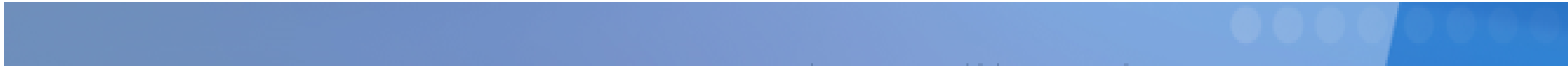
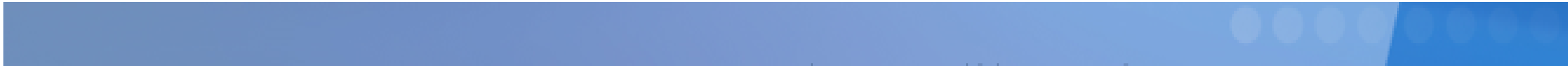

Business Insight Center
Machine Learning en Big Data
Pyspark
PySpark

AGENDA

- 1. Acerca de Pyspark
- 2. Instalación Pyspark en Google colab
- 3. Importando archive de datos y adaptando a format Spark
- 4. Data Wrangling / Manipulación de datos con Pyspark
  - Lectura, Formato
  - Agrupamiento
  - EDA / Analisis exploratorio de datos
  - Identificación de valores Nulos
  - Tratamiento de Outliers
- 5. RDD vs DataFrame en Spark. Paralelizacion de operaciones
- Etapas de modelamiento de datos en Colab con Pyspark



