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# Direct Marketing Analytics with R

useR! 2008  
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Jim Porzak,  
Senior Director of Analytics  
Responsys, Inc.  
San Francisco, California



# Outline

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- Introduction
  - What is Direct Marketing (DM)?
  - How does “analytics” play a role?
  - What's Special About DM data & analytics?
- DM data requirements -> Class Structure
- Basic DM Metrics
- Testing
- Segmentation
- Modeling
- Directions & Questions
- (Appendix with resources & links)



# Introduction



# What is DM?

- Also know as “direct *response* marketing.”
- Characteristics:
  - **Directed** at targeted *individuals* or *demographic*
  - **Response** is asked for and expected
  - **Tracking** of responses back to source
  - **Evaluated** by counts and value [€, £, \$, ...]
  - **Testing** of alternate elements is implicit in DM
- Elements (in order of importance):
  1. List
  2. Offer
  3. Creative



# Channels used in DM

## Classical

- Individual
  - Direct Mail
- Demographic
  - Advertisement
  - TV or Radio
  - Billboard
  - Insert

## Internet

- Individual
  - Email
- Demographic
  - Banner
  - Search
    - Paid
    - Free

*Remember, all of above ask for a response that is traceable back to source!*



# Use Analytics to Answer these Questions

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- *Directed* to whom?
  - Predicting responses
    - Which of list, or part of list?
    - When to send?
  - Segmenting population –
    - To use best offer, creative, & channel
- *Evaluated* with accepted metrics
  - Open definitions are important here.
  - Use confidence intervals
- *Testing* to improve next time around.
  - Show significance of results



# So What's So Special?

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- Statistically speaking?
  - Not much...
  - But remember the nature of DM problems:
    - Huge N (typically  $10^4$  to  $10^7$ )
    - Small proportions (often 3% to 0.05% for direct or email)
- The audience!
  - The corporate world
  - DMers themselves
- The Data Structure
  - Levels of granularity
  - “Campaign” hierarchies drives testing



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“It's the structure, stupid!”





# The DM Process (Individual)

## Postal Mail

- Outbound
  - Mail a “piece”
    - Tagged?
- Inbound
  - Recipient responds
    - Return mail
    - Calling 800#
    - Visits
      - Web
      - Physical location

## Email

- Outbound
  - Send a “message”
    - Tagged?
- Inbound
  - ISP
    - Bounce
    - Opt-out
  - Recipient
    - Open
    - Click
    - (Request or Buy)
    - Opt-out



# Data Elements

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- Details
  - The “List” (perhaps with additional data)
  - Send Events
  - Response Events
- Summaries
  - Response counts & rates (total & unique)
  - Simple “cell-level” metrics
- Campaign Meta-data
  - Costs and Values
  - Time window
  - Batch or Triggered
  -



# Class & Method Challenges

- Detail & Summary classes. ~ *straightforward*
- Campaign wise meta-data. ~ *straightforward*
- Campaign elements & relations. *harder!*
  - summary, print & plot should be able to understand a group of campaigns and elements within a campaign.
- Leverage arules?

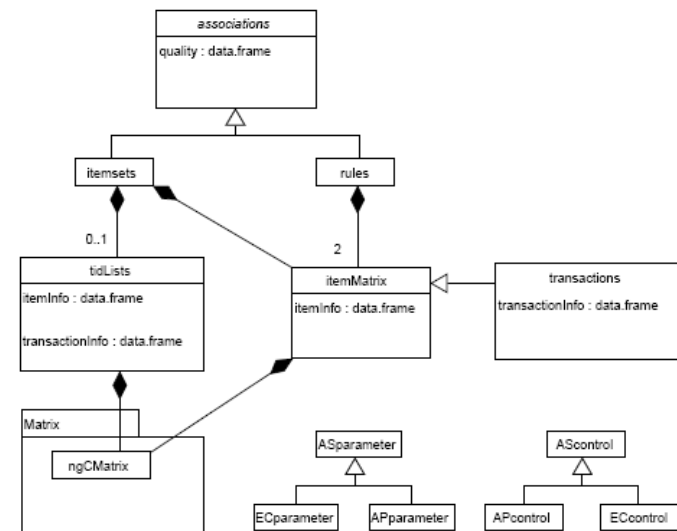


Figure 2: UML class diagram (see Fowler, 2004) of the arules package.

