# Análisis de Ventas y Segmentación de Clientes en un E-commerce

Autor: Italo Buonanno

Mentora: Alana Olivieri

## Objetivo General:

Analizar el comportamiento de los usuarios en un entorno de e-commerce para segmentarlos en distintas categorías relevantes para un estudio de mercado.

## Objetivos Específicos:

Analizar la cantidad total de productos vendidos.
Examinar las cantidades vendidas por mes.
Analizar el comportamiento de compra de los usuarios.
Agrupar a los clientes según su comportamiento de compra utilizando el modelo Recency/Frequency/Monetary (RFM).
Aplicar un modelo de Random Forest para predecir la categoría de los clientes.

# Dataset

UC Irvine Machine Learning Repository

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## Online Retail

Donated on 11/5/2015

This is a transactional data set which contains all the transactions occurring between 01/12/2010 and 09/12/2011 for a UK-based and registered non-store online retail.

**Dataset Characteristics**
Multivariate, Sequential, Time-Series

**Subject Area**
Business

**Associated Tasks**
Classification, Clustering

**Feature Type**
Integer, Real

**# Instances**
541909

**# Features**
6

### Dataset Information

**Additional Information**
This is a transactional data set which contains all the transactions occurring between 01/12/2010 and 09/12/2011 for a UK-based and registered non-store online retail.The company mainly sells unique all-occasion gifts. Many customers of the company are wholesalers.

**Has Missing Values?**
No

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CITE

8 citations

364664 views

### Keywords

sales

### Creators

Daqing Chen
chend@lsbu.ac.uk
School of Engineering, London South Bank University

### DOI

10.24432/C5BW33

- https://archive.ics.uci.edu/dataset/352/online+retail

# Dataset

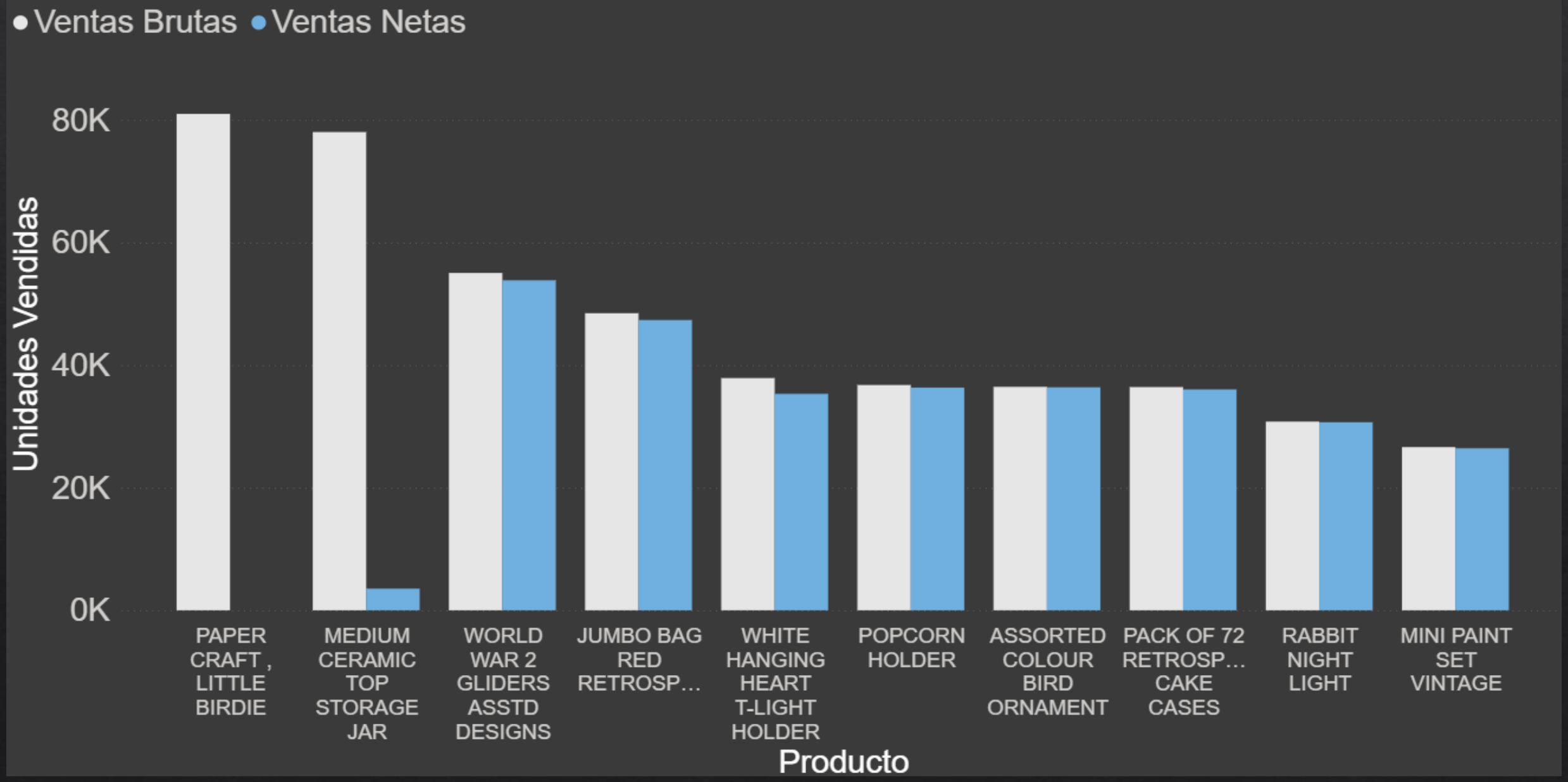
| | InvoiceNo | StockCode | Description | Quantity | InvoiceDate | UnitPrice | CustomerID | Country |
|---|---|---|---|---|---|---|---|---|
| 0 | 536365 | 85123A | WHITE HANGING HEART T-LIGHT HOLDER | 6 | 2010-12-01 08:26:00 | 2.55 | 17850.0 | United Kingdom |
| 1 | 536365 | 71053 | WHITE METAL LANTERN | 6 | 2010-12-01 08:26:00 | 3.39 | 17850.0 | United Kingdom |
| 2 | 536365 | 84406B | CREAM CUPID HEARTS COAT HANGER | 8 | 2010-12-01 08:26:00 | 2.75 | 17850.0 | United Kingdom |
| 3 | 536365 | 84029G | KNITTED UNION FLAG HOT WATER BOTTLE | 6 | 2010-12-01 08:26:00 | 3.39 | 17850.0 | United Kingdom |
| 4 | 536365 | 84029E | RED WOOLLY HOTTIE WHITE HEART. | 6 | 2010-12-01 08:26:00 | 3.39 | 17850.0 | United Kingdom |
| 5 | 536365 | 22752 | SET 7 BABUSHKA NESTING BOXES | 2 | 2010-12-01 08:26:00 | 7.65 | 17850.0 | United Kingdom |
| 6 | 536365 | 21730 | GLASS STAR FROSTED T-LIGHT HOLDER | 6 | 2010-12-01 08:26:00 | 4.25 | 17850.0 | United Kingdom |
| 7 | 536366 | 22633 | HAND WARMER UNION JACK | 6 | 2010-12-01 08:28:00 | 1.85 | 17850.0 | United Kingdom |
| 8 | 536366 | 22632 | HAND WARMER RED POLKA DOT | 6 | 2010-12-01 08:28:00 | 1.85 | 17850.0 | United Kingdom |
| 9 | 536367 | 84879 | ASSORTED COLOUR BIRD ORNAMENT | 32 | 2010-12-01 08:34:00 | 1.69 | 13047.0 | United Kingdom |