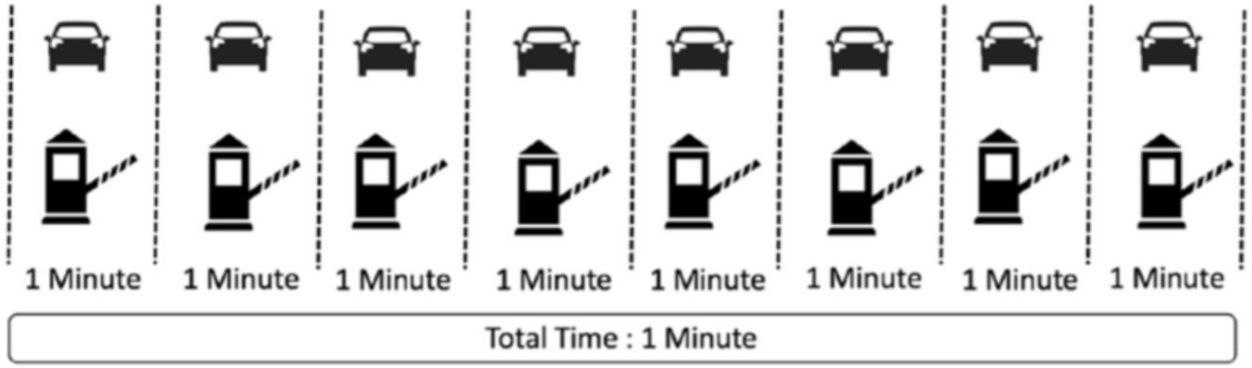
1 ACERCA DE PYSPARK



PROCESAMIENTO DE COMPUTO PARALALELO FRENTE A BIG DATA

Business Insight Center

- Lenguajes transaccionales como SQL responden a tareas en secuencia

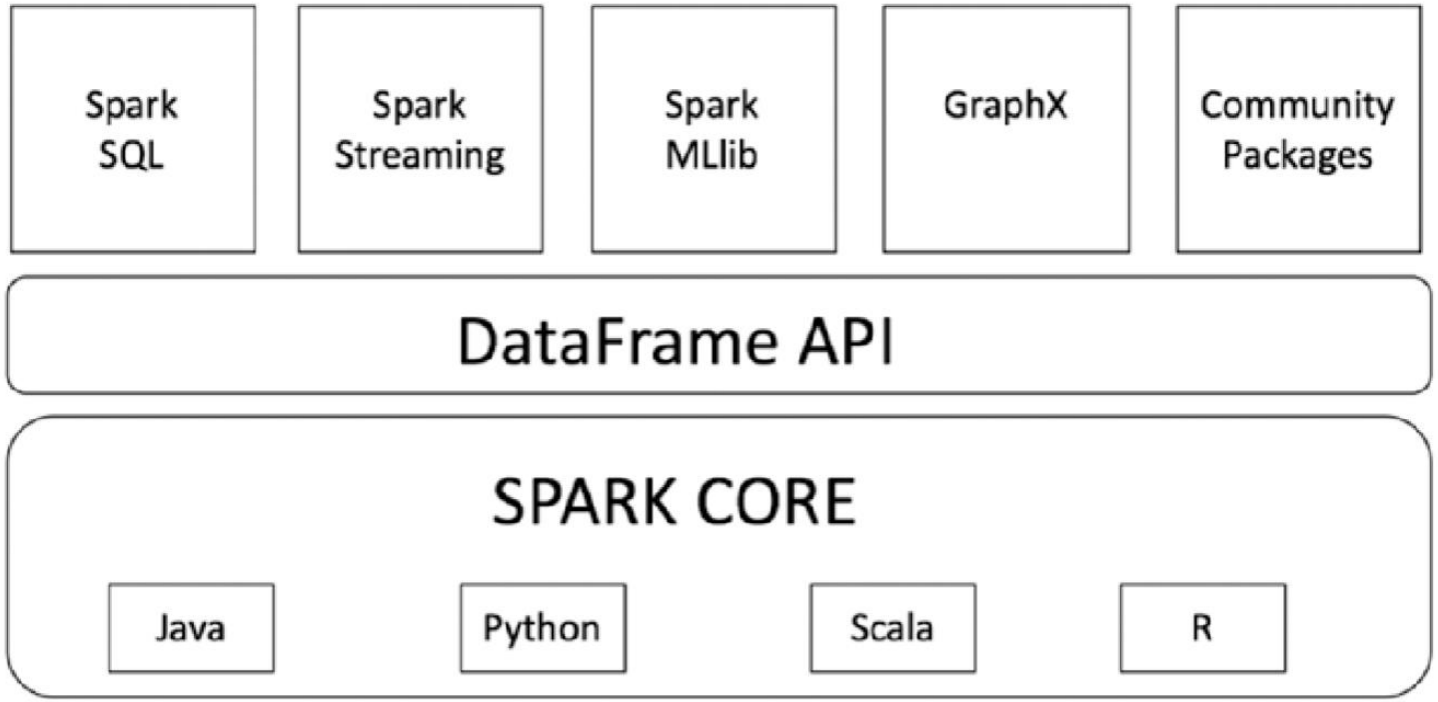


- Spark responde a procesamiento en paralelo de operaciones distribuyendo tareas y respondiendo rápidamente a operaciones frente a grandes volúmenes de datos

ACERCA DE SPARK

Business Insight Center

- Spark es un plataforma de entorno de trabajo distribuida que trabaja con nodos maestros y nodos trabajadores donde se almacenan los datos
- Spark utiliza diferentes estructuras de data como RDD o Dataframe

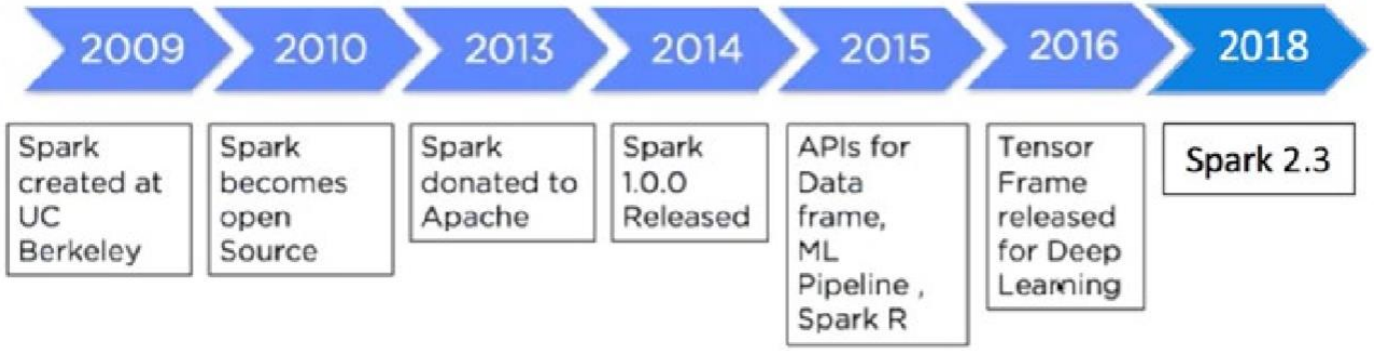


- **Spark SQL**: Busca optimizar el procesamiento de datos. Considerado SQL query distribuido
- **Spark Streaming**: Procesa en tiempo real los datos con micro procesos batch
- **Spark Mlib**: Machine Learning distribuido
- **Spark Graph**: Utilizado para comprender relaciones y visualizar insight

