



Using SPSS Statistics for Marketing Applications

Jarlath Quinn – Analytics Consultant

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Just waiting for all attendees to join...

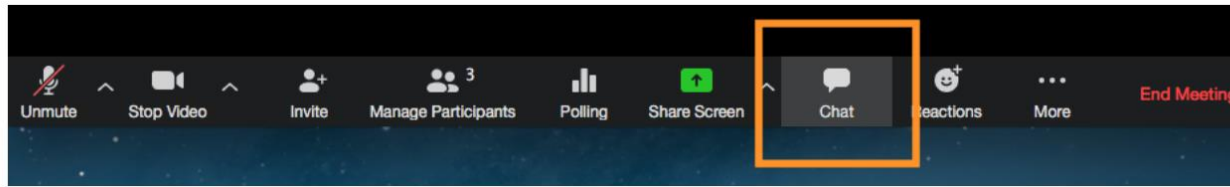


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FAQ's

- Is this session being recorded? Yes
- Can I get a copy of the slides? Yes, we'll email links to download materials after the session has ended.
- Can we arrange a re-run for colleagues? Yes, just ask us.
- How can I ask questions? All lines are muted so please use the chat panel – if we run out of time we will follow up with you.





- Gold accredited partner to IBM, Predictive Solutions and DataRobot specialising in advanced analytics & big data technologies
- Work with open-source technologies (R, Python, Spark etc.)
- Team each has 15 to 30 years of experience working in the advanced and predictive analytics industry
- Deep experience of applied advanced analytics applications across sectors
 - Retail
 - Gaming
 - Utilities
 - Insurance
 - Telecommunications
 - Media
 - FMCG





Performing A/B Testing with Significance Tests

A/B Testing

- A/B testing, also known as split testing, is a method used to compare two versions of a webpage, email, app feature, or other content to see which one performs better.
- The process involves randomly showing two different versions (A and B) to different segments of users and measuring their responses based on predefined metrics like click-through rates, conversions, or other user interactions.
- Analysts often have to think about how much data they need to collect in order to see if a change has an effect. This is especially true when dealing with behaviours that only occur a small percentage of the time.
- A/B testing helps businesses make data-driven decisions to optimize their content and improve user experience.

