

LOGIC FINAL

1. Import all necessary libraries and functions.
2. Define spark context and add .py files with csv.
3. Connect to kafka topic using

Bootstrap-server: 18.211.252.152

Port Number: 9092

Topic: transactions-topic-verified

4. Read kafka stream into required schema to map data.
5. Look Up Table Name: look_up_table
Card Transaction table Name: card_transactions
6. Defining following UDF to perform required activities and determine whether transaction is fraudulent or genuine.

FUNCTION	INPUT	OUTPUT
ucl_data	CARD_ID	UCL (look_up_table)
score_data	CARD_ID	Credit Score (look up tab)
postcode_data	CARD_ID	post code (look up table)
distance_calc	post codes (lookup table & kafka stream)	Distance between 2 locations of current transaction and previous transaction
time_cal	transaction date (lookup table & kafka stream)	difference between transaction dates in seconds.
ITransD_data	CARD_ID	transaction date (look up table)
speed_calc	Distance & Time calculated from above distance_calc & time_cal functions	Distance & Time calculated from distance_calc & time_cal functions
status_res	Amount from current transaction read thru kafka stream, UCL from look up table, Credit_Score (look up table) & Speed calculated (udf)	Status of transaction (genuine or fraud)

7. Executing UDF sequentially. Hence, deriving if transaction is fraud or genuine. These functions work as agents to derive inputs to function status_res (function H).
8. The rules performed on inputs supplied to function H.

If current transaction amount is greater than UCL of look up table for that card_id, mark transaction as Fraud. Else, proceed to check below:

- If credit score of that card_id under process is less than 250, reject transaction as FRAUD. Else, proceed.
- If speed calculated is greater than 250, recognize the transaction as "FRAUD". If speed is between 0 and 250, mark the transaction as genuine.

9. To summarize, a transaction is qualified to be genuine only when:
 - Credit score of member is greater than 200,
 - Speed is between 0 & 250
 - Amount on current transaction is less than UCL calculated.
10. Functions "A", "B", "C", "F" & "H" contact dao.py to call the look up table (given above) for designated purposes.
 - In process of calling dao.py from this driver.py file, I fo called "Import" which loads other .py files in same directory.
 - Establishing spark context to add python files and csv files before command import.

11. Function "D" uses geopandas to calculate distance between last transaction & current transaction locations that is used in calculating speed which is one of factors for determining status of transaction.
12. Function "H" status_res also calls look_up_table using write_data function when transaction is genuine.
 - It also updates card_transactions table with latest information of posid, amount, transaction date and member ID.

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Batch: 0
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+-----+-----+-----+-----+-----+-----+-----+
|card_id|member_id|amount|pos_id|postcode|transaction_dt_ts|status|
+-----+-----+-----+-----+-----+-----+-----+
|348702330256514|37495066290|4380912|248063406800722|96774|2017-12-31 08:24:29|GENUINE|
|348702330256514|37495066290|6703385|786562777140812|84758|2017-12-31 04:15:03|FRAUD|
|348702330256514|37495066290|7454328|466952571393508|93645|2017-12-31 09:56:42|GENUINE|
|348702330256514|37495066290|4013428|45845320330319|15868|2017-12-31 05:38:54|GENUINE|
|348702330256514|37495066290|5495353|545499621965697|79033|2017-12-31 21:51:54|GENUINE|
|348702330256514|37495066290|3966214|369266342272501|22832|2017-12-31 03:52:51|GENUINE|
|348702330256514|37495066290|1753644|9475029292671|17923|2017-12-31 00:11:30|FRAUD|
|348702330256514|37495066290|1692115|27647525195860|55708|2017-12-31 17:02:39|GENUINE|
|5189563368503974|117826301530|9222134|525701337355194|64002|2017-12-31 20:22:10|GENUINE|
|5189563368503974|117826301530|4133848|182031383443115|26346|2017-12-31 01:52:32|FRAUD|
|5189563368503974|117826301530|8938921|799748246411019|76934|2017-12-31 01:06:50|FRAUD|
|5189563368503974|117826301530|1786366|131276818071265|63431|2017-12-31 14:29:38|GENUINE|
|5189563368503974|117826301530|9142237|564240259678903|50635|2017-12-31 19:37:19|GENUINE|
|5407073344486464|1147922084344|6885448|887913906711117|59031|2017-12-31 07:53:53|FRAUD|
|5407073344486464|1147922084344|4028209|116266051118182|80118|2017-12-31 01:06:50|FRAUD|
|5407073344486464|1147922084344|3858369|896105817613325|53820|2017-12-31 17:37:26|GENUINE|
|5407073344486464|1147922084344|9307733|729374116016479|14898|2017-12-31 04:50:16|FRAUD|
|5407073344486464|1147922084344|4011296|543373367319647|44028|2017-12-31 13:09:34|GENUINE|
|5407073344486464|1147922084344|9492531|211980095659371|49453|2017-12-31 14:12:26|GENUINE|
|5407073344486464|1147922084344|7550074|345533088112099|15030|2017-12-31 02:34:52|FRAUD|
+-----+-----+-----+-----+-----+-----+-----+
only showing top 20 rows

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Current count: 20000, row: 27999
Current count: 21000, row: 28899
Current count: 22000, row: 29799
Current count: 23000, row: 30698
Current count: 24000, row: 31598
Current count: 25000, row: 32498
Current count: 26000, row: 33398
Current count: 27000, row: 341724964458347.210778177559185.12-06-2018152638.2021-01-04171328.398477
Current count: 28000, row: 346618652451637.540752175696215.29-04-2018005259.2021-01-04171400.227023
Current count: 29000, row: 35264
Current count: 30000, row: 36164
Current count: 31000, row: 370582035866789.433646648625434.08-07-2018034337.2021-01-04171349.489639
Current count: 32000, row: 375806375521605.880937166605469.26-05-2018130045.2021-01-04171430.733012
Current count: 33000, row: 38176
Current count: 34000, row: 39076
Current count: 35000, row: 39877
Current count: 36000, row: 40768
Current count: 37000, row: 41560
Current count: 38000, row: 42387
Current count: 39000, row: 4318541450654035.496612742732167.12-02-2018145807.2021-01-04171356.009418
Current count: 40000, row: 43999
Current count: 41000, row: 44784
Current count: 42000, row: 45546
Current count: 43000, row: 46306
Current count: 44000, row: 47134
Current count: 45000, row: 47925
Current count: 46000, row: 48730
Current count: 47000, row: 49500
Current count: 48000, row: 50351
Current count: 49000, row: 5120
Current count: 50000, row: 51888
Current count: 51000, row: 5257502990314019.205172644364018.14-07-2018070014.2021-01-04171327.867742
Current count: 52000, row: 53290
Current count: 53000, row: 5620
Current count: 54000, row: 6211
Current count: 55000, row: 647888441720966.273246841077378.06-10-2018212851.2021-01-04171333.585477
Current count: 56000, row: 6968
Current count: 57000, row: 7868
Current count: 58000, row: 8768
Current count: 59000, row: 9668
39367 row(s) in 3.8140 seconds

=> 59367

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