How to Make Your Predictive Models Actionable
The world is changing, enabling organizations to make faster, better-informed decisions

Instrumented
Interconnected
Intelligent
Industry Leader in Predictive Analytics

Over 40 year heritage, with an aim:

• to drive the widespread use of data analytics in decision making

Drove the creation of the Predictive Analytics market

Enables organizations to predict future events and proactively act upon that insight to drive better business outcomes

Acquired by IBM October 2009
Results? From reactions to predictions

Turning a call center into a profit center.

A large Dutch financial services company has implemented predictive cross selling programs in its call centers. The implementation took 2 months and the company saw €30M additional sales.

Turning clients into advocates.

A Swiss telco provider adopted a retention approach based on satisfaction. Based on the use of the “Wisdom of Crowds” principle, gathering feedback. The company reduced churn from 14% to 2%

Preventing crime before it happens.

A large US city turned to predictive analytics to predict occurrences of crimes. Resulting in an optimized deployment of police forces; lowering homicides by 35% and robberies by 20% year over year.

Dramatically lowering the cost of claims.

A large US insurer has embedded predictive analytics in claims handling. The company achieved an ROI of 403% with payback in 3 months.
94% of customers achieved a positive ROI, average payback in 10.7 months

Over 90% of users attributed an increase in productivity to SPSS

81% of projects were deployed on time, 75% on or under budget

“This is one of the highest ROI scores Nucleus has ever seen in its Real ROI series of research reports.”

Rebecca Wettemann, VP of Research, Nucleus Research
David Mould, Ph.D.
Predictive Analytics Scientist, MedeAnalytics
About MedeAnalytics

MedeAnalytics delivers performance management solutions across the healthcare system — including hospitals, physician practices and payers — to ensure accountability and improve financial, operational and clinical outcomes. The healthcare industry is undergoing profound change, accelerated by the passage of health reform (notably the more far-reaching provisions of bundled payments, value-based purchasing and accountable care organizations). MedeAnalytics helps organizations thrive in this dynamic and challenging environment by aggregating data from disparate sources and delivering relevant information in a timely, accurate and prescriptive manner, enabling a level of transparency that brings accountability to the system.
MedeAnalytics - OLAP Cube

Executive Scorecards
Personal Dashboards
Root Cause Analysis
Transaction Detail

Interactive “Click” Intelligence and Collaboration Platform
A Critical Issue Nation Wide

“The rising uninsured and under-insured are amongst the top issues plaguing healthcare. Not only does this issue impact access to care and hospital’s ability to fulfill their mission, it impacts their ability to protect margins and keep their doors open.

— Deloitte Survey of CEOs and Boards “The Future of Healthcare”
MedeAnalytics – Self-Pay Model

Self-Pay Risk Segmentation

20% Low Risk

80% of Collected

Self-Pay Accounts

Patient Payments
MedeAnalytics - Self-Pay Model

Variable Contribution

- Payment History
- Admit Type
- Credit Score
- Zip Code
- Procedure Code
Decision Tree Segmentation

Self-Pay Model

• Which are most likely to pay?
• Which self-pay accounts should we sell to third parties?
• Convert to bad debt?
• What are the best levels for charity care thresholds?
A Typical Decision Tree Model
The Initial Output is the Predictor Importance and Model
Another Output is the Decision Tree
The Key Output Is the Rule Set

```
Rules for 0 - contains 4 rule(s)

Rule 1 for 0 (3.175, 0.818)
  if PreviousPaymentHistory_ID = 1
  and OriginalFinancialClass grp in [2]
  then 0

Rule 2 for 0 (1.216, 0.673)
  if PreviousPaymentHistory_ID = 2
  and OriginalFinancialClass grp in [2]
  and paymentgrp in [3 4 5 6 7 8 9]
  then 0

Rule 3 for 0 (23.915, 0.829)
  if OriginalFinancialClass grp in [3 4]
  then 0

Rule 4 for 0 (3.688, 0.856)
  if OriginalFinancialClass grp in [5]
  and prevprodgrp in [1 3 4]
  then 0

Rules for 1 - contains 3 rule(s)

Rule 1 for 1 (2.225, 0.853)
  if PreviousPaymentHistory_ID = 0
  and OriginalFinancialClass grp in [2]
  then 1

Rule 2 for 1 (3.743, 0.855)
  if PreviousPaymentHistory_ID = 2
  and OriginalFinancialClass grp in [2]
  and paymentgrp in [2 10 11 12]
  then 1

Rule 3 for 1 (20.893, 0.758)
  if OriginalFinancialClass grp in [5]
  and prevprodgrp in [5 6 -1]
  then 1

Default: 0
```
The Rule Set Is Used To Build If-Then-Else Statements

