Exploratory Analysis of Customer Segmentation (RFM Analysis) in SQL

Analyst: Olanrewaju Olatunji

Business Request/Problem Statement:

Hi, Olanrewaju

The organization is looking to lunch a new campaign on all products. We need you to segment our customers by finding the best and the worse group of customers for the campaign.

Objectives: -Rank and group customers

-Identify good and bad customers

-Who are our most valuable customers.

Technique: Rank and group customers based on Recency, Frequency and Monetary total of their transactions to identify the top customers and perform targeted marketing campaign.

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What is RFM Analysis?

RFM Analysis stands for Recency, Frequency and Monetary.

It is an indexing technique that uses past purchase behaviour to segment customers. An RFM report is a way of segmenting customers using three metrics;

-Recency (How long ago was the customer's last purchase).

-Frequency (How often the customers purchase from us).

-Monetary Value (How much a customer spends).

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Step 1:

Data Filtering: I filtered the dataset to what is needed to avoid ambiguity. The columns needed were; order id, order date, customer name and sales

Raw Data:

	order_id	order_date	customers_name	country	state	city	region	segment	ship_mode	category	sub_category	product_name
1	AZ-2011-9050313	2011-01-03	Summer Hayward	United Kingdom	England	Southport	North	Consumer	Economy	Furniture	Bookcases	Dania Corner Shelving, Tradit
2	AZ-2011-6674300	2011-01-04	Devin Huddleston	France	Auver...	Valence	Cen...	Consumer	Economy	Office ...	Art	Binney & Smith Sketch Pad, I
3	AZ-2011-617423	2011-01-05	Daniel Burke	France	Auver...	Echirolles	Cen...	Home O...	Priority	Office ...	Art	Binney & Smith Pencil Sharpe
4	AZ-2011-617423	2011-01-05	Daniel Burke	France	Auver...	Echirolles	Cen...	Home O...	Priority	Office ...	Art	Sanford Canvas, Fluorescent
5	AZ-2011-2918397	2011-01-07	Fredrick Beverid...	France	Prove...	La Seyn...	Cen...	Corporate	Priority	Furniture	Bookcases	Bush Floating Shelf Set, Pine
6	AZ-2011-2918397	2011-01-07	Fredrick Beverid...	France	Prove...	La Seyn...	Cen...	Corporate	Priority	Office ...	Fasteners	Accos Thumb Tacks, Assorte
7	AZ-2011-2918397	2011-01-07	Fredrick Beverid...	France	Prove...	La Seyn...	Cen...	Corporate	Priority	Office ...	Storage	Smead Lockers, Industrial
8	AZ-2011-6712797	2011-01-11	Evie Flockhart	Italy	Liguria	Genoa	South	Consumer	Economy	Office ...	Binders	Ibico Hole Reinforcements, F
9	AZ-2011-4827146	2011-01-11	Faith Greenwood	Austria	Vienna	Vienna	Cen...	Consumer	Economy	Office ...	Art	Boston Canvas, Fluorescent
10	AZ-2011-4827146	2011-01-11	Faith Greenwood	Austria	Vienna	Vienna	Cen...	Consumer	Economy	Office ...	Storage	Smead Trays, Single Width
11	AZ-2011-6439906	2011-01-11	Summer Hayward	Spain	Murcia	Murcia	South	Consumer	Economy	Office ...	Labels	Novimex File Folder Labels, A
12	AZ-2011-7053593	2011-01-11	Gracie Powell	United Kingdom	England	Woking	North	Consumer	Immediate	Furniture	Chairs	SAFCO Executive Leather Ar
13	AZ-2011-7053593	2011-01-11	Gracie Powell	United Kingdom	England	Woking	North	Consumer	Immediate	Office ...	Art	Binney & Smith Canvas, Blue

Query executed successfully. | DESKTOP-170U4IG (16.0 RTM) | sa (63) | AdventureWorks2019 | 00:00:00 | 6,311 rows

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Filtered Dataset:

```sql
-- Step 1: Data Filtering

SELECT
    order_id,
    order_date,
    customers_name,
    sales
FROM [dbo].[sample]
```

100 %

Results | Messages | Client Statistics

	order_id	order_date	customers_name	sales
1	AZ-2011-9050313	2011-01-03	Summer Hayward	854
2	AZ-2011-6674300	2011-01-04	Devin Huddleston	140
3	AZ-2011-617423	2011-01-05	Daniel Burke	90
4	AZ-2011-617423	2011-01-05	Daniel Burke	207
5	AZ-2011-2918397	2011-01-07	Fredrick Beveridge	155
6	AZ-2011-2918397	2011-01-07	Fredrick Beveridge	33
7	AZ-2011-2918397	2011-01-07	Fredrick Beveridge	716
8	AZ-2011-6712797	2011-01-11	Evie Flockhart	22
9	AZ-2011-4827146	2011-01-11	Faith Greenwood	55
10	AZ-2011-4827146	2011-01-11	Faith Greenwood	97
11	AZ-2011-6439906	2011-01-11	Summer Hayward	40
12	AZ-2011-7053593	2011-01-11	Gracie Powell	1384
13	AZ-2011-7053593	2011-01-11	Gracie Powell	103
14	AZ-2011-5702370	2011-01-12	Hershel Snyder	552

Query executed successfully.