*From package vignette: arules.pdf*



# DMA Modules



# Direct Marketing Metrics

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- Direct Mail
  - Response counts & rate
  - Cost per response (sale, lead, ...)
- Email
  - all above, plus email specific metrics
    - Opt-out, bounce, open, click counts & rates
    - Add unique opens, clicks, responses
- General
  - Campaign ROI
  - List growth (opt-ins / -outs per time period)
  - List fatigue



# DM Testing

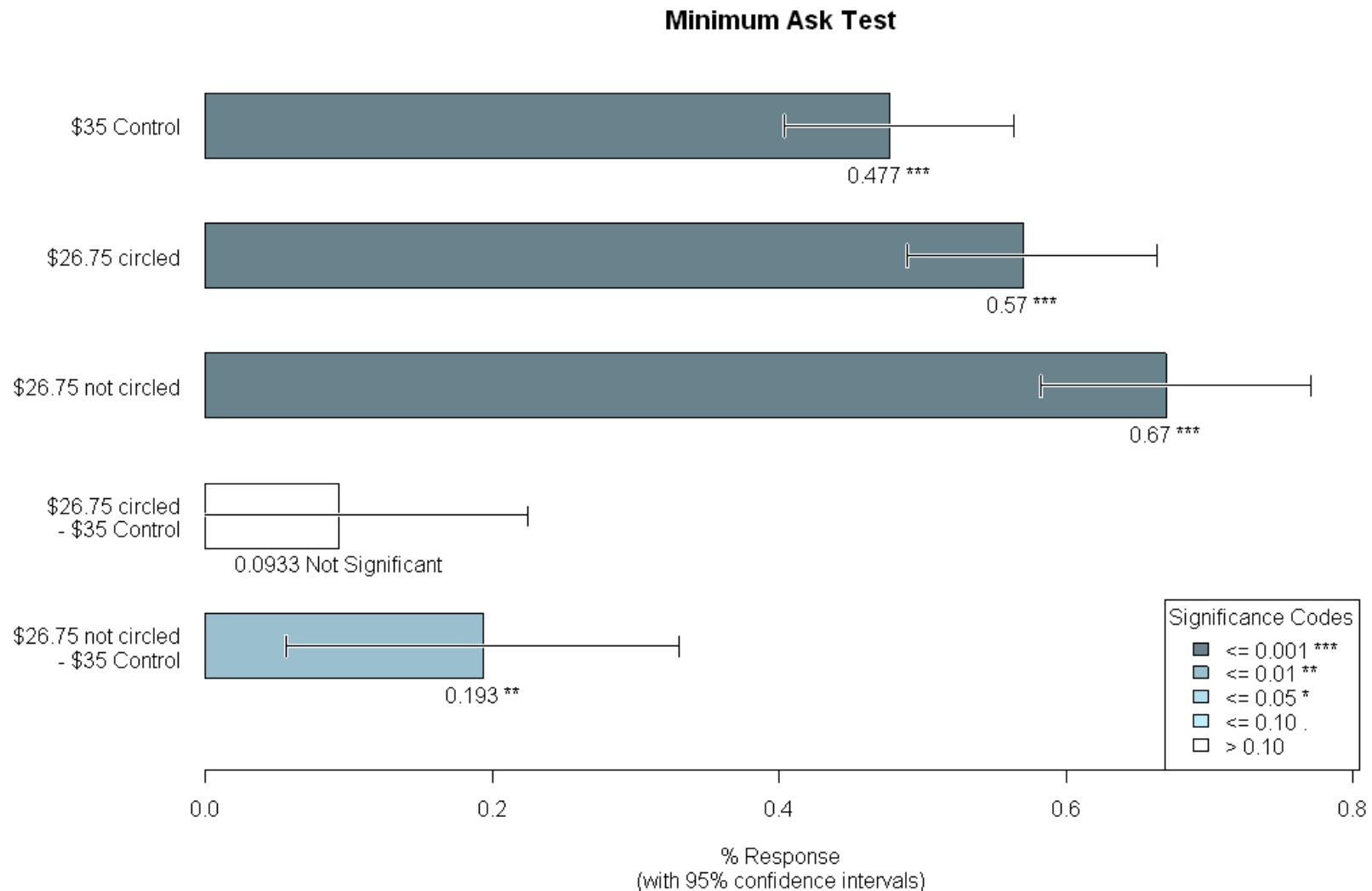
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- Simple 2-way: A/B, Control/Test
- Multiple test against control: A/BCD...
- True MVT