A/B Test - Newsletter Subscription Button



Sign up

Control



Keep me informed

Test



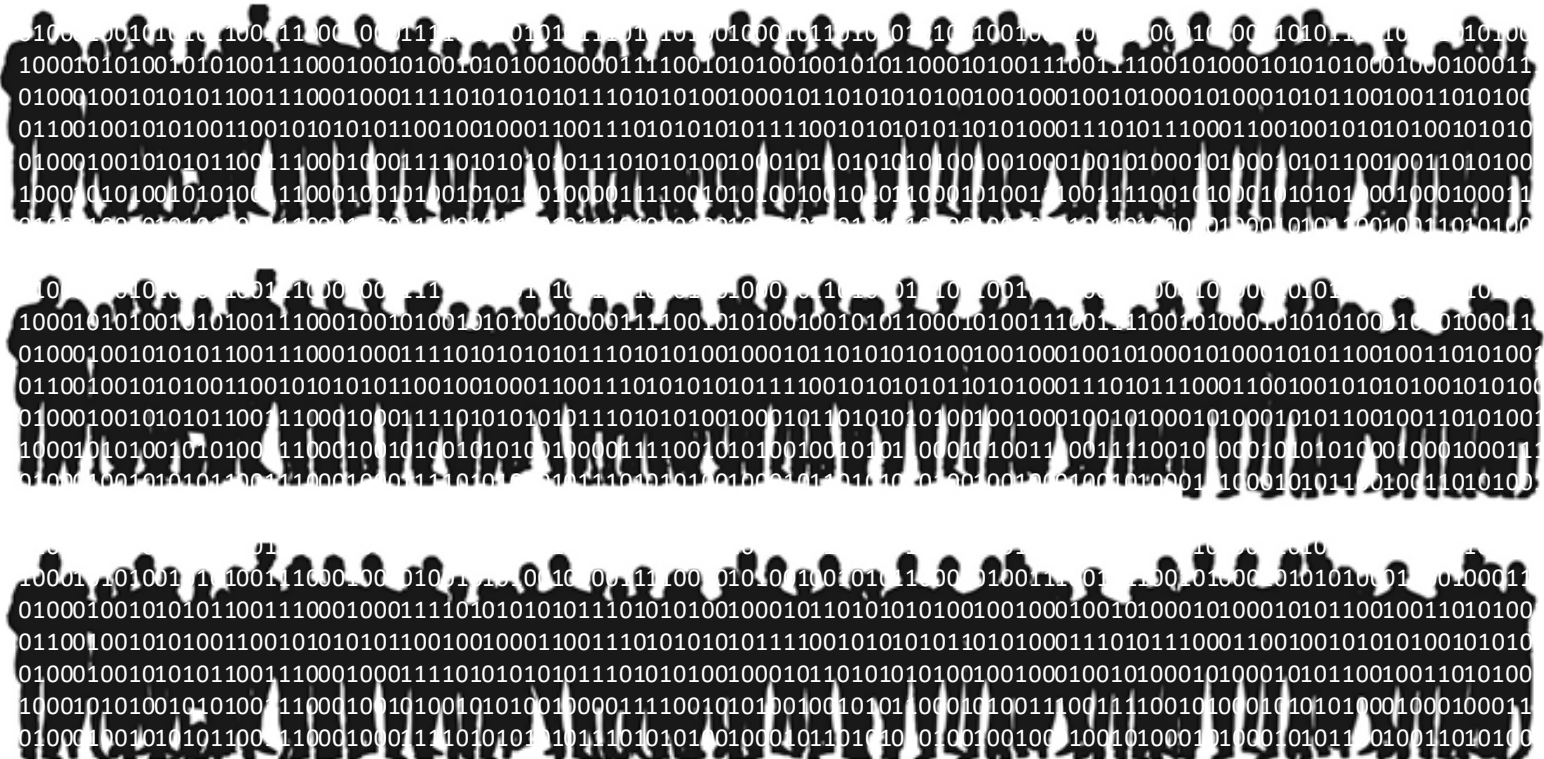


Segmentation & RFM

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Using data to uncover customer segments



Deeper customer understanding = more appropriate interactions

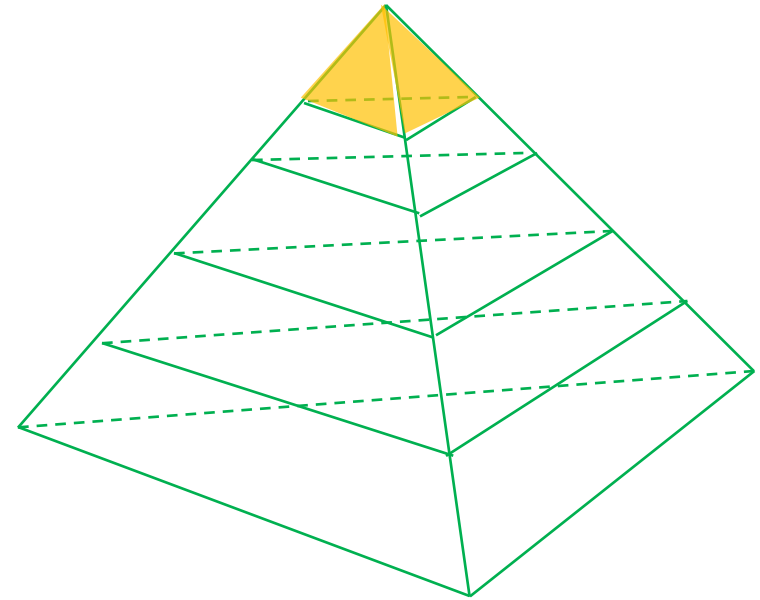


‘Unsupervised’ techniques like cluster analysis can uncover subtle differences and previously hidden groups

