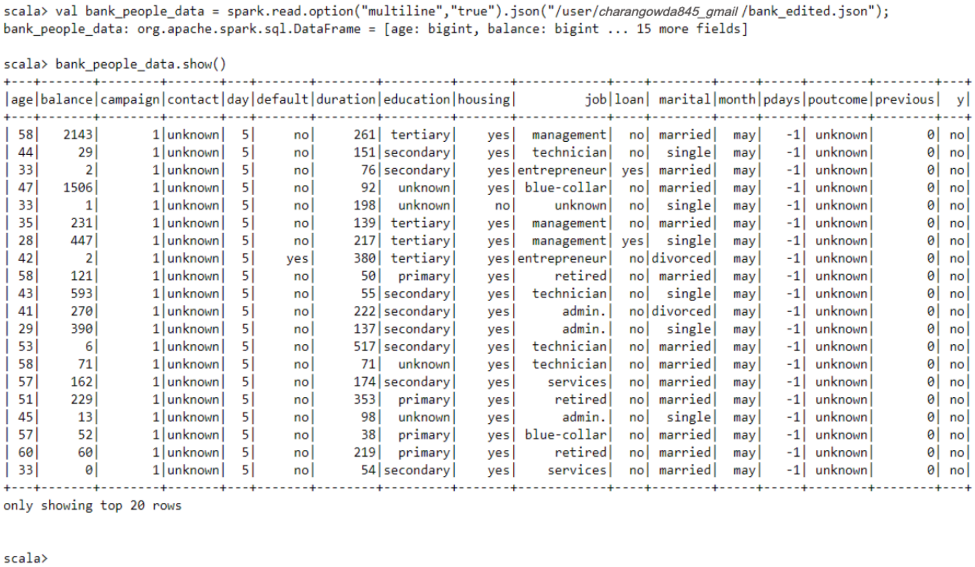
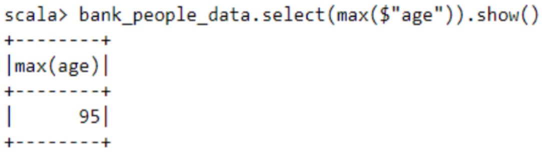
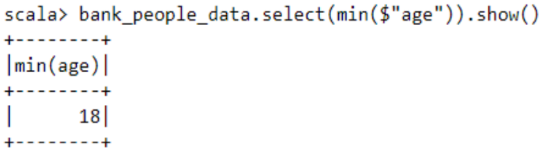


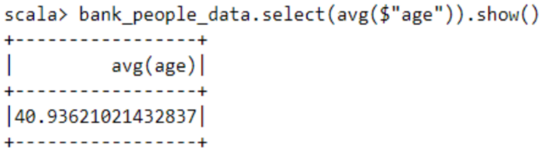
```
scala> val bank_people_data = spark.read.option("multiline","true").json("/user/charangowda845_gmail /bank_edited.json");
bank_people_data: org.apache.spark.sql.DataFrame = [age: bigint, balance: bigint ... 15 more fields]

scala> bank_people_data.show()
+---+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
|age|balance|campaign|contact|day|default|duration|education|housing|         job|loan| marital|month|pdays|poutcome|previous|  y|
+---+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
| 58|   2143|       1|unknown|  5|     no|     261| tertiary|    yes|  management|  no| married|  may|   -1| unknown|       0| no|
| 44|     29|       1|unknown|  5|     no|     151|secondary|    yes|  technician|  no|  single|  may|   -1| unknown|       0| no|
| 33|      2|       1|unknown|  5|     no|      76|secondary|    yes|entrepreneur| yes| married|  may|   -1| unknown|       0| no|
| 47|   1506|       1|unknown|  5|     no|      92|  unknown|    yes| blue-collar|  no| married|  may|   -1| unknown|       0| no|
| 33|      1|       1|unknown|  5|     no|     198|  unknown|     no|     unknown|  no|  single|  may|   -1| unknown|       0| no|
| 35|    231|       1|unknown|  5|     no|     139| tertiary|    yes|  management|  no| married|  may|   -1| unknown|       0| no|
| 28|    447|       1|unknown|  5|     no|     217| tertiary|    yes|  management| yes|  single|  may|   -1| unknown|       0| no|
| 42|      2|       1|unknown|  5|    yes|     380| tertiary|    yes|entrepreneur|  no|divorced|  may|   -1| unknown|       0| no|
| 58|    121|       1|unknown|  5|     no|      50|  primary|    yes|     retired|  no| married|  may|   -1| unknown|       0| no|
| 43|    593|       1|unknown|  5|     no|      55|secondary|    yes|  technician|  no|  single|  may|   -1| unknown|       0| no|
| 41|    270|       1|unknown|  5|     no|     222|secondary|    yes|      admin.|  no|divorced|  may|   -1| unknown|       0| no|
| 29|    390|       1|unknown|  5|     no|     137|secondary|    yes|      admin.|  no|  single|  may|   -1| unknown|       0| no|