*Goal is appropriate analysis done based on campaign meta-data.*



# Example A/BC Test





# Segmentation for Targeting

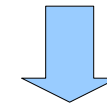
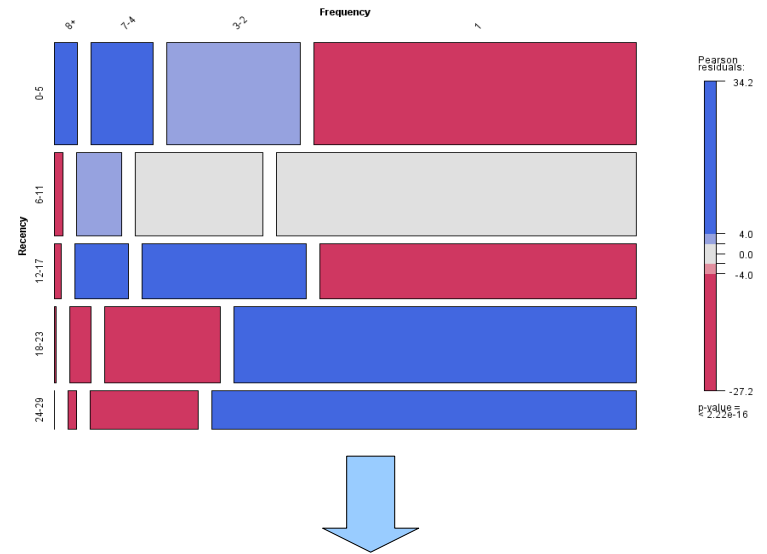
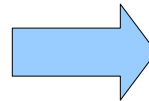
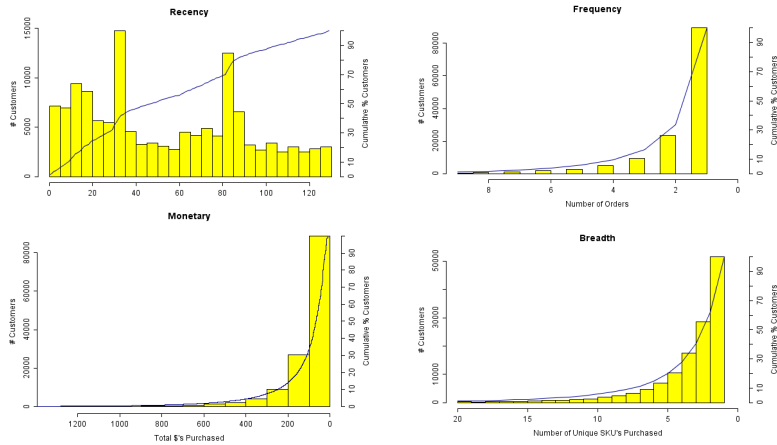
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- Behavior based
  - Purchases
  - Usage
- Attitudinal
  - Preference / Interest Survey