# Herramientas

# Analisis Descriptivo

# Productos Mas Vendidos

# Ventas Brutas Vs Ventas Netas

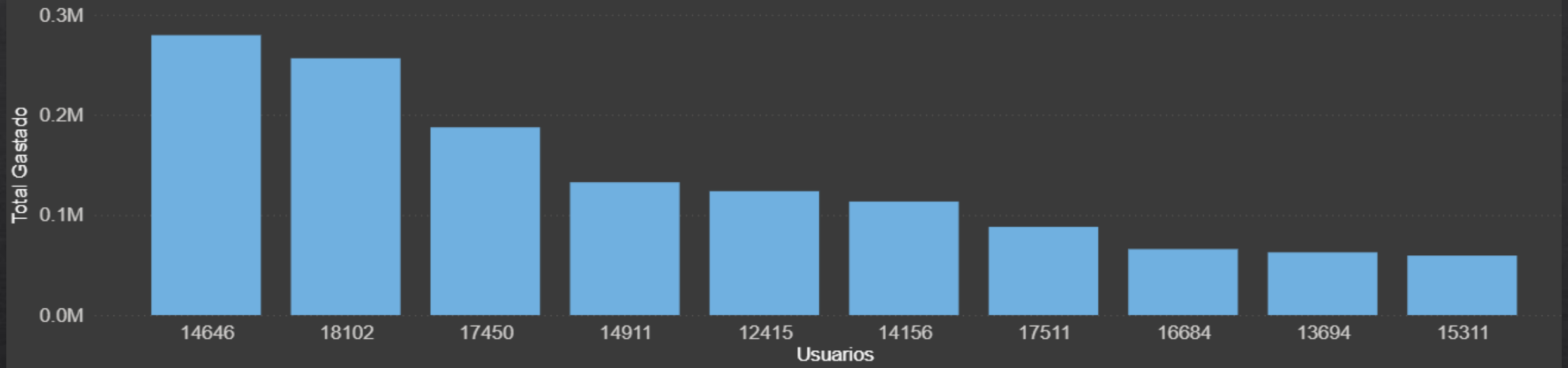


# Cantidad De Ventas Por Mes

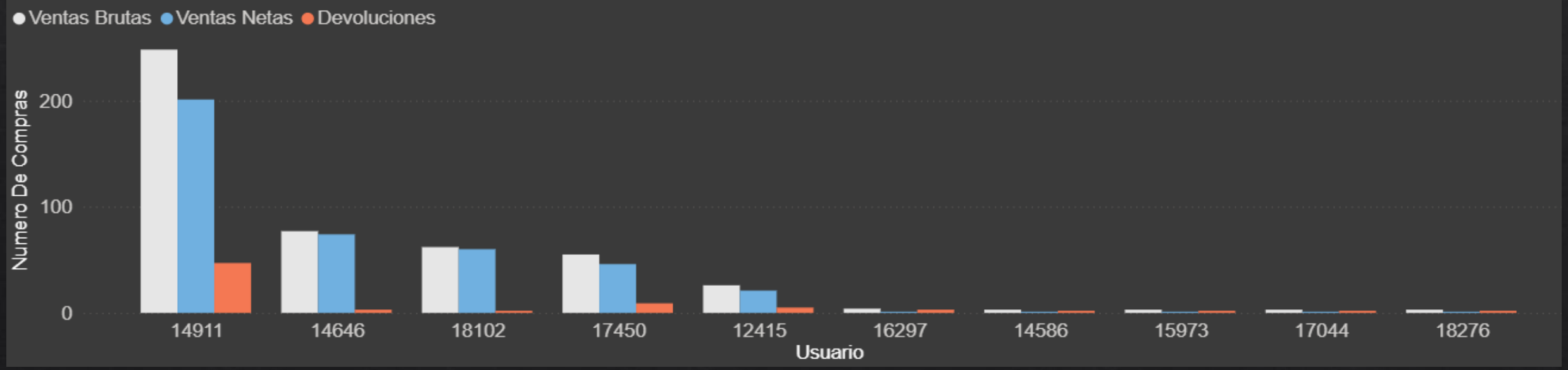
Ventas Por Mes
Ventas Brutas
Ventas Netas
0.8M
0.7M
0.6M
0.5M
0.4M
0.3M
0.2M
Cantidad Vendida
Jan 2011
Mar 2011
May 2011
Jul 2011
Sep 2011
Nov 2011
Mes