If PreviousPaymentHistory_ID =0 and OriginalFinancialClassGrp = 2 then propensitytopay = 0.953
Else
If PreviousPaymentHistory_ID =2 and OriginalFinancialClassGrp = 2 and Patagegrp = (2 10 11 12) then propensitytopay = 0.805
Else
If OriginalFinancialClassGrp = 5 and prevpprctgrp = ( 5 6 -1) then propensitytopay = 0.755
Else
If PreviousPaymentHistory_ID =2 and OriginalFinancialClassGrp = 2 and Patagegrp = (3 4 5 6 7 8 9) then propensitytopay = 0.387
Else
If PreviousPaymentHistory_ID =1 and OriginalFinancialClassGrp = 2 then propensitytopay = 0.182
Else
If OriginalFinancialClassGrp = 5 and prevpprctgrp = ( 1 3 4) then propensitytopay = 0.144
Else
If OriginalFinancialClassGrp = (3 4) then propensitytopay = 0.061
Else propensitytopay = 0.0
The Patient Records in Final Bill Status Are Run Through the If-Then-Else Statements to Create Segments

<table>
<thead>
<tr>
<th>Segment</th>
<th>Propensity to Pay</th>
<th>Collector Actions Differ By Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>95.3%</td>
<td>Just send final bill</td>
</tr>
<tr>
<td>2</td>
<td>80.5%</td>
<td>Send follow-up letter</td>
</tr>
<tr>
<td>3</td>
<td>75.5%</td>
<td>Follow-up letter &amp; phone</td>
</tr>
<tr>
<td>4</td>
<td>38.7%</td>
<td>Send to collection agency after 8 weeks</td>
</tr>
<tr>
<td>5</td>
<td>18.2%</td>
<td>Send to collection agency after 6 weeks</td>
</tr>
<tr>
<td>6</td>
<td>14.4%</td>
<td>Send to collection agency after 4 weeks</td>
</tr>
<tr>
<td>7</td>
<td>0.6%</td>
<td>Send to collection agency now</td>
</tr>
</tbody>
</table>
One Hospital’s ROI

Increased Self-Pay Collection Rates by 12%
Reduced Self-Pay Collections Staff by Over 50%
Reduced Agency Fees by $25K per Month
Reduced Bad Debt Write-offs by 30%
A New Insurance Division Isn’t Generating Enough Sales

Situation – A new commercial insurance division is trying to sell insurance through trade associations. The sales representatives are closing deals on only 15% of the prospects. A lot of face time is being wasted on sales calls that don’t convert. They need a way to improve the conversion ratio.
Solution – Use a CART Decision Tree to Create a Prospecting List for the Sales Division

Gather independent variables from the Encyclopedia of Trade Associations for both the closed sales and lost deals

• Association name & contact
• Address
• Year founded
• Number of members
• Conferences
• State or local associations
• Reference library
• Newsletter frequency
• Number of activities
• Number of committees
• Other variables

Use a CART decision tree analysis to determine the factors that most useful in distinguishing between the closed and the lost sales
An Actionable Output – Prospecting List of Potential Customers

The independent variables related to an active trade association were the most predictive. Active trade associations were more likely to offer the commercial insurance to their members as a benefit.

Most sales departments have ways to identify potential prospects. Predictive analytics can help improve the prospecting list by identifying the most important variables.

Two additional fields were added to the prospecting list … historic profitability in terms of an industry loss ratio and a five-year industry growth forecast provided by Predicast.

The prospecting list was sorted by geographic territory that matched the sales representative’s territories.
Prospecting List Results

The new prospecting list improved the conversion rate from 15% to 30%. Twice as much revenue with the same number of sales representatives. Quotas and revenue goals were met and then surpassed. Staff morale improved.
Summary

Start small. Don’t try to replace an entire process all at once. Let the clients get used to predictive modeling and then build upon your successes.

Try to integrate the predictive model results into the current process.

Add fields / variables to the output that the client would find useful.

Slice and dice the output according to how the client wants it.
“It’s the Singer Not the Song”
Questions?
For more information

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