/* tripdata
hdfs dfs -put /home/<YOUR_USERNAME>/taxi_zone_lookup.csv taxi_zone
```

Create Tables

5. This code will create the table “tripdata” and load the data from the zip files into the table “tripdata.”

```
DROP TABLE IF EXISTS tripdata;
CREATE EXTERNAL TABLE if not exists tripdata (
  count BIGINT,
  Hvfhs_license_num VARCHAR(10),
  Dispatching_base_num VARCHAR(10),
```

```

originating_base_num VARCHAR(10),
request_datetime TIMESTAMP,
on_scene_datetime TIMESTAMP,
Pickup_datetime TIMESTAMP,
DropOff_datetime TIMESTAMP,
PULocationID INT,
DOLocationID INT,
trip_miles FLOAT,
trip_time INT,
base_passenger_fare FLOAT,
tolls FLOAT,
bcf FLOAT,
sales_tax FLOAT,
congestion_surcharge FLOAT,
airport_fee FLOAT,
tips FLOAT,
driver_pay FLOAT,
shared_request_flag CHAR(4),
shared_match_flag CHAR(4),
access_a_ride_flag CHAR(4),
wav_request_flag CHAR(4),
wav_match_flag CHAR(4)
)
ROW FORMAT DELIMITED
FIELDS TERMINATED BY ","
STORED AS TEXTFILE
LOCATION '/user/<YOUR_USERNAME>/tripdata'
tblproperties ("skip.header.line.count"="1");

```

6. Create a table for taxi zones.

```

DROP TABLE IF EXISTS taxi_zones;
CREATE EXTERNAL TABLE if not exists taxi_zones (
locationId INT,
borough STRING,
zone STRING,
service_zone STRING
)
ROW FORMAT DELIMITED
FIELDS TERMINATED BY ","
STORED AS TEXTFILE
LOCATION '/user/<YOUR_USERNAME>/taxi_zone'
tblproperties ("skip.header.line.count"="1");

```

7. Run the SQL command below to test the tripdata table

```
SELECT hvfhs_license_num, dispatching_base_num, request_datetime,  
trip_miles, base_passenger_fare FROM tripdata LIMIT 10;
```

8. Run the SQL command below to test the data in the taxi_zone table

```
SELECT * FROM taxi_zones LIMIT 15;
```

9. Run the SQL command below to count the total amount of records.
 - a. 10,565,803 Records

```
SELECT COUNT(*) FROM tripdata;
```

```
INFO : Concurrency mode is disabled, not creating a lock
+-----+
| _c0    |
+-----+
| 10565803 |
+-----+
1 row selected (10.889 seconds)
0: jdbc:hive2://bigdaiun0.sub03291929060.trai>
```

Clean Up Data

10. Run the SQL below on Hive to create a join table between “tripdata” and “taxi_zones.”
This will help us when visualization of the data. At the same time, we are replacing any HV-code with their assigned Rideshare Company.

```
DROP TABLE IF EXISTS trips_join_table;
CREATE TABLE IF NOT EXISTS trips_join_table row format delimited fields
terminated BY "," stored AS textfile location
"/user/<YOUR_USERNAME>/tmp/taxi_zones" AS
SELECT
    CASE
        WHEN hvfhs_license_num = "HV0002" THEN
            regexp_replace(hvfhs_license_num, 'HV0002', 'Juno')
        WHEN hvfhs_license_num = "HV0003" THEN
            regexp_replace(hvfhs_license_num, 'HV0003', 'Uber')
        WHEN hvfhs_license_num = "HV0004" THEN
            regexp_replace(hvfhs_license_num, 'HV0004', 'Via')
```

```

        WHEN hvfhs_license_num = "HV0005" THEN
regexp_replace(hvfhs_license_num, 'HV0005', 'Lyft')
    END AS ridesharing_company,
    dispatching_base_num,
    request_datetime,
    pickup_datetime,
    dropoff_datetime,
    pulocationid,
    zone AS pu_zone,
    dolocationid,
    trip_miles,
    trip_time,
    base_passenger_fare,
    tolls,
    bcf,
    sales_tax,
    congestion_surcharge,
    airport_fee,
    tips,
    driver_pay
FROM taxi_zones t
JOIN tripdata s
ON s.pulocationid = t.locationid;

```

11. Run this command to verify both tables are joined properly.