# Usuarios Que Mas Gastan

# Top 10 De Los Usuarios Que Mas Gastan



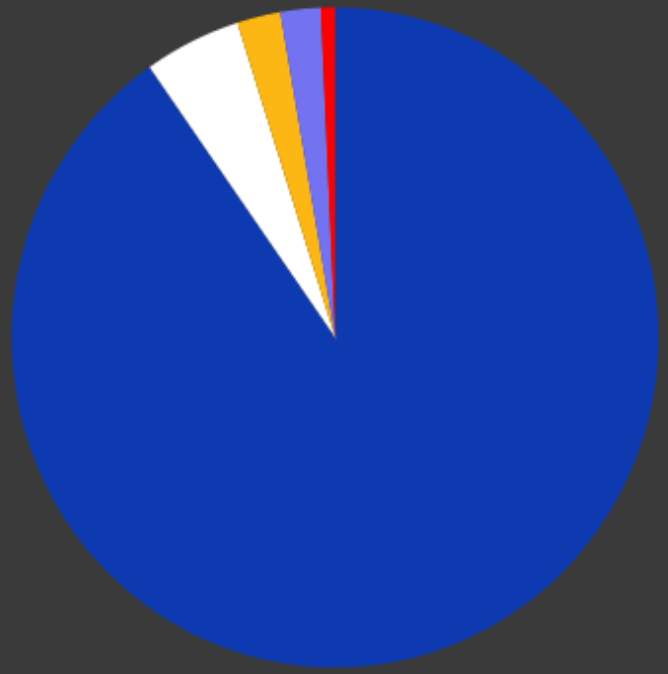

# Compras De Los Usuarios



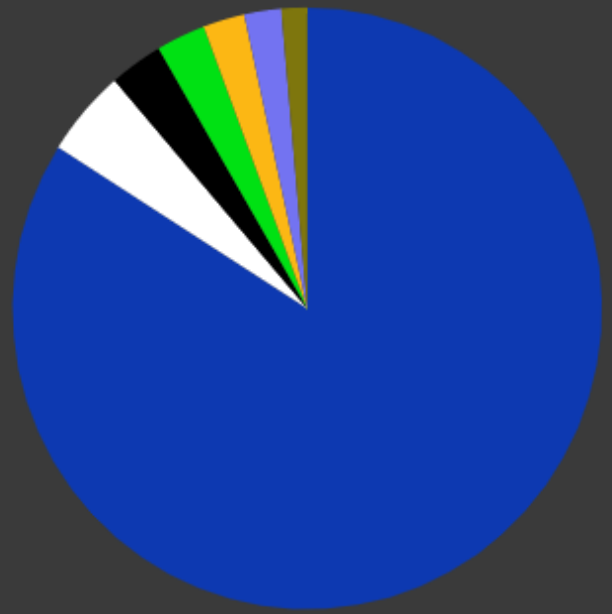
# Paises Que Mas Compran

United Kingdom Otros Germany France Spain Netherlands EIRE Singapore USA Hong Kong Bahrain

