**Task 2: Chi-Square hypothesis test**

**Objective:** Based on employee sample data check if salary depends on role.

#Read data

df = spark.read.csv("/home/s\_kante/spark/data/developers\_survey\_training.csv", header='true')

#Replace IsDeveloper value with integer 1 or 0

df.createOrReplaceTempView("inputData")

df1 = spark.sql("SELECT CASE IsDeveloper WHEN 'Yes' THEN 1 ELSE 0 END AS IsDeveloper, CASE WHEN YearsOfExp<=2 THEN 1 WHEN YearsOfExp>2 AND YearsOfExp<=5 THEN 2 ELSE 3 END AS YearsOfExp, CASE WHEN Salary<=50000 THEN 1 WHEN Salary>50000 AND Salary<100000 THEN 2 ELSE 3 END AS Salary FROM inputData ");

#Create feature vector

from pyspark.ml.feature import VectorAssembler

assembler = VectorAssembler(inputCols=["IsDeveloper","YearsOfExp"], outputCol="features")

combined = assembler.transform(df1)

vector\_df = combined.select(combined.Salary, combined.features)

#Find the chi-square stats

from pyspark.ml.stat import ChiSquareTest

chiResult = ChiSquareTest.test(vector\_df, "features", "Salary")

#Display the stats

chiResult.head().pValues

chiResult.head().degreesOfFreedom

Ref:

<https://www.khanacademy.org/math/statistics-probability/inference-categorical-data-chi-square-tests/chi-square-goodness-of-fit-tests/v/chi-square-distribution-introduction>

<https://www.ling.upenn.edu/~clight/chisquared.htm>

<https://stattrek.com/chi-square-test/goodness-of-fit.aspx>

Best: <https://stattrek.com/chi-square-test/independence.aspx>