ACERCA DE PYSPARK

Business Insight Center

- Plataforma computacional diseñada para la **rapidez**, propósito general y uso sencillo.
- Proposito general ejecuta procesos: batch, iterativas y streaming
- Sistema de **alta integración** con API´s: Scala, Python, Java, R y SQL

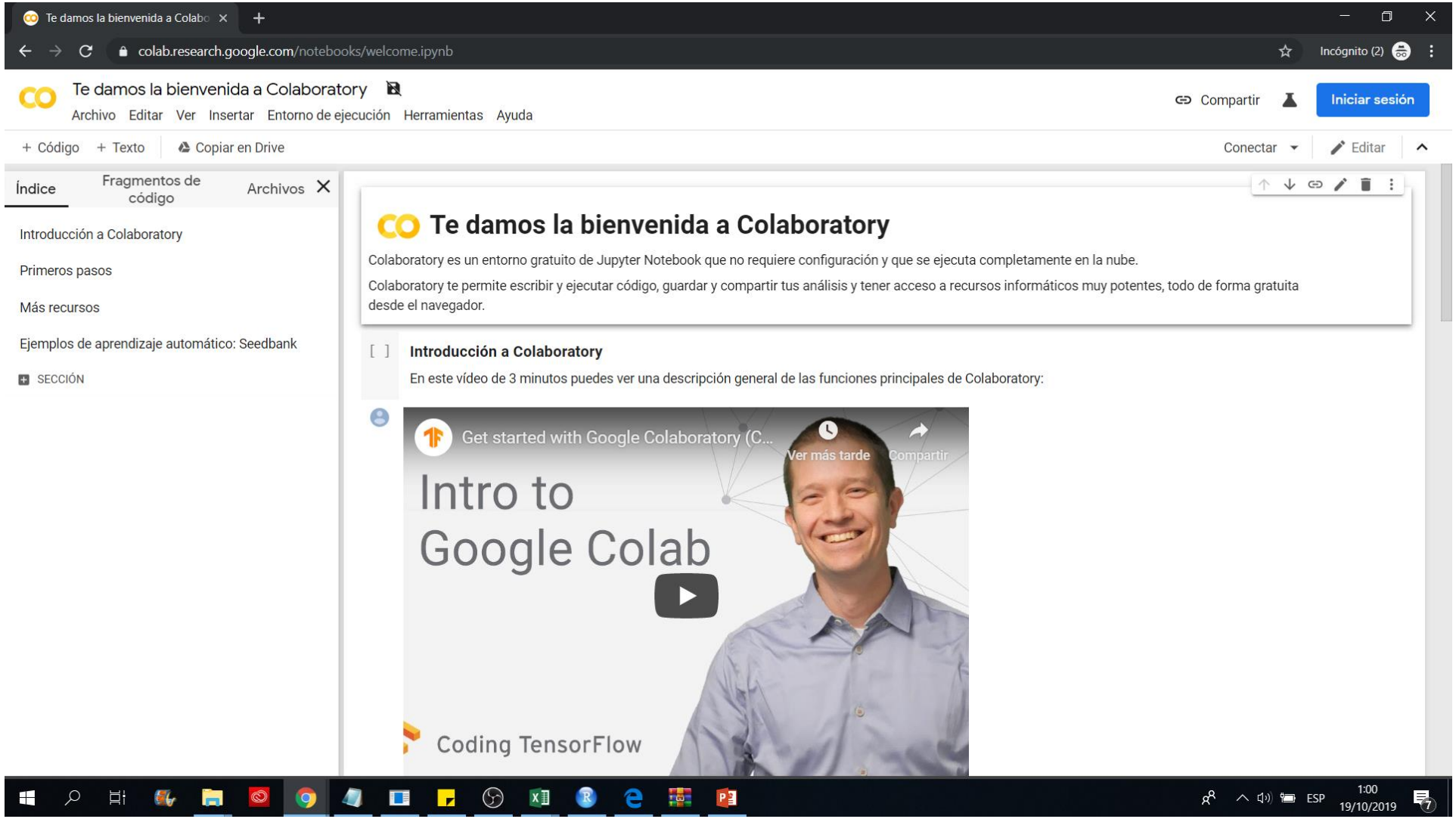


- Es el entorno de trabajo más utilizado para resolver problemas reales de Machine Learning de manera rápida y distribuida
- A diferencia de Python esta Pyspark esta preparado para procesar los algoritmos de manera distribuida

2 INSTALACION DE PYSPARK

Business Insight Center

GOOGLE COLAB



Business Insight Center

INSTALACION INICIALES

Paso1 BIC_Manipulacion_de_datos_Pyspark_.ipynb

Archivo Editar Ver Insertar Entorno de ejecución Herramientas Ayuda Se han guardado todos los cambios

+ Código + Texto

```
[1]  !apt-get install openjdk-8-jdk-headless -qq > /dev/null
     !wget -q https://www-us.apache.org/dist/spark/spark-2.3.4/spark-2.3.4-bin-hadoop2.7.tgz
     !tar xf spark-2.3.4-bin-hadoop2.7.tgz

     !wget -q https://www-us.apache.org/dist/spark/spark-2.4.4/spark-2.4.4-bin-hadoop2.7.tgz
     !tar xf spark-2.4.4-bin-hadoop2.7.tgz
```

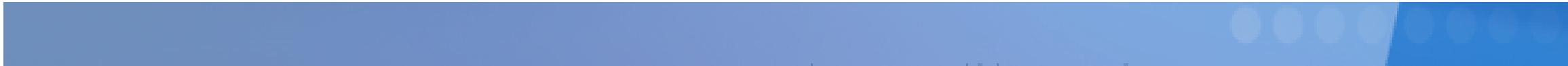
```
[2]  !pip install -q findspark
```

```
[3]  import os
     os.environ["JAVA_HOME"] = "/usr/lib/jvm/java-8-openjdk-amd64"
     os.environ["SPARK_HOME"] = "/content/spark-2.4.4-bin-hadoop2.7"
```

```
[4]  !pip install pyspark
```

```
[5]  from pyspark.sql import SparkSession
     from pyspark import SparkContext