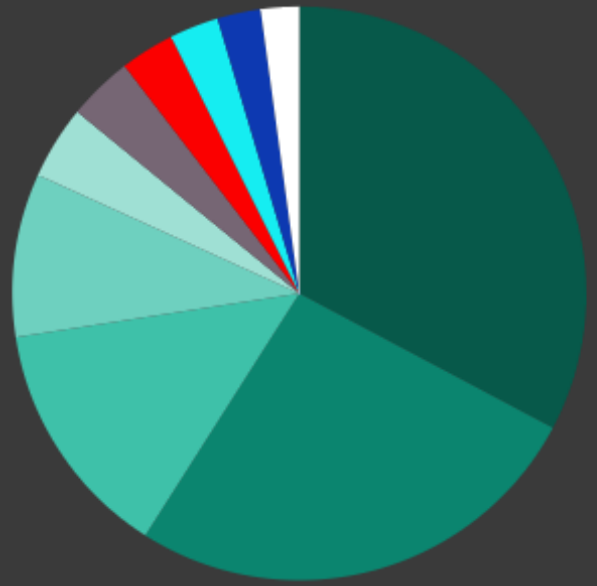
## Clientes Por Pais



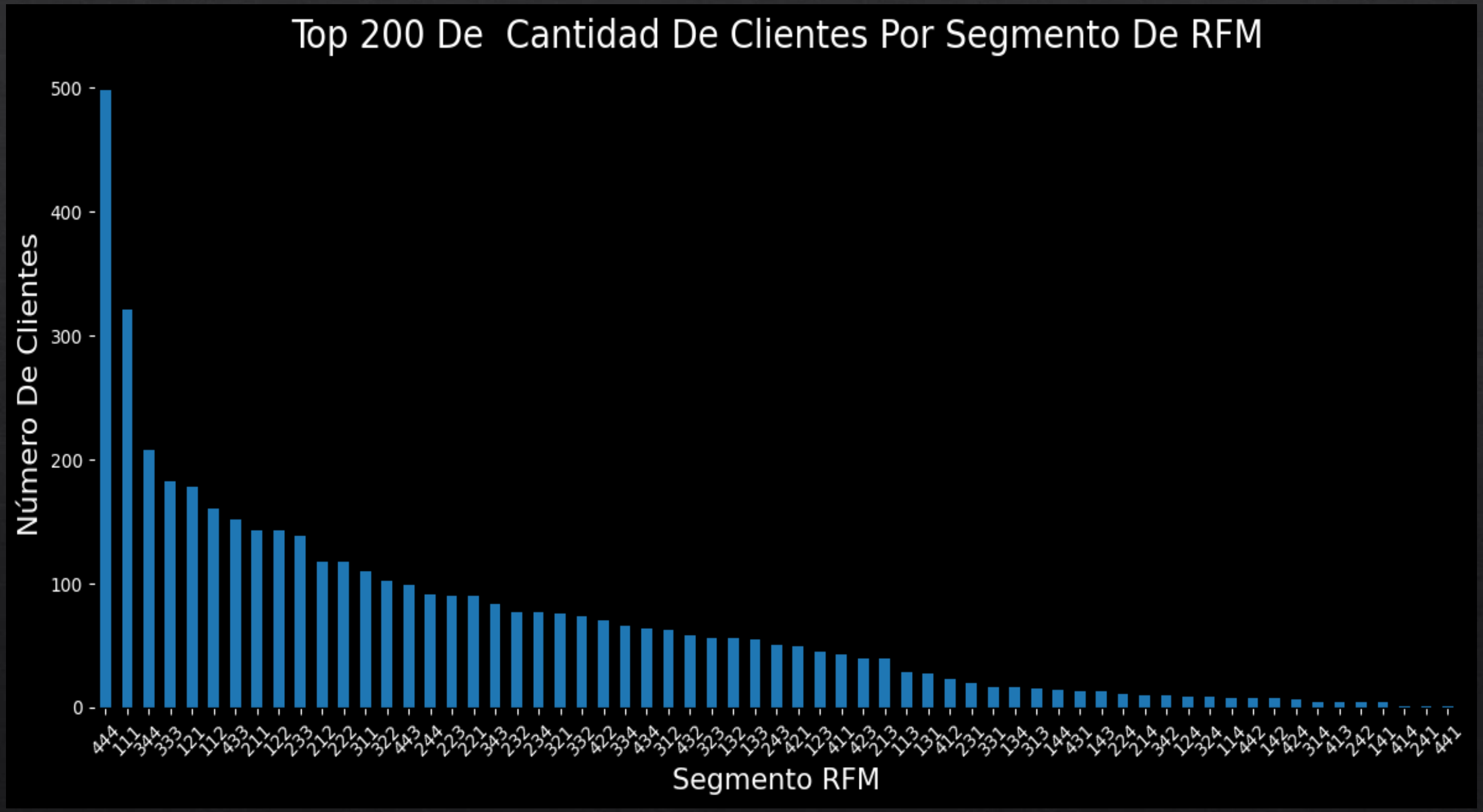
## Consumo Neto Por Pais

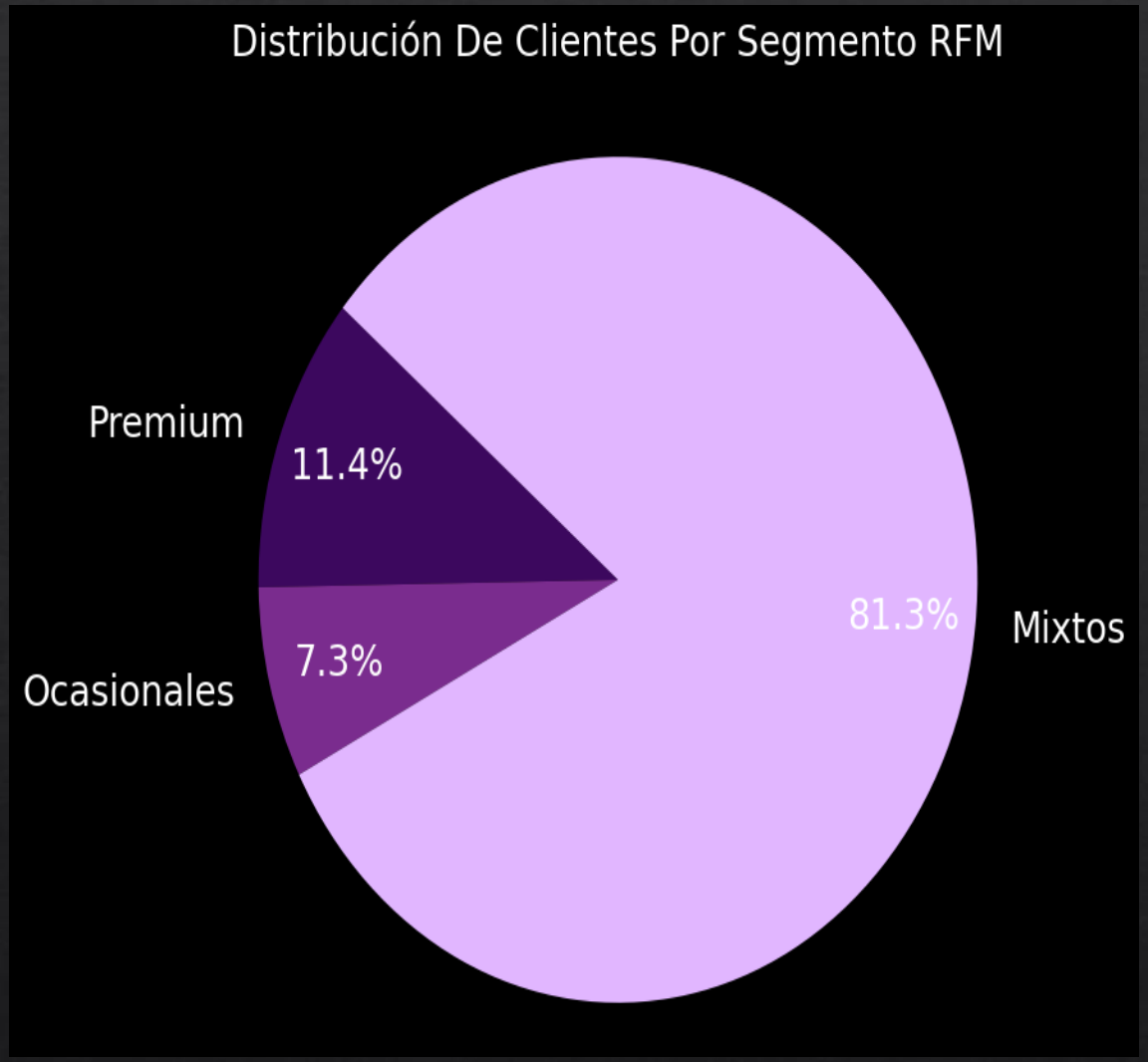


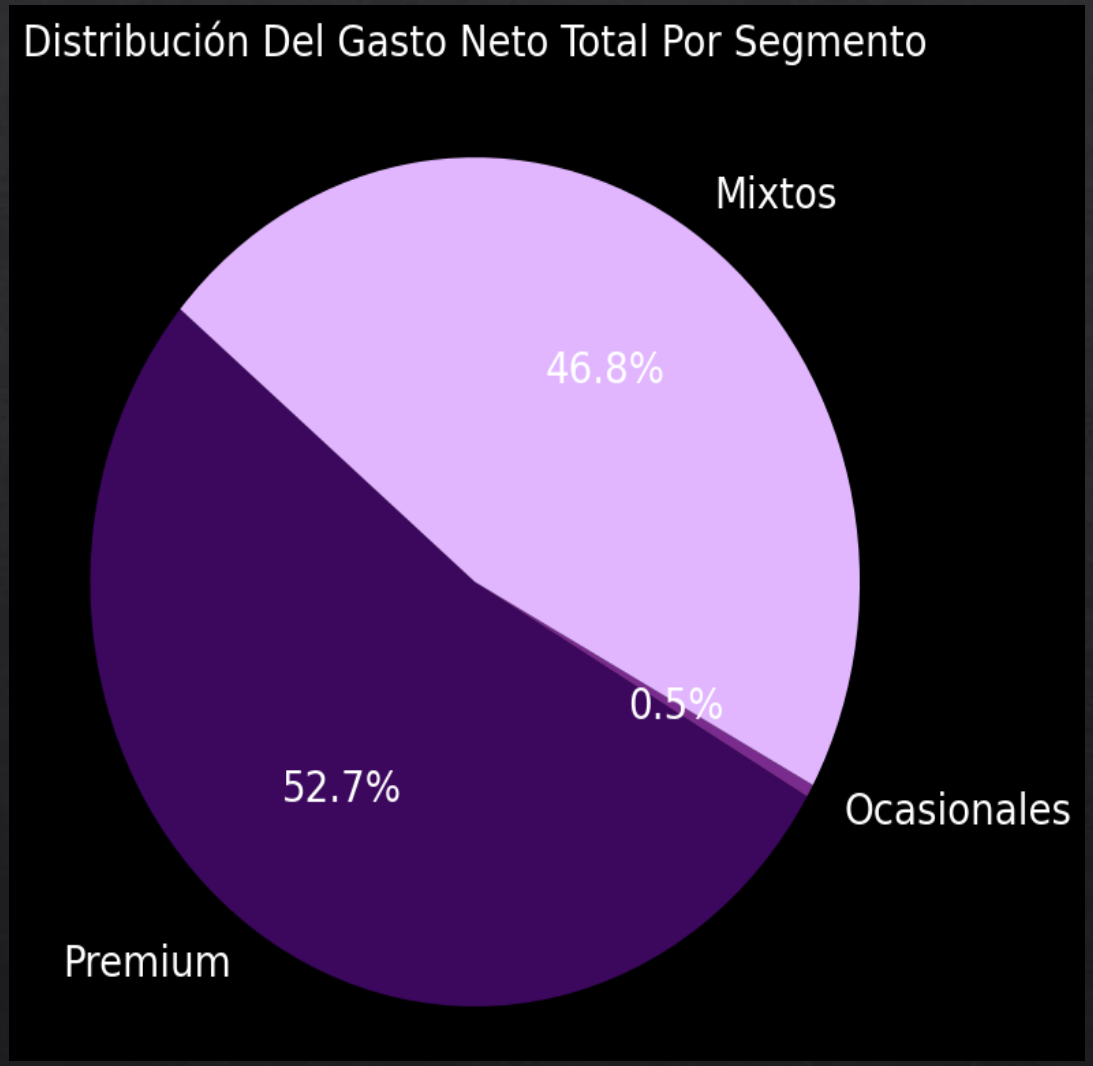
## Devoluciones Por Pais



# RFM


Top 200 De  Cantidad De Clientes Por Segmento De RFM
Número De Clientes
0
100
200
300
400
500
444 111 344 333 121 112 433 211 122 233 212 222 311 322 443 244 223 221 343 232 234 321 332 422 334 434 312 432 323 132 133 243 421 123 411 423 213 113 131 412 231 331 134 313 144 431 143 224 214 342 124 324 114 442 142 424 314 413 242 141 414 241 441
Segmento RFM