| 53|      6|       1|unknown|  5|     no|     517|secondary|    yes|  technician|  no| married|  may|   -1| unknown|       0| no|
| 58|     71|       1|unknown|  5|     no|      71|  unknown|    yes|  technician|  no| married|  may|   -1| unknown|       0| no|
| 57|    162|       1|unknown|  5|     no|     174|secondary|    yes|    services|  no| married|  may|   -1| unknown|       0| no|
| 51|    229|       1|unknown|  5|     no|     353|  primary|    yes|     retired|  no| married|  may|   -1| unknown|       0| no|
| 45|     13|       1|unknown|  5|     no|      98|  unknown|    yes|      admin.|  no|  single|  may|   -1| unknown|       0| no|
| 57|     52|       1|unknown|  5|     no|      38|  primary|    yes| blue-collar|  no| married|  may|   -1| unknown|       0| no|
| 60|     60|       1|unknown|  5|     no|     219|  primary|    yes|     retired|  no| married|  may|   -1| unknown|       0| no|
| 33|      0|       1|unknown|  5|     no|      54|secondary|    yes|    services|  no| married|  may|   -1| unknown|       0| no|
+---+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
only showing top 20 rows


scala>
```



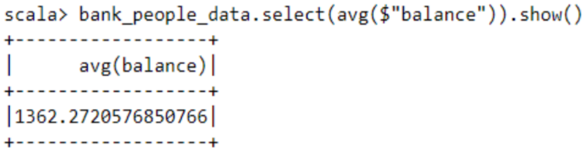
```
scala> bank_people_data.select(max($"age")).show()
+--------+
|max(age)|
+--------+
|      95|
+--------+
```



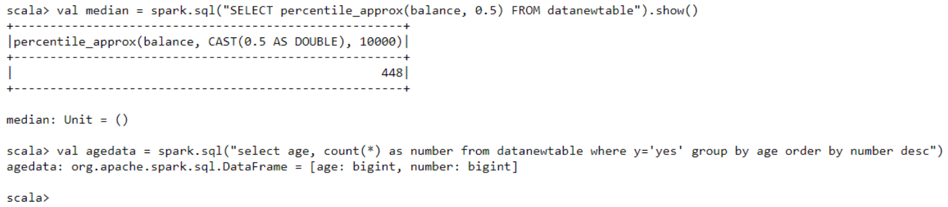
```
scala> bank_people_data.select(min($"age")).show()
+--------+
|min(age)|
+--------+
|      18|
+--------+
```



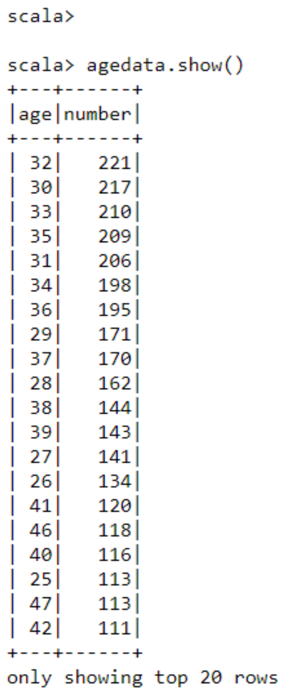
```
scala> bank_people_data.select(avg($"age")).show()
+-----------------+
|         avg(age)|
+-----------------+
|40.93621021432837|
+-----------------+
```



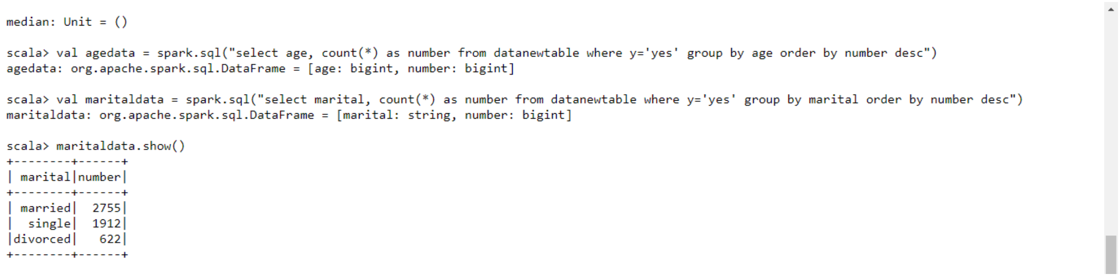
```
scala> bank_people_data.select(avg($"balance")).show()
+------------------+
|      avg(balance)|
+------------------+
|1362.2720576850766|
+------------------+
```



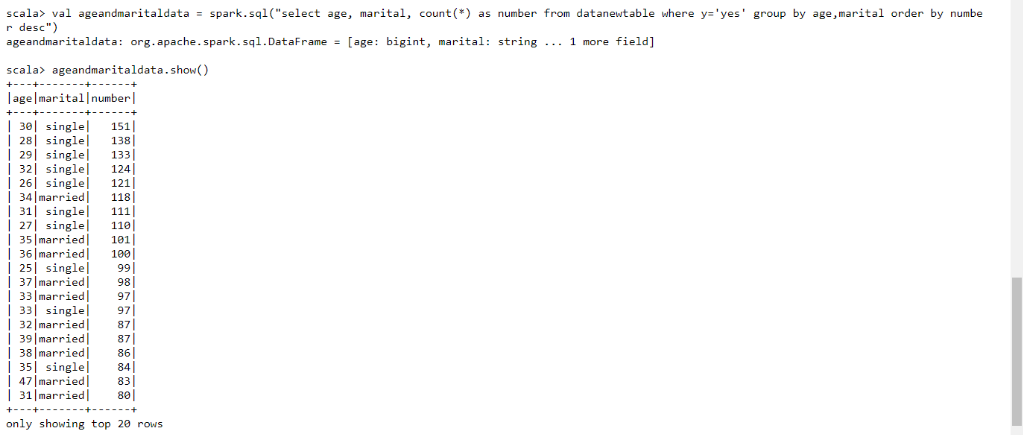
```
scala> val median = spark.sql("SELECT percentile_approx(balance, 0.5) FROM datanewtable").show()
+------------------------------------------------------+
|percentile_approx(balance, CAST(0.5 AS DOUBLE), 10000)|
+------------------------------------------------------+
|                                                   448|
+------------------------------------------------------+