     spark = SparkSession.builder.master("local").getOrCreate()
     sc = SparkContext.getOrCreate()
```

3 IMPORTANDO ARCHIVOS DE DATOS Y FORMATO SPARK



IMPORTANDO ARCHIVOS DE DATOS DESDE CSV HASTA DRIVE

Business Insight Center

Mis reuniones | GoToM | PySpark Machine Learn | Paso1 BIC_Manipulacio | Inicia sesión: Cuentas d | Import data into Googl

QLUXS81JDoHvMbROO1rTn7SFBn11Kqq#scrollTo=7zPCb9l3vOXF

En pausa

Volver a conectar | Editar

1. Lectura de datos

```
[ ] from google.colab import files
    uploaded = files.upload()
```

Elegir archivos | 0. DS_Seguros_Salud.csv

- **0. DS_Seguros_Salud.csv**(application/vnd.ms-excel) - 2690973 bytes, last modified: 10/10/2019 - 100% done

```
Saving 0. DS_Seguros_Salud.csv to 0. DS_Seguros_Salud.csv
```

```
[ ] from google.colab import drive
    drive.mount('/content/drive')
```

```
Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client_id=947318989803-6bn6qk8qdgf4n4g3pfee6491hc0brc4i.apps.googleu

Enter your authorization code:
··········
Mounted at /content/drive
```

```
[ ] !ls '/content/drive/My Drive/PySpark Machine Learning en plataforma Big Data/ML Sesion 3 Training R ML en Casos de Negocios/2_caso negocio
```

```
'0. Caso negocio endeudamiento creditio.pptx'   2_DS_creditos.csv
'1_Diccionario credito.xls'
```

```
[ ] ls
```

```
'0. DS_Seguros_Salud.csv'     spark-2.3.4-bin-hadoop2.7.tgz
 drive/                       spark-2.4.4-bin-hadoop2.7/
 sample_data/                 spark-2.4.4-bin-hadoop2.7.tgz
 spark-2.3.4-bin-hadoop2.7/
```