Distribución De Clientes Por Segmento RFM
Premium
11.4%
Ocasionales
7.3%
81.3%
Mixtos


Distribución Del Gasto Neto Total Por Segmento
Mixtos
46.8%
0.5%
52.7%
Ocasionales
Premium

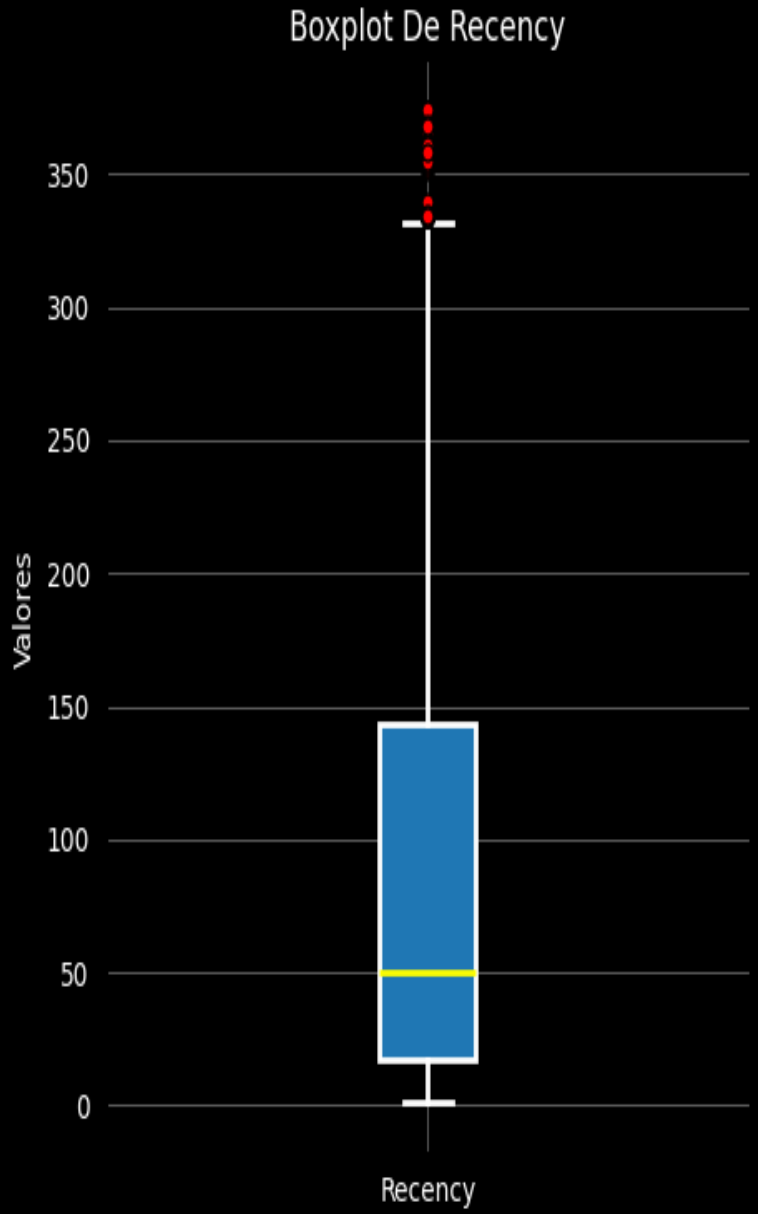
# Machine Learning

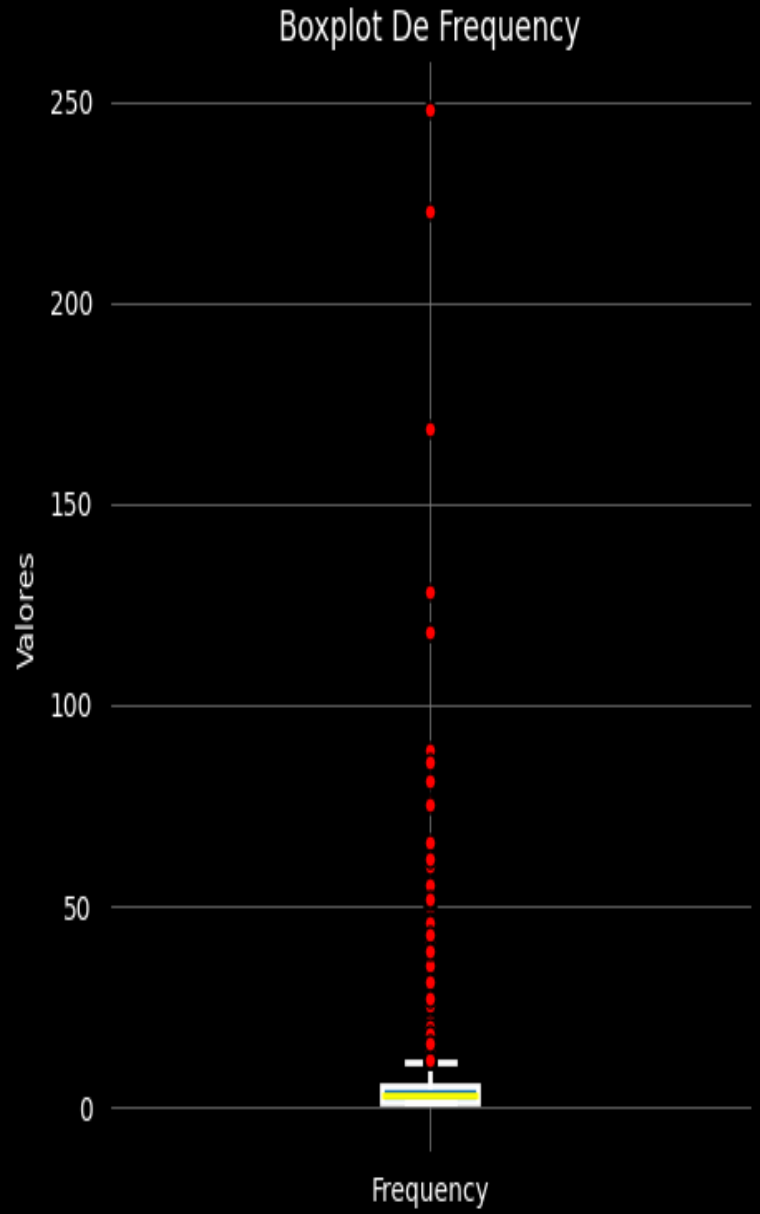
| | CustomerID | InvoiceDate | Recency | Frequency | Monetary | R_Score | F_Score | M_Score | RFM_Score | Segmento |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 12346 | 2011-01-18 10:17:00 | 326 | 2 | 0.00 | 1 | 2 | 1 | 121 | Mixtos |
| 1 | 12347 | 2011-12-07 15:52:00 | 2 | 7 | 4310.00 | 4 | 4 | 4 | 444 | Premium |
| 2 | 12348 | 2011-09-25 13:13:00 | 75 | 4 | 1797.24 | 2 | 3 | 4 | 234 | Mixtos |
| 3 | 12349 | 2011-11-21 09:51:00 | 19 | 1 | 1757.55 | 3 | 1 | 4 | 314 | Mixtos |