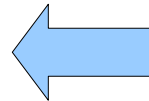
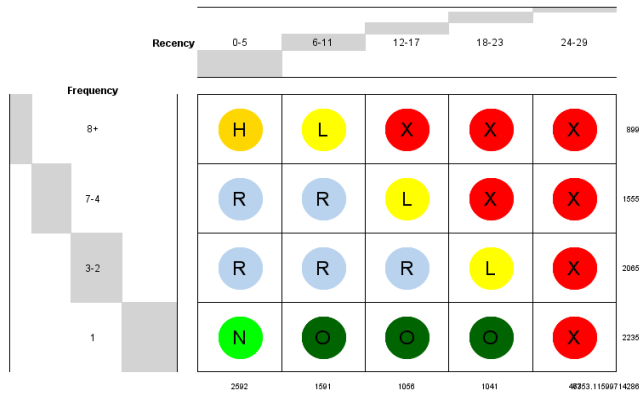




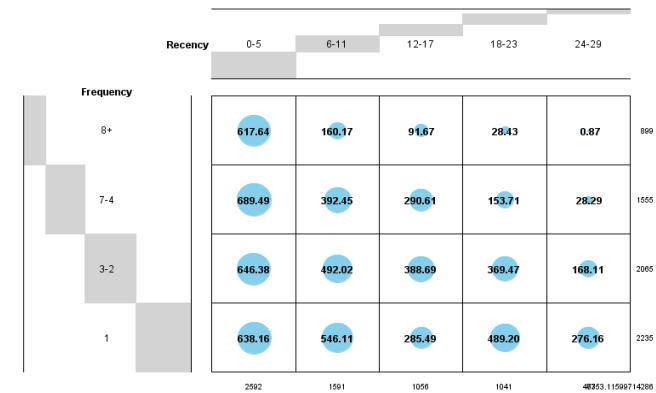
# Purchase Behavior Example



Balloon Plot for Recency by Frequency. Area is proportional to Annual Sales (000).



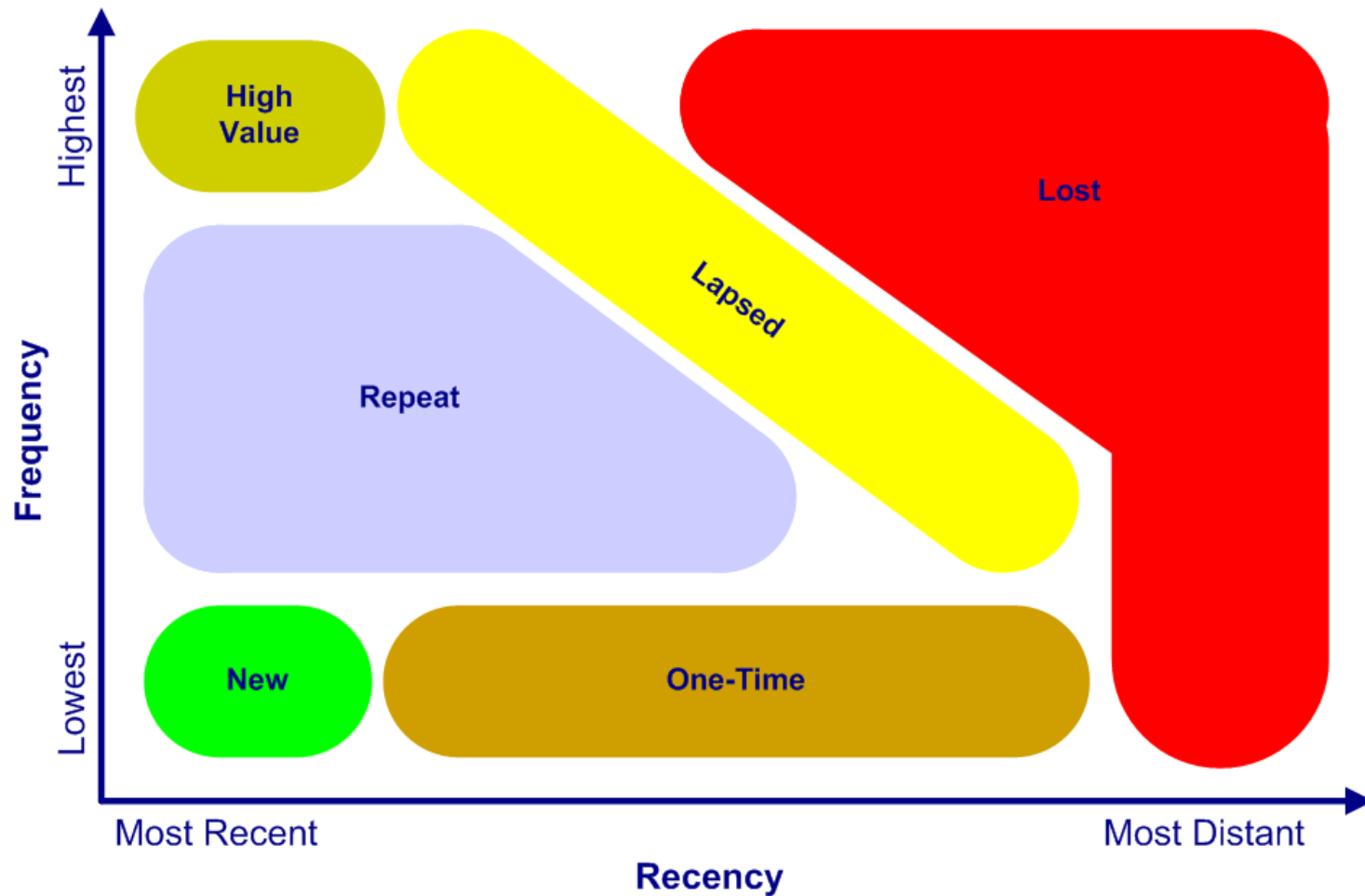
Balloon Plot for Recency by Frequency. Area is proportional to Annual Sales (000).





