A/B test for offspec

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A/B testing

Objective: find a difference in test results for batches that are on spec and off spec.

Sprint:PO_SPRINT_23_SEP_2018

Contents:MES data file named "Product_1_sample", containing a sheet named "Score Pivot" [formatted]

Strcuture:The data file used is namesfrom Honeywell shareddrive that contains batchwise descriptive statistics of test results with labels for on/off specification.

Loading data

Below is the head of a data.frame that contains ON and OFF spec which will be compared in the following plots.

```
##       ResultEntryTime BatchNumber Average.of.Result Sum.of.SpecMin
## 1 2016-05-21 09:25:24  3032008763           0.06580          0.061
## 2 2016-05-21 09:25:54  3032008763           0.06575          0.061
## 3 2016-05-22 11:35:34  3032008763           0.06530          0.061
## 4 2016-05-22 11:35:52  3032008763           0.06560          0.061
## 5 2016-09-08 11:44:44  3032008910           0.00000         96.000
## 6 2016-02-18 05:26:28  3032008617          10.00000        150.000
##   Sum.of.SpecMax Spec
## 1          0.065  OFF
## 2          0.065  OFF
## 3          0.065  OFF
## 4          0.065  OFF
## 5             NA  OFF
## 6             NA  OFF
```

Each batch contains 3-4 aggregated sensor readings. However since the 2 parts of the data "ON" and "OFF" spec are similar they can be compared for rough analysis. Below table shows the proportion of ON spec to OFF spec batches in the pilot data. And the general struture of the dataset.

```
##
##  OFF   ON
##   51 7250
```

```
## 'data.frame':    7301 obs. of  6 variables:
##  $ ResultEntryTime  : POSIXct, format: "2016-05-21 09:25:24" "2016-05-21 09:25:54" ...
##  $ BatchNumber      : num  3.03e+09 3.03e+09 3.03e+09 3.03e+09 3.03e+09 ...
##  $ Average.of.Result: num  0.0658 0.0658 0.0653 0.0656 0 ...
##  $ Sum.of.SpecMin   : num  0.061 0.061 0.061 0.061 96 150 0.26 0.26 0.26 0.26 ...
##  $ Sum.of.SpecMax   : num  0.065 0.065 0.065 0.065 NA NA 0.34 0.34 0.34 0.34 ...
##  $ Spec             : chr  "OFF" "OFF" "OFF" "OFF" ...
```

Below is the summary statistics of all the OFF spec batches

```
##  Average.of.Result Sum.of.SpecMin     Sum.of.SpecMax
##  Median : 0.2540   Median :  0.2600   Median :0.3400
##  Mean   : 0.8221   Mean   : 15.5527   Mean   :0.2991
```

Below is the summary statistics of all the ON spec batches

```
##  Average.of.Result Sum.of.SpecMin    Sum.of.SpecMax
##  Median :  0.631   Median : 40.000   Median :  0.690
##  Mean   : 39.845   Mean   : 62.741   Mean   : 17.904
```

The min,median and max are the results of quality tests eg:ABD,Crush etc. The next step of analysis is to map the off spec batches to PI data and compare the summary statistics to randomly selected ON spec batches.

This is to test the hypothesis:

Sensor readings of "ON" spec batches are 'different' from sensor readings of "OFF" spec batches.