median: Unit = ()

scala> val agedata = spark.sql("select age, count(*) as number from datanewtable where y='yes' group by age order by number desc")
agedata: org.apache.spark.sql.DataFrame = [age: bigint, number: bigint]

scala>
```



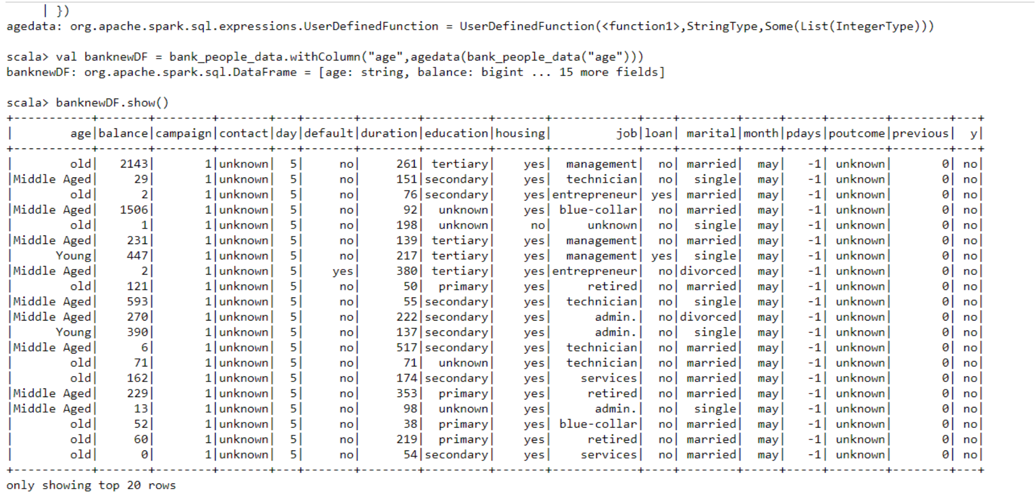
```
scala>

scala> agedata.show()
+---+------+
|age|number|
+---+------+
| 32|   221|
| 30|   217|
| 33|   210|
| 35|   209|
| 31|   206|
| 34|   198|
| 36|   195|
| 29|   171|
| 37|   170|
| 28|   162|
| 38|   144|
| 39|   143|
| 27|   141|
| 26|   134|
| 41|   120|
| 46|   118|
| 40|   116|
| 25|   113|
| 47|   113|
| 42|   111|
+---+------+
only showing top 20 rows
```



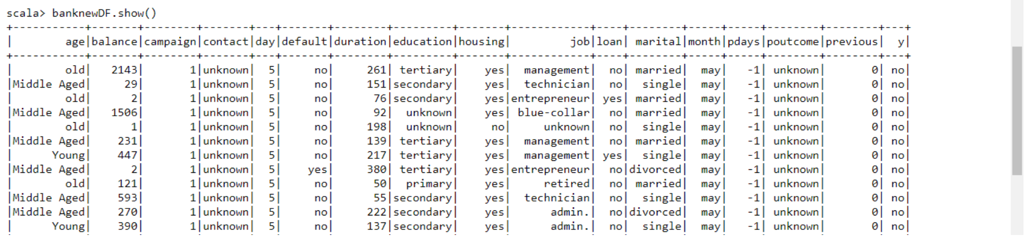
```
median: Unit = ()

scala> val agedata = spark.sql("select age, count(*) as number from datanewtable where y='yes' group by age order by number desc")
agedata: org.apache.spark.sql.DataFrame = [age: bigint, number: bigint]

scala> val maritaldata = spark.sql("select marital, count(*) as number from datanewtable where y='yes' group by marital order by number desc")
maritaldata: org.apache.spark.sql.DataFrame = [marital: string, number: bigint]

scala> maritaldata.show()
+--------+------+
| marital|number|
+--------+------+
| married|  2755|
|  single|  1912|
|divorced|   622|
+--------+------+
```



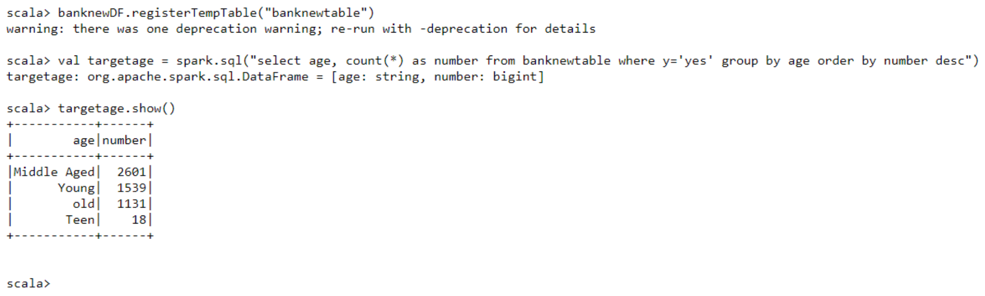
```
scala> val ageandmaritaldata = spark.sql("select age, marital, count(*) as number from datanewtable where y='yes' group by age,marital order by numbe
r desc")
ageandmaritaldata: org.apache.spark.sql.DataFrame = [age: bigint, marital: string ... 1 more field]

scala> ageandmaritaldata.show()
+---+-------+------+
|age|marital|number|
+---+-------+------+
| 30| single|   151|
| 28| single|   138|
| 29| single|   133|
| 32| single|   124|
| 26| single|   121|
| 34|married|   118|
| 31| single|   111|
| 27| single|   110|
| 35|married|   101|
| 36|married|   100|
| 25| single|    99|
| 37|married|    98|
| 33|married|    97|
| 33| single|    97|
| 32|married|    87|
| 39|married|    87|
| 38|married|    86|
| 35| single|    84|
| 47|married|    83|
| 31|married|    80|
+---+-------+------+
only showing top 20 rows
```



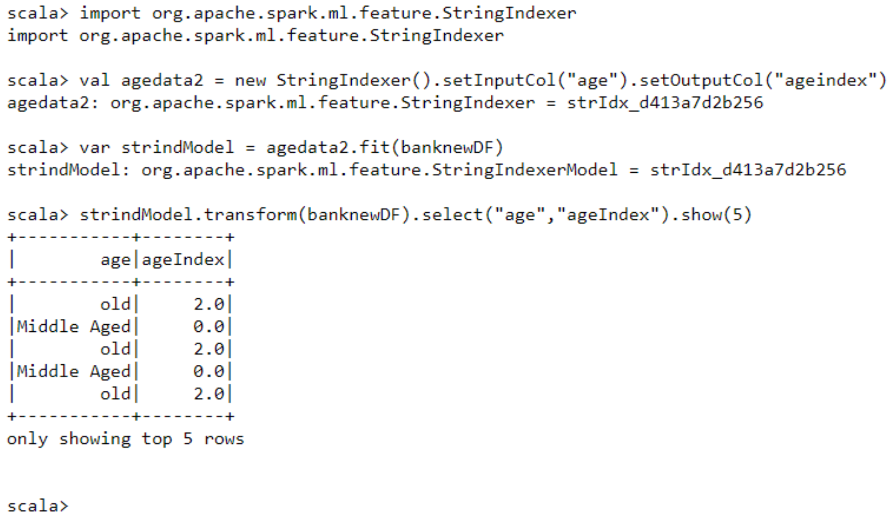
```
     | })