# Purchase Behavior Categories

For executive presentations, we re-draw the segment cells in this way:





# Modeling for List Optimization

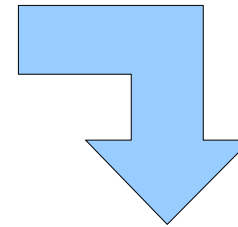
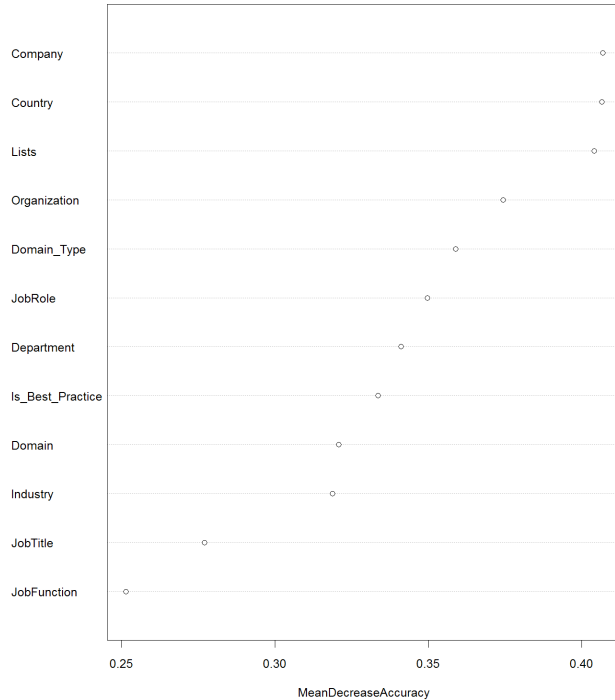
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- Model full list to select those recipients with highest expected response to offer
- Methods include logistic regression and machine learning tools like random forest.
- Supply “model validation” curve (ROC) so marketer can pick “depth of file” to use based on economics of the offer

