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ark/spark-web-ui-understanding/) FAQ's P(yStpark/epark(b)yisxasSQLeturctionsteark-questions/) execute SQL-like expressions and to use an existing DataFrame column value as an (https://sparkbyexamples.com/py More Yexplession/apairhenexa Pysbark কলা) নি functions. Most of the commonly used SQL functions are either part of the PySpark Column class

> (https://sparkbyexamples.com/pyspark/pysp ark-column-functions/) or built-in

pyspark.sql.functions API, besides these PySpark also supports many other SQL functions, so in order to use these, you have to use expr() function.

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Below are 2 use cases of PySpark expr() funcion.

· First, allowing to use of SQL-like functions that are not present in

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<u>DataFrame</u>
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<u>spark/pyspark-create-an-empty-</u>
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<u>PySpark – show()</u> (https://sparkbyexamples.com/py spark/pyspark-show-displaydataframe-contents-in-table/)</u>

<u>PySpark – StructType &</u> <u>StructField</u>

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<u>PySpark – select()</u>
(<u>https://sparkbyexamples.com/pyspark/select-columns-from-pyspark-dataframe/)</u>

<u>PySpark – collect()</u>
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<u>PySpark – withColumn()</u> (https://sparkbyexamples.com/py spark/pyspark-withcolumn/)

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<u>PySpark – where() & filter()</u>
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spark/pyspark-where-filter/)</u>

PySpark – drop() & dropDuplicates() (https://sparkbyexamples.com/pyspark/pyspark-distinct-to-dropduplicates/)

<u>PySpark – orderBy() and sort()</u> (https://sparkbyexamples.com/py

- PySpark Column type &
 pyspark.sql.functions API for
 example CASE WHEN, regr_count().
- Second, it extends the PySpark SQL
 Functions by allowing to use DataFrame
 columns in functions for expression. for
 example, if you wanted to add a month
 value from a column to a Date column. I
 will explain this in the example below.

1. PySpark expr() Syntax

Following is syntax of the expr() function.

expr(str)

expr() function takes SQL expression as a string argument, executes the expression, and returns a PySpark Column type. Expressions provided with this function are not a compile-time safety like DataFrame operations.

2. PySpark SQL expr()

Function Examples

Below are some of the examples of using expr() SQL function.



2.1 Concatenate Columns using || (similar to SQL)

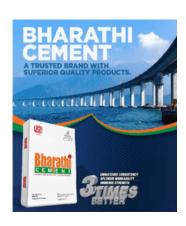
If you have SQL background, you pretty much familiar using || to concatenate values from two string columns, you can use expr() expression to do exactly same.

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spark/pyspark-orderby-and-sortexplained/)

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<u>PySpark – unionByName()</u> (https://sparkbyexamples.com/spark/spark-merge-two-dataframes-with-different-columns/)</u>

PySpark – UDF (User Defined Function) (https://sparkbyexamples.com/py

(https://sparkbyexamples.com/py spark/pyspark-udf-user-definedfunction/)

<u>PySpark – map()</u> (https://sparkbyexamples.com/py spark/pyspark-maptransformation/)</u>

<u>PySpark – flatMap()</u> (<u>https://sparkbyexamples.com/pyspark/pyspark-flatmap-transformation/)</u>

pyspark - foreach()
(https://sparkbyexamples.com/py
spark/pyspark-loop-iteratethrough-rows-in-dataframe/#useforeach-loop-through-dataframe)

PySpark - sample() vs sampleBy() (https://sparkbyexamples.com/py spark/pyspark-samplingexample/)

PySpark – fillna() & fill() (https://sparkbyexamples.com/pyspark/pyspark-fillna-fill-replace-null-values/)

PySpark – pivot() (Row to Column) (https://sparkbyexamples.com/pyspark/pyspark-pivot-and-unpivot-dataframe/)

<u>PySpark – partitionBy()</u>
(https://sparkbyexamples.com/py
spark/pyspark-partitionbyexample/)</u>

PySpark – ArrayType Column
(Array)
(https://sparkbyexamples.com/py
spark/pyspark-arraytype-column-with-examples/)

2.2 Using SQL CASE WHEN with expr()

PySpark doesn't have SQL Like CASE WHEN

(https://sparkbyexamples.com/pyspark/pyspark-when-otherwise/) so in order to use this on PySpark DataFrame withColumn() (https://sparkbyexamples.com/pyspark/pyspark-withcolumn/) or select(), you should use expr() function with expression as shown below.

