

EBAY MultiScreen Insight

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Agenda

- EBAY DDI Introduction
- MultiScreen Introduction
- EBAY MultiScreen Insight Case Study
- Q & A













HTC EVO3D





Bon Iver's whiskey barrel guitar

Updated Tue, Oct 23, 2012

In this day of mass-produced guitars, it is nice to know there is still a niche business catering to individual guitar-making But a guitar made from whiskey barrels? You need to see it to believe it. Continue reading →



Canon Digital Cameras

Nintendo Wi







Analytics Platform Architecture



Data Platforms



Understanding Cross-platform Consumer Behavior





Majority of our daily media interactions are screen based





Our time online is spread between 4 primary media devices





Context drives device choice

Today consumers own multiple devices and move seamlessly between them throughout the day





Computers keep us productive and informed





Smartphones keep us connected





Tablets keep us entertained





There are two modes of multi-screening

Sequential Usage Moving from one device to another at different times to accomplish a task



Simultaneous Usage



Using more than one device at the same time for either a related or an unrelated activity

Multi-tasking - Unrelated activity



Complementary Usage - Related activity



Smartphones are the most common starting place for online activities





Consumers rely on search to move between devices





Consumers take a multi-device path to purchase





50% of switches are within 2 hours. 8% within 7 minutes.





Switch starting from pc->mob and mob->pc are nearly 50%



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Generate MultiScreen segments by 3D RGL package



MultiScreen Segment Similarity Clustering by GA(Genetic Algorithm)





MultiScreen Segment Similarity Clustering by GA(Genetic Algorithm)





```
ga(type = c("binary", "real-valued", "permutation"),
fitness, ...,
min, max, nBits,
population = gaControl(type)@population,
selection = gaControl(type)@selection,
crossover = gaControl(type)@crossover,
mutation = gaControl(type)@mutation,
popSize = 50, pcrossover = 0.8, pmutation = 0.1,
elitism = max(1, round(popSize * 0.05)),
monitor = gaMonitor, maxiter = 100, run = maxiter,
maxfitness = -Inf, names = NULL, suggestions, seed)
```

GA Package



> GA search global minimum for Rastrigin Function





It is defined by:

$$\begin{split} f(\mathbf{x}) &= An + \sum_{i=1}^n \left[x_i^2 - A\cos(2\pi x_i) \right] \\ \text{where } A &= 10 \text{ and } x_i \in [-5.12, 5.12]. \text{ It has a global minimum at } \mathbf{x} = \mathbf{0} \text{ where } f(\mathbf{x}) = 0 \end{split}$$

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Genetic Algorithm VS Standard K-Means





Task Continuity Prediction Model

Features	χ^2	Info Gain
NumRelatedQueryMobile	491.23172	0.031685
TimeIntervalSwitch	378.00423	0.024016
PreQueryContiguousSwitch	342.97317	0.020403
NumRelatedQuerySwitch	315.34983	0.020822
AvgSpeedSwitch	295.76765	0.022745
GeoDistanceSwitch	270.39483	0.020108
NumOfContiguousSwitch	235.27217	0.020083
EntropyAvg	221.82945	0.015446
NumRelatedQueryDesktop	172.73978	0.015161
IsSameLocationSwitch	95.81413	0.009118



Summary

- MultiScreen is important for e-commerce.
- > R has powerful statistical and ML packages to support the MultiScreen research.
- Future work to answer not only what questions, but also why and how questions for MultiScreen.
- Future work to research RHadoop ML algorithms.



Resources and References

R GUI: <u>http://www.r-project.org/</u>

R COP: <u>http://datahub.corp.ebay.com/groups/x12uy</u>

Data Science COP: <u>http://datahub.corp.ebay.com/groups/x245i</u>















Thank You

Q**&A**