agedata: org.apache.spark.sql.expressions.UserDefinedFunction = UserDefinedFunction(<function1>,StringType,Some(List(IntegerType)))

scala> val banknewDF = bank_people_data.withColumn("age",agedata(bank_people_data("age")))
banknewDF: org.apache.spark.sql.DataFrame = [age: string, balance: bigint ... 15 more fields]

scala> banknewDF.show()
+-----------+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
|        age|balance|campaign|contact|day|default|duration|education|housing|         job|loan| marital|month|pdays|poutcome|previous|  y|
+-----------+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
|        old|   2143|       1|unknown|  5|     no|     261| tertiary|    yes|  management|  no| married|  may|   -1| unknown|       0| no|
|Middle Aged|     29|       1|unknown|  5|     no|     151|secondary|    yes|  technician|  no|  single|  may|   -1| unknown|       0| no|
|        old|      2|       1|unknown|  5|     no|      76|secondary|    yes|entrepreneur| yes| married|  may|   -1| unknown|       0| no|
|Middle Aged|   1506|       1|unknown|  5|     no|      92|  unknown|    yes| blue-collar|  no| married|  may|   -1| unknown|       0| no|
|        old|      1|       1|unknown|  5|     no|     198|  unknown|     no|     unknown|  no|  single|  may|   -1| unknown|       0| no|
|Middle Aged|    231|       1|unknown|  5|     no|     139| tertiary|    yes|  management|  no| married|  may|   -1| unknown|       0| no|
|      Young|    447|       1|unknown|  5|     no|     217| tertiary|    yes|  management| yes|  single|  may|   -1| unknown|       0| no|
|Middle Aged|      2|       1|unknown|  5|    yes|     380| tertiary|    yes|entrepreneur|  no|divorced|  may|   -1| unknown|       0| no|
|        old|    121|       1|unknown|  5|     no|      50|  primary|    yes|     retired|  no| married|  may|   -1| unknown|       0| no|
|Middle Aged|    593|       1|unknown|  5|     no|      55|secondary|    yes|  technician|  no|  single|  may|   -1| unknown|       0| no|
|Middle Aged|    270|       1|unknown|  5|     no|     222|secondary|    yes|      admin.|  no|divorced|  may|   -1| unknown|       0| no|
|      Young|    390|       1|unknown|  5|     no|     137|secondary|    yes|      admin.|  no|  single|  may|   -1| unknown|       0| no|