Here, I have used CASE WHEN expression on withColumn() by using expr(), this example updates an existing column gender with the derived values, **M for male**, **F for Female**, and unknown **for others**

```
from pyspark.sql.functions import
data = [("James", "M"), ("Michael", "F
columns = ["name", "gender"]
df = spark.createDataFrame(data = d
#Using CASE WHEN similar to SQL.
from pyspark.sql.functions import
df2=df.withColumn("gender", expr("(
          "WHEN gender = 'F' THEN
df2.show()
+----+
   name | gender |
+----+
 James| Male|
|Michael| Female|
    Jen unknown
+----+
```

If you have any errors in the expression you will get the run time error but not during the compile time.

<u>PySpark – MapType (Map/Dict)</u> (https://sparkbyexamples.com/py spark/pyspark-maptype-dictexamples/)</u>

PySpark SQL Functions

<u>PySpark – Aggregate Functions</u> (https://sparkbyexamples.com/pyspark/pyspark-aggregate-functions/)</u>

<u>PySpark – Window Functions</u> (https://sparkbyexamples.com/pyspark/pyspark-window-functions/)</u>

PySpark – Date and Timestamp
Functions
(https://sparkbyexamples.com/pyspark/pyspark-sql-date-and-timestamp-functions/)

<u>PySpark – JSON Functions</u> (<u>https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/)</u>

PySpark Datasources

<u>PySpark</u> – Read & Write CSV File (https://sparkbyexamples.com/pyspark/pyspark-read-csv-file-into-dataframe/)

<u>PySpark – Read & Write Parquet</u> File

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<u>PySpark – Read & Write JSON</u> <u>file</u>

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2.3 Using an Existing Column Value for Expression

Most of the PySpark function takes constant literal values but sometimes we need to use a value from an existing column instead of a constant and this is not possible without expr() expression. The below example adds a number of months from an existing column instead of a Python constant.

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ote that Importing SQL functions are not equired when using them with expr(). You ee above add_months() is used without nporting.

..4 Giving Column Alias along with expr()

You can also use SQL like syntax to provide the <u>alias name to the column</u> (https://sparkbyexamples.com/pyspark/pyspark-column-alias-after-groupby/) expression.



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PySpark Built-In Functions

<u>PySpark – when()</u> (https://sparkbyexamples.com/pyspark/pyspark-when-otherwise/)</u>

PySpark - expr()
(https://sparkbyexamples.com/pysp

ark/pyspark-sql-expr-expressionfunction/)

PySpark - lit()

(https://sparkbyexamples.com/pyspark/pyspark-lit-add-literal-constant/)

PySpark - split()

(https://sparkbyexamples.com/pyspark/pyspark-convert-string-to-array-column/)

<u>PySpark – concat_ws()</u> (<u>https://sparkbyexamples.com/pyspark/pyspark-convert-array-column-to-string-column/)</u>

<u>Pyspark – substring()</u>
(https://sparkbyexamples.com/pyspark/pyspark-substring-from-a-column/)</u>

PySpark – translate() (https://sparkbyexamples.com/pyspark/pyspark-replace-column-values/#translate-replace-character-by-character)

<u>PySpark - regexp_replace()</u>
(https://sparkbyexamples.com/pyspark/pyspark-replace-column-

.5 Case Function with expr()

elow example converts long data type to tring type.

```
# Using Cast() Function
df.select("increment",expr("cast(ir
    .printSchema()

root
    |-- increment: long (nullable = tr
    |-- str_increment: string (nullabl
```

2.7 Arithmetic operations

expr() is also used to provide arithmetic operations, below examples add value 5 to increment and creates a new column new_increment

2.8 Using Filter with expr()

Filter the DataFrame rows

(https://sparkbyexamples.com/pyspark/pyspark-where-filter/) can done using expr() expression.

<u>values/#regexp_replace-replace-string-columns)</u>

PySpark – overlay() (https://sparkbyexamples.com/pyspark/pyspark-replace-column-values/#overlay-function)

PySpark - to_timestamp()
(https://sparkbyexamples.com/spark
/pyspark-to_timestamp-convertstring-to-timestamp-type/)

<u>PySpark – to_date()</u>
(https://sparkbyexamples.com/pyspark/pyspark-to_date-convert-timestamp-to-date/)</u>

<u>PySpark - date_format()</u>
(https://sparkbyexamples.com/pyspark/pyspark-date_format-convert-date-to-string-format/)</u>

<u>PySpark – datediff()</u>
(https://sparkbyexamples.com/pyspark/pyspark-difference-between-two-dates-days-months-years/#datediff)

PySpark - months_between() (https://sparkbyexamples.com/pyspark/pyspark-difference-between-two-dates-days-months-years/#months_between())

<u>PySpark – explode()</u>
(https://sparkbyexamples.com/pyspark/pyspark-explode-nested-array-into-rows/)</u>