```

SELECT ridesharing_company, request_datetime, pickup_datetime,
dropoff_datetime, pu_zone FROM trips_join_table limit 10;

```

INFO: Concurrency mode is disabled; not creating a lock manager

ridesharing_company	request_datetime	pickup_datetime	dropoff_datetime	pu_zone
Uber	2021-09-02 14:47:08.0	2021-09-02 15:01:26.0	2021-09-02 15:52:19.0	"Roosevelt Island"
Uber	2021-09-02 15:36:53.0	2021-09-02 15:41:06.0	2021-09-02 16:33:32.0	"Roosevelt Island"
Lyft	2021-09-02 15:27:27.0	2021-09-02 15:36:04.0	2021-09-02 16:25:03.0	"Roosevelt Island"
Lyft	2021-09-02 15:14:33.0	2021-09-02 15:22:19.0	2021-09-02 15:59:46.0	"Roosevelt Island"
Lyft	2021-09-02 15:02:46.0	2021-09-02 15:05:45.0	2021-09-02 16:15:03.0	"Roosevelt Island"
Uber	2021-09-02 15:40:00.0	2021-09-02 15:33:25.0	2021-09-02 16:25:43.0	"Roosevelt Island"
Lyft	2021-09-02 14:02:10.0	2021-09-02 14:18:55.0	2021-09-02 14:42:43.0	"Roosevelt Island"
Uber	2021-09-02 14:10:00.0	2021-09-02 14:04:01.0	2021-09-02 14:36:28.0	"Roosevelt Island"
Lyft	2021-09-02 14:08:19.0	2021-09-02 14:28:38.0	2021-09-02 14:49:39.0	"Roosevelt Island"
Uber	2021-09-02 14:11:15.0	2021-09-02 14:28:47.0	2021-09-02 14:38:31.0	"Roosevelt Island"

Download Data to the Local Machine

12. Create a CSV file from the join table.

```
INSERT OVERWRITE DIRECTORY '/user/<your_username>/trip_data_export/'  
ROW FORMAT DELIMITED FIELDS TERMINATED BY ','  
select * from trips_join_table;
```

13. Export CSV file from Hive to Local Machine

```
hdfs dfs -get /user/<your_username>/trip_data_export/0000*  
/home/<your_username>/tripdata
```

14. Compile all CSV files into one CSV file

```
cat /home/<your_username>/tripdata/0000* > tripdata.txt
```

15. Download the file from the server to the Desktop of your home computer