IMPORTANDO ARCHIVOS DE DATOS DESDE CSV HASTA DRIVE

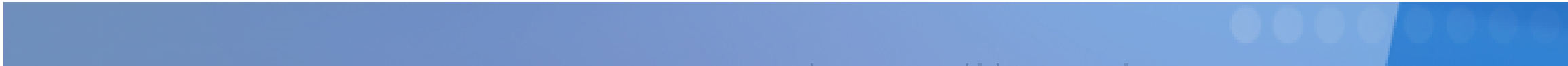
Business Insight Center


```
DS_Salud = spark.read.csv('0. DS_Seguros_Salud.csv'
, sep=';', header=True, inferSchema=True)

# 2.1 Revision de formatos
DS_Salud.printSchema()
```


```
DS_cred = spark.read.csv('/content/drive/My Drive/P
ySpark Machine Learning en plataforma Big Data/ML S
esion 3 Training R ML en Casos de Negocios/2_caso n
egocio 2 riesgo crediticio/2_DS_creditos.csv', sep=
',', header=True, inferSchema=True)

# 2.1 Revision de formatos
DS_cred.printSchema()
```

Data Pre-processing & Data Wrangling in Machine learning & Deep Learning

4 DATA WRANGLING



4.1 EXPLORACION DATAFRAME

4.1 EXPLORACION DE DATAFRAME

Business Insight Center

Explora el format de las variables

```
[In]: df.printSchema()
[Out]: root
 |-- MES_T0: integer (nullable = true)
```

```
[In]: df.columns

[Out]: ['ratings', 'age', 'experience', 'family','mobile']
```

```
[In]: len(df.columns)

[Out]: 5
```

```
[In]: df.count

[Out]: ['ratings', 'age', 'experience', 'family','mobile']
```

4.1 EXPLORACION DE DATAFRAME

Business Insight Center

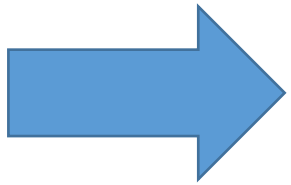
Revision de filas de una tabla

```
[In]: print((df.count),(len(df.columns))

[Out]: ( 33,5)
```

```
[In]: df.show(3)
[Out]:
```

```
+-------+---+----------+------+-------+
|ratings|age|experience|family| mobile|
+-------+---+----------+------+-------+
|      3| 32|       9.0|     3|   Vivo|
|      3| 27|      13.0|     3|  Apple|
|      4| 22|       2.5|     0|Samsung|
|      4| 37|      16.5|     4|  Apple|
|      5| 27|       9.0|     1|     MI|
+-------+---+----------+------+-------+
only showing top 5 rows
```

```
[In]: df.select('age','mobile').show(5)
[Out]:
```



```
+---+-------+
|age| mobile|
+---+-------+
| 32|   Vivo|
| 27|  Apple|
| 22|Samsung|
| 37|  Apple|
| 27|     MI|
+---+-------+
```

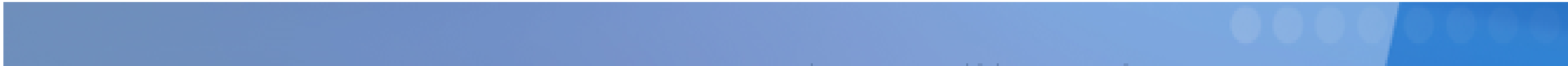
4.1 EXPLORACION DE DATAFRAME

Business Insight Center

```
[In]: df.describe().show()
[Out]:
```

summary	ratings	age	experience	family	mobile
count	33	33	33	33	33
mean	3.5757575757575757	30.484848484848484	10.303030303030303	1.8181818181818181	null
stddev	1.1888066636071336	6.18527087180309	6.770731351213326	1.8448330794164254	null
min	1	22	2.5	0	Apple
max	5	42	23.0	5	Vivo