<u>PySpark – array_contains()</u> (<u>https://sparkbyexamples.com/pyspark/pyspark-arraytype-column-withexamples/#array_contains)</u>

<u>PySpark – array()</u>
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<u>PySpark - collect_list()</u>
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PySpark - collect_set()
(https://sparkbyexamples.com/pyspark/pyspark-aggregate-functions/#collect-set)

PySpark - create_map() (https://sparkbyexamples.com/pyspark/pyspark-convert-dataframe-columns-to-maptype-dict/)

PySpark - map_keys()
(https://sparkbyexamples.com/pyspark/pyspark-maptype-dict-examples/#map_keys)

<u>PySpark - map_values()</u> (https://sparkbyexamples.com/pysp

```
#Use expr() to filter the rows
from pyspark.sql.functions import e
data=[(100,2),(200,3000),(500,500)]
df=spark.createDataFrame(data).toDF
df.filter(expr("col1 == col2")).shc

+---+---+
|col1|col2|
+---+---+
| 500| 500|
+----+----+
```

Complete Example of PySpark SQL expr()

Function

This example is also available at GitHub
PySpark Examples
(https://github.com/sparkexamples/pysparkexamples/blob/master/pyspark-expr.py)
Project.

ark/pyspark-maptype-dictexamples/#map_values)

<u>PySpark – struct()</u>
(https://sparkbyexamples.com/pyspark/pyspark-structtype-and-structfield/#update-struct-function)

<u>PySpark – countDistinct()</u>
(https://sparkbyexamples.com/pyspark/pyspark-count-distinct-from-dataframe/)</u>

<u>PySpark – sum(), avg()</u>
(https://sparkbyexamples.com/pyspark/pyspark-dataframe-groupby-and-sort-by-descending-order/)</u>

<u>PySpark - row_number()</u>
(https://sparkbyexamples.com/pyspark/pyspark-window-functions/#row_number)

<u>PySpark - rank()</u>
(https://sparkbyexamples.com/pyspark/pyspark-window-functions/#rank)

PySpark – dense_rank()
(https://sparkbyexamples.com/pyspark/pyspark-windowfunctions/#dense_rank)

<u>PySpark – percent_rank()</u>
(https://sparkbyexamples.com/pyspark/pyspark-window-functions/#percent_rank)

<u>PySpark – typedLit()</u>
(https://sparkbyexamples.com/pyspark/pyspark-lit-add-literal-constant/#typedlit)</u>

<u>PySpark - from_json()</u>
(https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/#from_json)</u>

<u>PySpark - to_json()</u> (https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/#to_json)</u>

<u>PySpark – json_tuple()</u>
(https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/#json_tuple)</u>

<u>PySpark – get_json_object()</u>
(https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/#get_json_object)</u>

<u>PySpark – schema of json()</u>
(https://sparkbyexamples.com/pyspark/pyspark-json-functions-with-examples/#schema of json)

```
from pyspark.sql import SparkSessid
spark = SparkSession.builder.appNan
from pyspark.sql.functions import
#Concatenate columns
data=[("James", "Bond"), ("Scott", "Va
df=spark.createDataFrame(data).toDF
df.withColumn("Name",expr(" col1 |
#Using CASE WHEN sql expression
data = [("James","M"),("Michael","F
columns = ["name", "gender"]
df = spark.createDataFrame(data =
df2 = df.withColumn("gender", expr(
           "WHEN gender = 'F' THEN
df2.show()
#Add months from a value of another
data=[("2019-01-23",1),("2019-06-24
df=spark.createDataFrame(data).toDF
df.select(df.date,df.increment,
     expr("add months(date,incremer
  .alias("inc date")).show()
# Providing alias using 'as'
df.select(df.date,df.increment,
     expr("""add months(date,increm
  ).show()
# Δdd
df.select(df.date,df.increment,
     expr("increment + 5 as new ind
  ).show()
# Using cast to convert data types
df.select("increment",expr("cast(ir
  .printSchema()
#Use expr() to filter the rows
data=[(100,2),(200,3000),(500,500)
df=spark.createDataFrame(data).toDF
df.filter(expr("col1 == col2")).sho
```

Conclusion

PySpark expr() function provides a way to run SQL like expression with DataFrames, here you have learned how to use expression with select(), withColumn() and to filter the DataFrame rows.

Happy Learning !!

References

 https://spark.apache.org/docs/2.3.1/api/p ython/_modules/pyspark/sql/functions.ht ml (https://spark.apache.org/docs/2.3.1/api/ python/_modules/pyspark/sql/functions.ht ml)

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