```
import random
random.seed(1)
splits = df.randomSplit([0.7, 0.3])
df_train = splits[0]
df_test = splits[1]
indexer = StringIndexer(inputCol="class", outputCol="label")
vectorAssembler = VectorAssembler(inputCols=eval(input_columns), outputCol="features")
normalizer = MinMaxScaler(inputCol="features", outputCol="features_norm")
lr = LogisticRegression(maxIter=1000, regParam=2.0, elasticNetParam=1.0)
pipeline = Pipeline(stages=[indexer, vectorAssembler, normalizer, lr])
model = pipeline.fit(df_train)
prediction = model.transform(df_train)
binEval = MulticlassClassificationEvaluator(). \
    setMetricName("accuracy"). \
    setPredictionCol("prediction"). \
    setLabelCol("label")

print(binEval.evaluate(prediction))
print("maxIter=1000, regParam=2.0, elasticNetParam=1.0")
print("train=0.7, test=0.3, seed=1")
```

```
22/10/05 12:17:22 WARN netlib.BLAS: Failed to load implementation from: com.github.fommil.netlib.NativeSystemBLAS
22/10/05 12:17:22 WARN netlib.BLAS: Failed to load implementation from: com.github.fommil.netlib.NativeRefBLAS
[Stage 45:==================================================>       (6 + 1) / 7]
0.20651150878765567
maxIter=1000, regParam=2.0, elasticNetParam=1.0
train=0.7, test=0.3, seed=1
```

```
import random
random.seed(1)
splits = df.randomSplit([0.9, 0.1])
df_train = splits[0]
df_test = splits[1]
indexer = StringIndexer(inputCol="class", outputCol="label")
vectorAssembler = VectorAssembler(inputCols=eval(input_columns), outputCol="features")
normalizer = MinMaxScaler(inputCol="features", outputCol="features_norm")
lr = LogisticRegression(maxIter=1000, regParam=2.0, elasticNetParam=1.0)
pipeline = Pipeline(stages=[indexer, vectorAssembler, normalizer, lr])
model = pipeline.fit(df_train)
prediction = model.transform(df_train)
binEval = MulticlassClassificationEvaluator(). \
    setMetricName("accuracy"). \
    setPredictionCol("prediction"). \
    setLabelCol("label")

print(binEval.evaluate(prediction))
print("maxIter=1000, regParam=2.0, elasticNetParam=1.0")
print("train=0.9, test=0.1, seed=1")
```

```
[Stage 91:==================================================>       (6 + 1) / 7]
0.20631117480506167
maxIter=1000, regParam=2.0, elasticNetParam=1.0
train=0.9, test=0.1, seed=1
```