4.2 PRE-PROCESAMIENTO DE DATOS



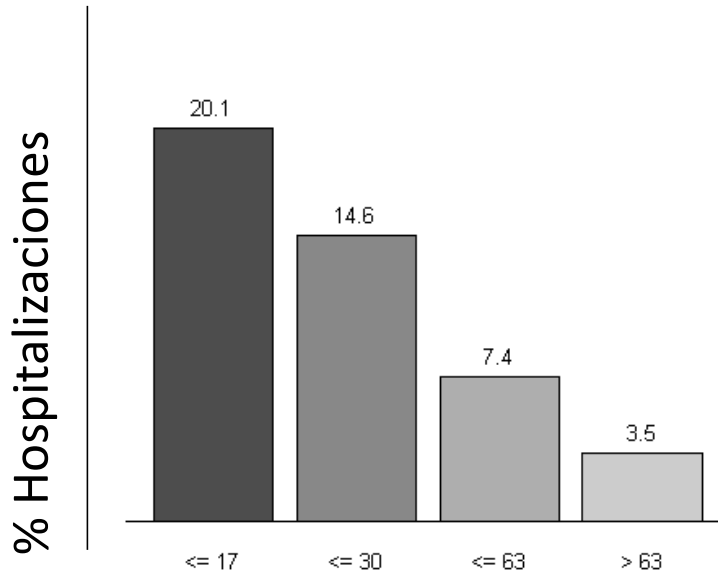
4.2 AGREGANDO UNA COLUMNA

Business Insight Center

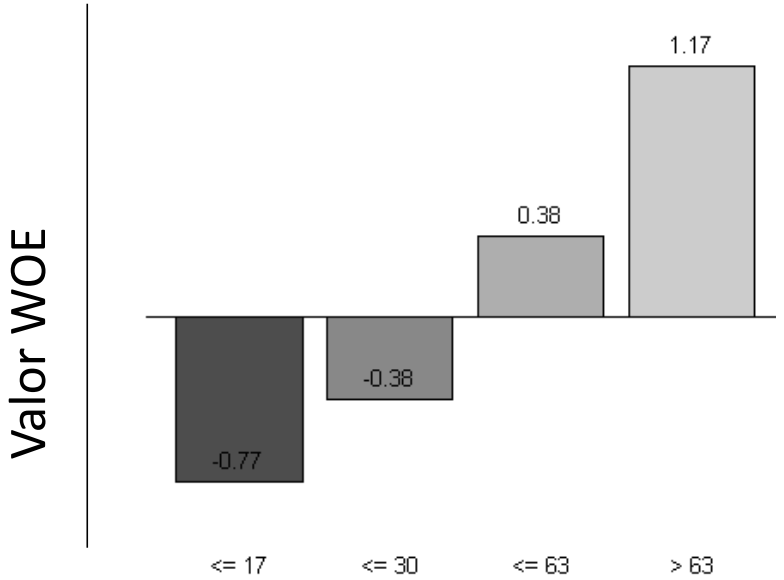
```
[In]: df.withColumn("age_after_10_yrs",(df["age"]+10)).
      show(10,False)
[Out]:
```

```
+-------+---+----------+------+-------+---------------+
|ratings|age|experience|family|mobile |age_after_10_yrs|
+-------+---+----------+------+-------+---------------+
|3      |32 |9.0       |3     |Vivo   |42             |
|3      |27 |13.0      |3     |Apple  |37             |
|4      |22 |2.5       |0     |Samsung|32             |
|4      |37 |16.5      |4     |Apple  |47             |
|5      |27 |9.0       |1     |MI     |37             |
|4      |27 |9.0       |0     |Oppo   |37             |
|5      |37 |23.0      |5     |Vivo   |47             |
|5      |37 |23.0      |5     |Samsung|47             |
|3      |22 |2.5       |0     |Apple  |32             |
|3      |27 |6.0       |0     |MI     |37             |
+-------+---+----------+------+-------+---------------+
only showing top 10 rows
```

Transformación WOE



Hemoglobina



Hemoglobina

Paciente	Trans Mean enode	Trans WOE
<17 Hemog	**20.1%**	**-0.77%**
>63 Hemog	**3.5%**	**1.17**

$$WOE = \ln\left(\frac{\%\ \text{of non-events}}{\%\ \text{of events}}\right)$$

Weight of Evidence Formula

lib Scorecardpy