

SIGNIFICANCE TESTING: AUTOMATING P-TESTS

CASE STUDY: SURVEY DATA ANALYSIS

Dining Restaurant Group

Objective

Conducting the hypothesis significance testing of responses obtained against 7 questions & 14 attributes from a mobile survey conducted for three countries. The total number of tests required to be done exceeds count of 4500.

Background and Challenges

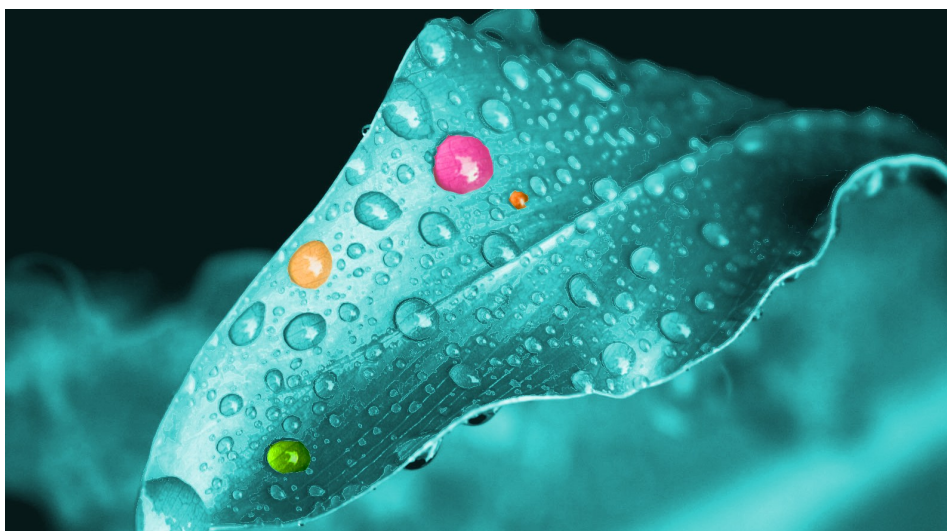
A prominent market research organization is working on collecting & analyzing data of a large customer survey for a top dining restaurant chain in U.S. The Restaurant Group has added new items in the menu and wants to test the effectiveness of the change by measuring customer responses on a variety of attributes obtained from a large-scale mobile survey.

The questions include specifics on the customers demographics, gender, age, frequency of dining, likeability attributes, serving factors, amongst others. The surveys are conducted on multiple geographies, and various third parties are engaged to manage the herculean task of collecting data from the appropriate questionnaires. Because of the massive global footprint of the exercise and the efforts required in collating the responses, the time available for proper analysis & presentation of results gets thinner than anticipated and, hence, appropriate measures are called to stimulate activities that address the pre closure of tasks required for the success of this market research campaign.

“We were used to Minitab for all our analyses, this is the first time somebody has used a different software to produce results quickly than we’ve ever seen before.

Hail R programming”

*- Managing Director
Market Research Company, U.S.*



Hypothesis Testing is about understanding - Are the Differences Statistically Significant ?

Insights into Market Research Automation

- Select the Right Test Variant
- Use VBA Macros to Build Templates in MS Excel
- Integrate R Output to the Formatted File Templates

Our Approach

Method: Hypothesis Testing using p-tests (Mean & Proportions)

Software Used: R Base Package, MS Excel VBA Macros

The design template is prepared in MS Excel to build the format required for showing results in the executive level presentation. Draft versions of the output are sent for approval from the client and discussions sought on the format to ensure results being conveyed most effectively. Details about all

the tests (aggregate / response level, variant of the p-tests, whether comparison needed at inter/intra country levels of performance, etc.) are thoroughly discussed with the client. Meanwhile, programs in R are developed to automate the testing exercise. In order to produce result-ready output files in the format approved by the client, VBA macros are written to pump the p-tests outputs from R files to the final output table. All the programs & macros are thoroughly tested for multiple scenario and dummy data.

(a) Sample of R program built:

```
ofile <- data.frame(var1 = bfile[,1],var2 = bfile[,j] )
dfile <- prop.test(ofile[,1],ofile[,2],correct = FALSE)
write.table(dfile[["p.value"]], file = ofile,append = TRUE)
i <- i + 2
```

(b) List of test-results quickly populated:

Q6-Mal	15-10-2012 22:53
Q7-Mal	15-10-2012 22:53
Q8-Mal	15-10-2012 22:53
Q9-Mal	15-10-2012 22:53
Q10-Mal	15-10-2012 22:53
Q11-Mal	15-10-2012 22:53
Q12-Mal	15-10-2012 22:53
Results-Q6-Mal	15-10-2012 23:01
Results-Q7-Mal	15-10-2012 23:01
Results-Q8-Mal	15-10-2012 23:02
Results-Q9-Mal	15-10-2012 23:03
Results-Q10-Mal	15-10-2012 23:04
Results-Q11-Mal	15-10-2012 23:05
Results-Q12-Mal	15-10-2012 23:05

(c) R output is pumped into respective files using VBA macros:

	South Africa		Malaysia	
	A. Pre	B. Post	A. Pre	B. Post
	437	439	361	
	31	13	4	2
	7%	3% ^a	1%	1%
	B	A	-	-
	55	36	22	10
	13%	8% ^b	6%	3% ^b
	B	A	B	A
	150	114	86	124
	34%	26% ^a	24%	35% ^a
	B	A	B	A
	140	144	174	127
	32%	33%	48%	25% ^a

Illustration: (a) Sample of R program built, (b) list of test-results quickly populated, & (c) R output is pumped into respective files using VBA macros

Contact Us

- Hypothesis Testing
- Conjoint Analyses
- Regression & Correlation
- Cross Tabulation

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Results and Implementation

R produces output results for all the p-tests (both by-Means and by-proportions) in less than 1 hour of time per geography. The results, obtained in CSV files, are pumped using a VBA macro that is written exclusively for the project. The output table is shipped successfully to the company in record time.