| 4 | 12350 | 2011-02-02 16:01:00 | 310 | 1 | 334.40 | 1 | 1 | 2 | 112 | Mixtos |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 4366 | 18280 | 2011-03-07 09:52:00 | 278 | 1 | 180.60 | 1 | 2 | 1 | 121 | Mixtos |
| 4367 | 18281 | 2011-06-12 10:53:00 | 181 | 1 | 80.82 | 1 | 2 | 1 | 121 | Mixtos |
| 4368 | 18282 | 2011-12-02 11:43:00 | 8 | 3 | 176.60 | 4 | 3 | 1 | 431 | Mixtos |
| 4369 | 18283 | 2011-12-06 12:02:00 | 4 | 16 | 2094.88 | 4 | 4 | 4 | 444 | Premium |
| 4370 | 18287 | 2011-10-28 09:29:00 | 43 | 3 | 1837.28 | 3 | 3 | 4 | 334 | Mixtos |

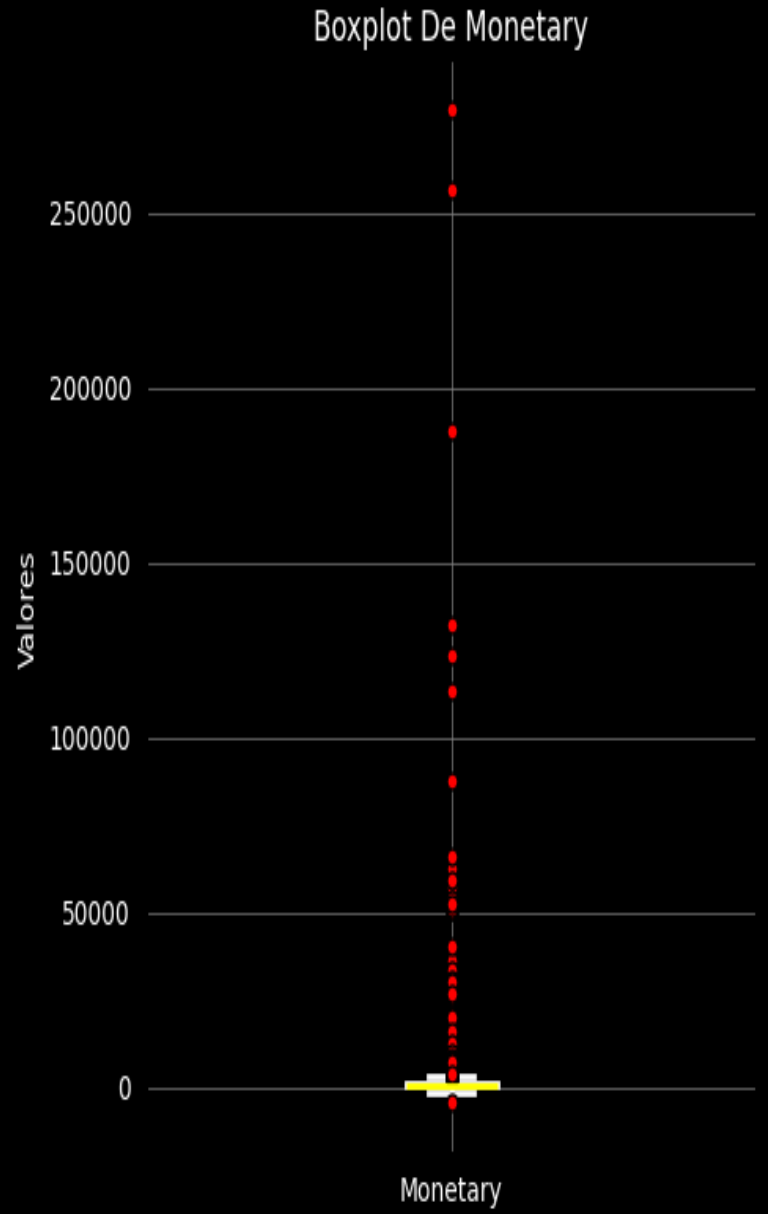
**Shapiro-Wilk**

Recency: Estadístico=0.8106, p-valor=0.0000 -> No es normal
Frequency: Estadístico=0.3774, p-valor=0.0000 -> No es normal
Monetary: Estadístico=0.1407, p-valor=0.0000 -> No es normal