|Middle Aged|      6|       1|unknown|  5|     no|     517|secondary|    yes|  technician|  no| married|  may|   -1| unknown|       0| no|
|        old|     71|       1|unknown|  5|     no|      71|  unknown|    yes|  technician|  no| married|  may|   -1| unknown|       0| no|
|        old|    162|       1|unknown|  5|     no|     174|secondary|    yes|    services|  no| married|  may|   -1| unknown|       0| no|
|Middle Aged|    229|       1|unknown|  5|     no|     353|  primary|    yes|     retired|  no| married|  may|   -1| unknown|       0| no|
|Middle Aged|     13|       1|unknown|  5|     no|      98|  unknown|    yes|      admin.|  no|  single|  may|   -1| unknown|       0| no|
|        old|     52|       1|unknown|  5|     no|      38|  primary|    yes| blue-collar|  no| married|  may|   -1| unknown|       0| no|
|        old|     60|       1|unknown|  5|     no|     219|  primary|    yes|     retired|  no| married|  may|   -1| unknown|       0| no|
|        old|      0|       1|unknown|  5|     no|      54|secondary|    yes|    services|  no| married|  may|   -1| unknown|       0| no|
+-----------+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
only showing top 20 rows
```



```
scala> banknewDF.show()
+-----------+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
|        age|balance|campaign|contact|day|default|duration|education|housing|         job|loan| marital|month|pdays|poutcome|previous|  y|
+-----------+-------+--------+-------+---+-------+--------+---------+-------+------------+----+--------+-----+-----+--------+--------+---+
|        old|   2143|       1|unknown|  5|     no|     261| tertiary|    yes|  management|  no| married|  may|   -1| unknown|       0| no|
|Middle Aged|     29|       1|unknown|  5|     no|     151|secondary|    yes|  technician|  no|  single|  may|   -1| unknown|       0| no|
|        old|      2|       1|unknown|  5|     no|      76|secondary|    yes|entrepreneur| yes| married|  may|   -1| unknown|       0| no|
|Middle Aged|   1506|       1|unknown|  5|     no|      92|  unknown|    yes| blue-collar|  no| married|  may|   -1| unknown|       0| no|
|        old|      1|       1|unknown|  5|     no|     198|  unknown|     no|     unknown|  no|  single|  may|   -1| unknown|       0| no|