Step 2:

Calculating RFM Values: I used some aggregate functions to determine the RFM Values. Summed up the sales to get Monetary value (It shows the amount spent by each customer on every purchase made). I also did a count of the Order-ID to get my Frequency value (it gives the total order count for each customer). To be able to get the Recency Value, I did a max of the Order-Date to get the last Order-Date for each customer purchase. Then I used a select statement of the max order-Date to get the maximum date in the whole Dataset. And lastly, I used a DateDiff function to subtract the last order date from the maximum order date to be able to get my Recency Value. (This gave the number of days a customer last purchase).

```
WITH RFM_Value AS (
    SELECT
        customers_name,
        COUNT(order_id) AS Frequency,
        SUM(sales) AS Monetary,
        MAX(order_date) AS Last_order_date,
        (SELECT MAX(order_date) FROM [dbo].[sample]) AS Max_ordr_date,
        DATEDIFF(DD, MAX(order_date), (SELECT MAX(order_date) FROM [dbo].[sample])) AS Recency

    FROM [dbo].[sample]
    GROUP BY customers_name
),
```

Step 3:

Customer Ratings based on Recency, Frequency and Monetary: I assigned a rating to each value (Recency, Frequency and Monetary), the value will be based on the volume of my customers and transactions, I used rating of 1-5 and used NTILE function to assign the ratings based on my RFM Values.

```
--Customers Ratings based on Recency,Frequency and Monetary
    RFM_Score as (
SELECT
    customers_name,
    Recency,
    Frequency,
    Monetary,

    NTILE(5) OVER (ORDER BY Recency DESC) AS R,
    NTILE(5) OVER (ORDER BY Frequency) AS F,
    NTILE(5) OVER (ORDER BY Monetary) AS M


FROM RFM_Value
```

Step 4:

RFM Score: To get RFM Score, I concatenated RFM Ratings as string using CAST function. These scores each customer based on the above RFM ratings

```
SELECT
customers_name,
Recency,
Frequency,
Monetary,
R,F,M,

      Cast (R as varchar)+ Cast(F as varchar)+ Cast(M as varchar)as rfm_score


FROM RFM_Score
```

Step 5:

Customer Segmentation: The last step is segmenting customers based on the RFM Scores assigned to each customer by using a CASE Statement. This helped to identify top customers, loyal customers, customers that needs attention, lost customers etc.

```
--Customers RFM segmentation
    SELECT
    customers_name,
    Recency,
    Frequency,
    Monetary,
    R,F,M,
    rfm_score,
        case
        when rfm_score in (213, 221, 231, 241, 251, 312, 321, 331) then 'About to Sleep'
        when rfm_score in (124,125,133,134,135,142,143,145,152,153,224,225,234,235,242,243,244,245,252,253,254,255  ) then
        when rfm_score in (113,114,115,144,154,155,214,215) then 'Can Not Lose Them'
        when rfm_score in (445,454,455,544,545,554,555) then 'Champions'
        when rfm_score in (122,123,132,211,212,222,223,231,232,233,241,251,322,332) then 'Hibernating Customers'
        when rfm_score in (111,112,121,131,141,151) then 'Lost Customers'
        when rfm_score in (335,344,345,354,355,435,444,543) then 'Loyal Customers'
        when rfm_score in (324,325,334,343,434,443,534,535) then 'Need Attention'
        when rfm_score in (311,411,412,421,422,511,512) then 'New Customers'
        when rfm_score in (323,333,341,342,351,352,353,423,431,432,433,441,442,451,452,453,531,532,533,541,542,551,552,553
        when rfm_score in (313,314,315,413,414,415,424,425,513,514,515,521,522,523,524,525) then 'Promising '

    end as rfm_segment
    FROM RFM_Segment
```

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RFM Table:

Results | Messages | Client Statistics

	customers_name	Recency	Frequency	Monetary	R	F	M	rfm_score	rfm_segment
1	James Brown	742	1	14	1	1	1	111	Lost Customers
2	Jodie Garner	1343	1	16	1	1	1	111	Lost Customers
3	Molly Hawkins	721	1	19	1	1	1	111	Lost Customers
4	Grace Brown	497	1	23	1	1	1	111	Lost Customers
5	Paige Bibi	376	2	38	2	1	1	211	Hibernating C...
6	Marie Lawson	387	1	40	2	1	1	211	Hibernating C...
7	Max Baker	1238	1	44	1	1	1	111	Lost Customers
8	Alexandra Mah...	118	1	47	3	1	1	311	New Customers
9	James Fleming	1237	1	50	1	1	1	111	Lost Customers
10	Imogen Daly	1147	3	56	1	1	1	111	Lost Customers
11	Eleanor Pollard	358	3	56	2	1	1	211	Hibernating C...
12	Herbert Harrell	676	1	57	1	1	1	111	Lost Customers
13	Clifford Defreitas	509	2	59	1	1	1	111	Lost Customers
14	Kian Thomson	134	2	65	3	1	1	311	New Customers