```
scp <your_username>@129.153.114.72:/home/<your_username>/tripdata.txt  
~/Desktop/tripdata.txt
```

Analyze Data & Visualization

In this step, we will upload our .txt file onto Excel to create our desired 3D Map. To correctly upload data to Excel, we will:

1. First, open the Excel application and then the file utilizing the Text Import Wizard. We will be choosing the Delimited description for our data.

Text Import Wizard - Step 1 of 3

The Text Wizard has determined that your data is Fixed Width.
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type

Choose the file type that best describes your data:

☐ Delimited - Characters such as commas or tabs separate each field.

☒ Fixed width - Fields are aligned in columns with spaces between each field.

Start import at row: 1 File origin: 437 : OEM United States

☐ My data has headers.

Preview of file C:\Users\jestra126\Desktop\test.txt.

1	Uber,B02764,2021-10-02	09:16:41,2021-10-02	09:23:15,2021-10-02	09:39:44,1
2	Lyft,B03406,2021-10-02	09:24:06,2021-10-02	09:33:43,2021-10-02	09:43:17,6
3	Lyft,B03406,2021-10-02	09:48:30,2021-10-02	09:55:03,2021-10-02	10:26:09,6
4	Uber,B02764,2021-10-02	09:46:54,2021-10-02	09:51:33,2021-10-02	10:13:07,6
5	Uber,B02682,2021-10-02	09:45:13,2021-10-02	09:52:23,2021-10-02	10:03:19,6

Cancel < Back Next > Finish

2. Select **Comma** as the Delimiter.

Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

☐ Tab

☐ Semicolon

☒ Comma

☐ Space

☐ Other:

☐ Treat consecutive delimiters as one

Text qualifier: "

Data preview

Uber	B02764	2021-10-02	09:16:41	2021-10-02	09:23:15	2021-10-02	09:39:44	13
Lyft	B03406	2021-10-02	09:24:06	2021-10-02	09:33:43	2021-10-02	09:43:17	61
Lyft	B03406	2021-10-02	09:48:30	2021-10-02	09:55:03	2021-10-02	10:26:09	61
Uber	B02764	2021-10-02	09:46:54	2021-10-02	09:51:33	2021-10-02	10:13:07	61
Uber	B02682	2021-10-02	09:45:13	2021-10-02	09:52:23	2021-10-02	10:03:19	61

Cancel < Back Next > Finish

3. Column Data Format will be **General**.

Text Import Wizard - Step 3 of 3

This screen lets you select each column and set the Data Format.

Column data format

☒ General
☐ Text
☐ Date: MDY
☐ Do not import column (skip)

'General' converts numeric values to numbers, date values to dates, and all remaining values to text.

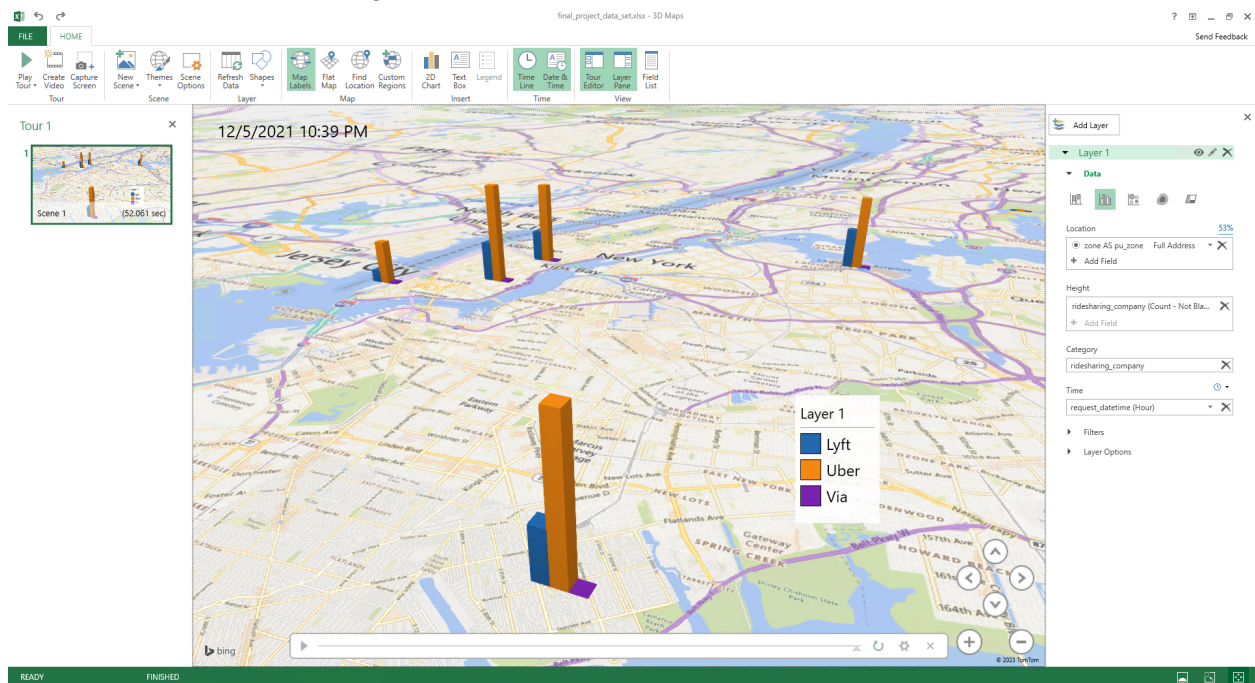
Advanced...

Data preview

General	General	General	General	General	General
Uber	B02764	2021-10-02 09:16:41	2021-10-02 09:23:15	2021-10-02 09:39:44	13
Lyft	B03406	2021-10-02 09:24:06	2021-10-02 09:33:43	2021-10-02 09:43:17	61
Lyft	B03406	2021-10-02 09:48:30	2021-10-02 09:55:03	2021-10-02 10:26:09	61
Uber	B02764	2021-10-02 09:46:54	2021-10-02 09:51:33	2021-10-02 10:13:07	61
Uber	B02682	2021-10-02 09:45:13	2021-10-02 09:52:23	2021-10-02 10:03:19	61

Cancel < Back Next > Finish

4. To visualize location go to **Insert** tab and then click on the 3D Map button.



References

1. Data Source URL:
 - a. <https://www.kaggle.com/datasets/shuhengmo/uber-nyc-forhire-vehicles-trip-data-2021>
2. RawData in CSV format
 - a. https://www.dropbox.com/s/4yrui8y6gumd6s1/fhvh_tripdata_2021_CSV.zip
3. GitHub URL:
 - a. https://github.com/JessieEstrada/NYC_Uber_Trip_Data_2021_Project