|Middle Aged|    231|       1|unknown|  5|     no|     139| tertiary|    yes|  management|  no| married|  may|   -1| unknown|       0| no|
|      Young|    447|       1|unknown|  5|     no|     217| tertiary|    yes|  management| yes|  single|  may|   -1| unknown|       0| no|
|Middle Aged|      2|       1|unknown|  5|    yes|     380| tertiary|    yes|entrepreneur|  no|divorced|  may|   -1| unknown|       0| no|
|        old|    121|       1|unknown|  5|     no|      50|  primary|    yes|     retired|  no| married|  may|   -1| unknown|       0| no|
|Middle Aged|    593|       1|unknown|  5|     no|      55|secondary|    yes|  technician|  no|  single|  may|   -1| unknown|       0| no|
|Middle Aged|    270|       1|unknown|  5|     no|     222|secondary|    yes|      admin.|  no|divorced|  may|   -1| unknown|       0| no|
|      Young|    390|       1|unknown|  5|     no|     137|secondary|    yes|      admin.|  no|  single|  may|   -1| unknown|       0| no|
```



```
scala> banknewDF.registerTempTable("banknewtable")
warning: there was one deprecation warning; re-run with -deprecation for details

scala> val targetage = spark.sql("select age, count(*) as number from banknewtable where y='yes' group by age order by number desc")
targetage: org.apache.spark.sql.DataFrame = [age: string, number: bigint]

scala> targetage.show()
+-----------+------+
|        age|number|
+-----------+------+
|Middle Aged|  2601|
|      Young|  1539|
|        old|  1131|
|       Teen|    18|
+-----------+------+


scala>
```



```
scala> import org.apache.spark.ml.feature.StringIndexer
import org.apache.spark.ml.feature.StringIndexer

scala> val agedata2 = new StringIndexer().setInputCol("age").setOutputCol("ageindex")
agedata2: org.apache.spark.ml.feature.StringIndexer = strIdx_d413a7d2b256

scala> var strindModel = agedata2.fit(banknewDF)
strindModel: org.apache.spark.ml.feature.StringIndexerModel = strIdx_d413a7d2b256

scala> strindModel.transform(banknewDF).select("age","ageIndex").show(5)
+-----------+--------+
|        age|ageIndex|
+-----------+--------+
|        old|     2.0|
|Middle Aged|     0.0|
|        old|     2.0|
|Middle Aged|     0.0|
|        old|     2.0|
+-----------+--------+
only showing top 5 rows


scala>
```