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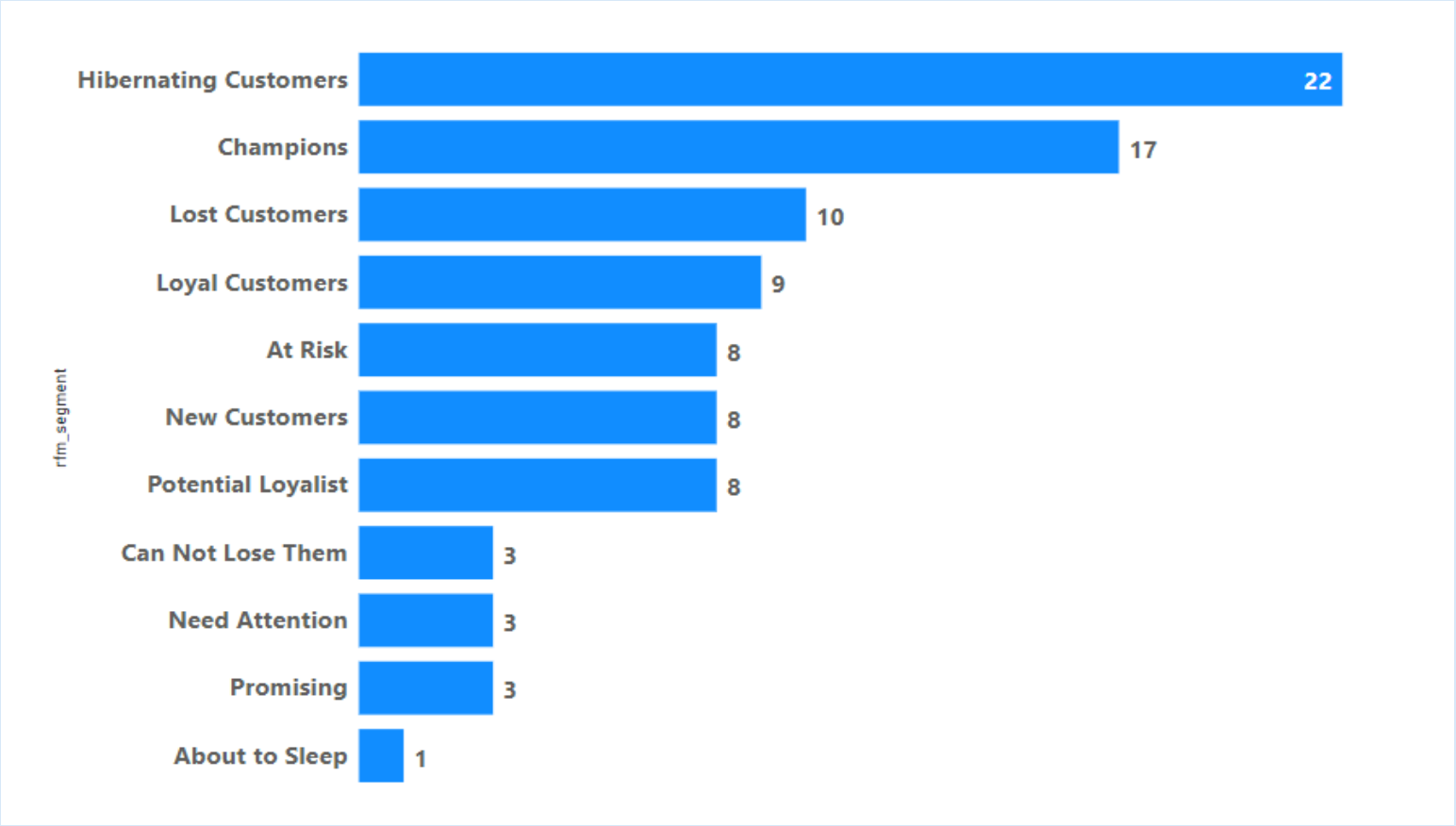
Customer Segmentation: By scoring our customers by Recency, Frequency and Monetary, I am able to Identify 11 major segments for targeting.



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Conclusion:

Champion and loyal customers are our top customers that have purchased an average of 100 times during the evaluation period, spending an average of $156,569 and have purchased in recent days.
While potential and promising customer have purchased an average of 50 times and have spent an average of $100,000 in the last 34days.

New Customers, Need Attention, About to Sleep, At Risk, Can not Lose, and Hibernating customers accounted for 48.8% of the total customers.
While 10% of the our customers are lost.

Recommendation:
We will create a target campaign to re-engage our Lost, At risk, Can not lose, Hibernating, Need attention and About to Sleep Customers with incentives/discounts.

Further analyse our top customers, loyal and new customers to maximise revenue.

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THANK YOU!

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