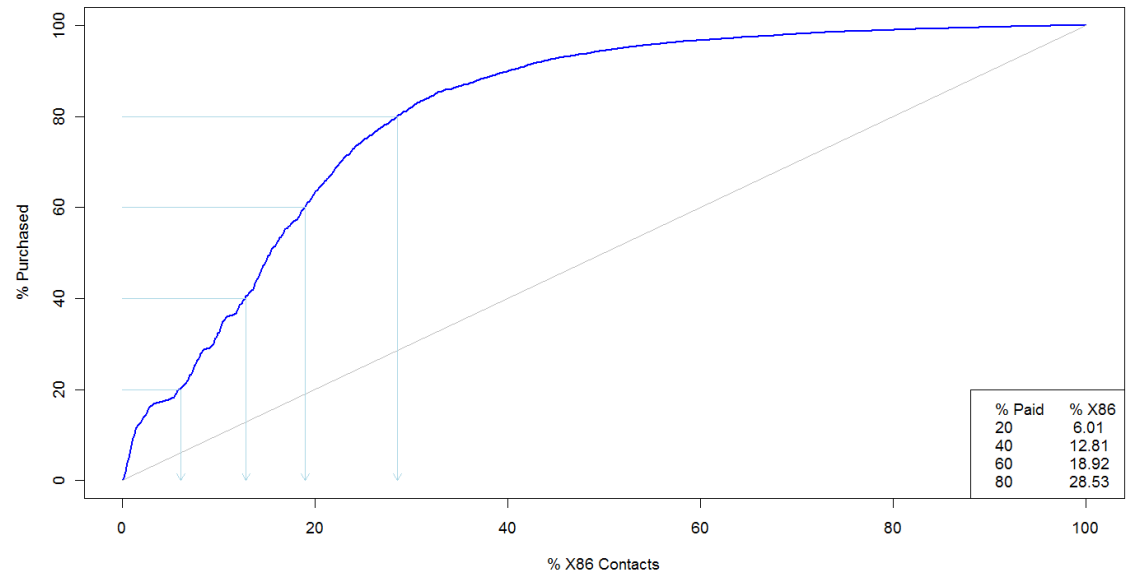


# Response Prediction Example

Purchase Model  
Variable Importance



Purchase Model Validation





# Future Directions

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- Finalize class structure
  - Need to work through more use cases
    - Feel free to send examples!
  - Sketch method dependencies
- Roadmap
  - Independent batch campaigns
  - 2-way & n-way against control
  - Triggered campaigns
  - True MVT
  - Segmentation
  - Response Modeling
- On R-Forge: <https://r-forge.r-project.org/projects/dma/>
  - Collaborators welcome!



Thanks!



# Appendix



# Links & References

- Books
  - Metrics
    - Davis, *Measuring Marketing – 103 Key Metrics Every Marketer Needs*, Wiley, 2007
    - Farris, Bendle, Pfeifer & Reibstein, *Marketing Metrics – 50+ Metrics Every Executive Should Master*, Wharton, 3<sup>rd</sup> printing, 2006.
  - Marketing
    - Libey & Pickering, *RFM & Beyond*, MeritDirect Press, 2005.
    - Alan Tapp, *Principles of Direct and Database Marketing, 3<sup>rd</sup> Edition*, Pearson, 2005.
    - A. M. Hughes, *Strategic Database Marketing, 3<sup>rd</sup> Edition*, McGraw-Hill, 2006.
- Links
  - Related Talks on [www.porzak.com/JimArchive/](http://www.porzak.com/JimArchive/)
  - dma on R-Forge <https://r-forge.r-project.org/projects/dma/>
  - Responsys.com [Resource Center](#)
  - Direct Marketing Association [International Resources](#)
  - Email Experience Council [Home](#)
  - EmailLabs: [Glossary](#), [Benchmark Data](#)
  - use R Group of San Francisco Bay Area <http://ia.meetup.com/67/>