# Boxplot


Boxplot De Recency
Valores
350
300
250
200
150
100
50
0
Recency


Boxplot De Frequency
Valores
250
200
150
100
50
0
Frequency


Boxplot De Monetary
Valores
250000
200000
150000
100000
50000
0
Monetary

# Random Forest

## 3.3 Definicion De Las Variables

```
[21]
X = rfm[['Recency','Frequency','Monetary']]
y = rfm['Segmento']
```

Python

## 3.4 RobustScaler

```
[22]
scaler = RobustScaler()
X_scaled = scaler.fit_transform(X)
```

Python

## 3.5 Segemetacion De Los Datos De Entramiento/Prueva

```
[23]
X_train_scaled, X_test_scaled, y_train, y_test = train_test_split(
    X_scaled, y, test_size=0.3, random_state=42)
```

Python

## 3.6 Modelo: Random Forest

```
[24]
modelo = RandomForestClassifier(random_state=42, class_weight='balanced')
modelo.fit(X_train_scaled, y_train)
```

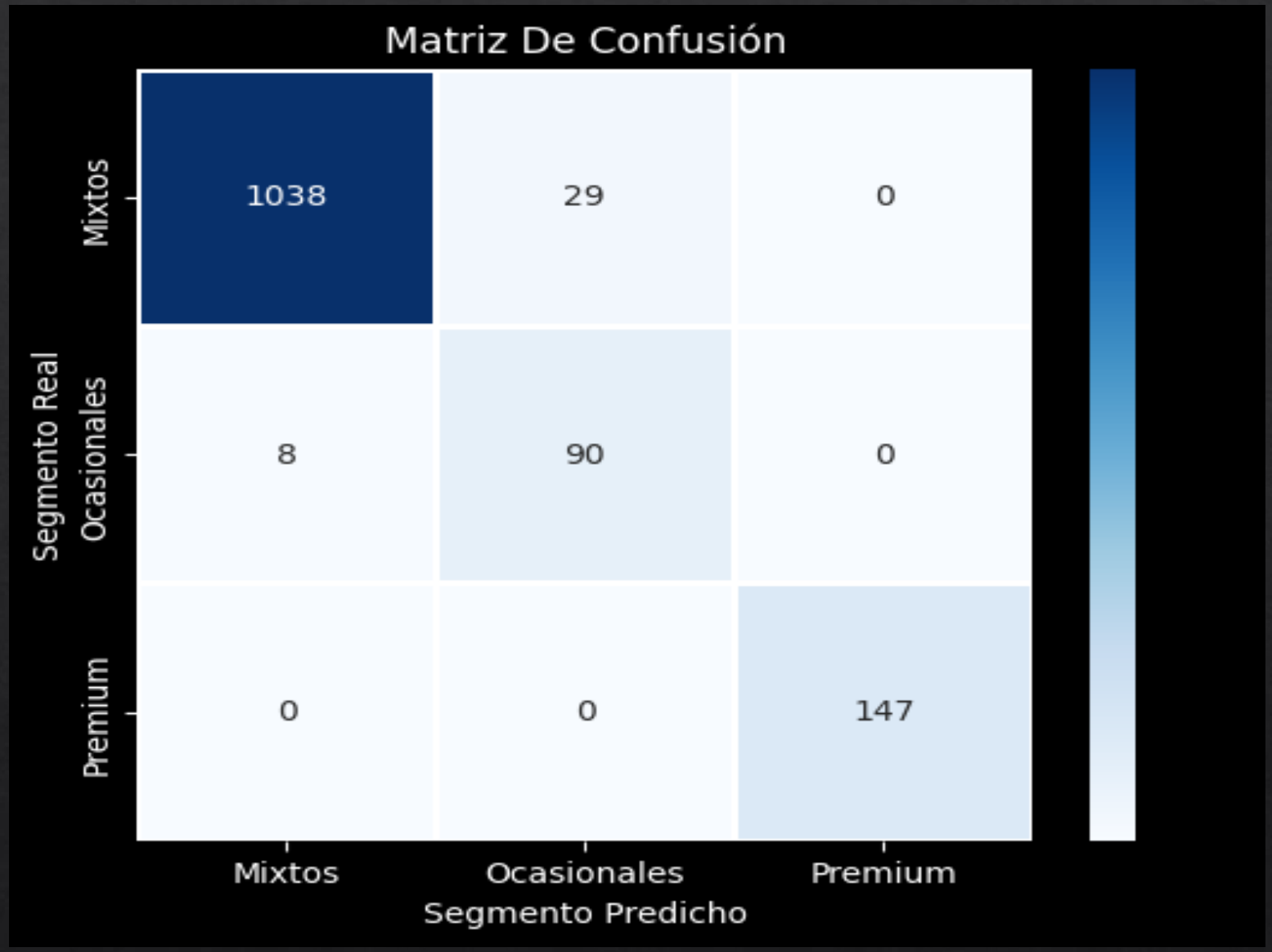
Python

...

▾ RandomForestClassifier ⓘ ?

▶ Parameters

# Accuracy = 0.97



# Conclusiones

# Gracias