RFM Analysis

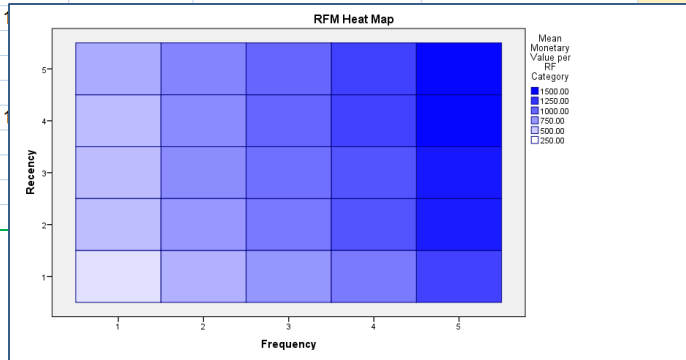
- RFM – Recency, Frequency, Monetary
- 3 Dimensions of loyalty

| Recency | Frequency | Monetary |
|---------|-----------|----------|
| 5 | 5 | 5 |
| 4 | 5 | 5 |
| 4 | 4 | 5 |
| 4 | 4 | 4 |
| 3 | 4 | 4 |
| 3 | 3 | 4 |
| 3 | 3 | 3 |
| 2 | 3 | 3 |
| 2 | 2 | 3 |
| 2 | 2 | 2 |
| 2 | 2 | 2 |
| 1 | 2 | 2 |
| 1 | 1 | 2 |
| 1 | 1 | 1 |



RFM Analysis

| | ID | TotalAmount | MostRecent | NumberOfPurchases | PurchaseInterval | Recency_score | Frequency_score | Monetary_score | RFM_score |
|----|----|-------------|------------|-------------------|------------------|---------------|-----------------|----------------|-----------|
| 1 | 1 | 1313.00 | 05/17/2006 | 10 | 229.00 | 2 | 3 | 5 | 235 |
| 2 | 2 | 1230.00 | 09/21/2005 | 11 | 467.00 | 1 | 5 | 4 | 154 |
| 3 | 3 | 1194.00 | 08/11/2006 | 13 | 143.00 | 3 | 5 | 2 | 352 |
| 4 | 4 | 794.00 | 05/24/2006 | 9 | 222.00 | 2 | 3 | 2 | 232 |
| 5 | 5 | 278.00 | 03/13/2005 | 3 | 659.00 | 1 | 1 | 2 | 112 |
| 6 | 6 | 922.00 | 07/28/2006 | 9 | 157.00 | 3 | 2 | 4 | 324 |
| 7 | 7 | 961.00 | 06/20/2006 | 11 | 195.00 | 2 | 4 | 2 | 242 |
| 8 | 8 | 615.00 | 06/08/2005 | 6 | 572.00 | 1 | 2 | 3 | 123 |
| 9 | 9 | 1097.00 | 05/02/2006 | 9 | 244.00 | 2 | 3 | 5 | 235 |
| 10 | 10 | 1164.00 | 05/07/2006 | 12 | 239.00 | 2 | 4 | 4 | 244 |
| 11 | 11 | 866.00 | 06/12/2006 | 12 | 203.00 | 2 | 4 | 1 | 241 |
| 12 | 12 | 950.00 | 09/25/2006 | 10 | 98.00 | 4 | 3 | 2 | 432 |
| 13 | 13 | 1562.00 | 07/28/2006 | 16 | 157.00 | 3 | 5 | 4 | 354 |
| 14 | 14 | 1083.00 | 08/19/2006 | 11 | 135.00 | 3 | 4 | 3 | 343 |
| 15 | 15 | 631.00 | 11/17/2005 | 8 | 410.00 | 1 | 3 | 1 | 131 |
| 16 | 16 | 807.00 | 01/01/2006 | 9 | 365.00 | 1 | 4 | 2 | 142 |
| 17 | 17 | 1300.00 | 06/04/2006 | 13 | 211.00 | 2 | 5 | 3 | 253 |
| 18 | 18 | 921.00 | 10/11/2005 | 10 | 447.00 | 1 | 4 | 3 | 143 |
| 19 | 19 | 561.00 | 07/20/2006 | 7 | 165.00 | 3 | 1 | 3 | 313 |
| 20 | 20 | | | | | 4 | 4 | 2 | 442 |
| 21 | 21 | | | | | 2 | 1 | 5 | 215 |
| 22 | 22 | | | | | 1 | 4 | 2 | 142 |
| 23 | 23 | | | | | 1 | 5 | 1 | 151 |
| 24 | 24 | | | | | 4 | 5 | 1 | 451 |
| 25 | 25 | | | | | 2 | 3 | 1 | 231 |
| 26 | 26 | | | | | 1 | 2 | 1 | 121 |
| 27 | 27 | | | | | 2 | 1 | 3 | 213 |
| 28 | 28 | | | | | 4 | 1 | 2 | 412 |





Predictive Modelling

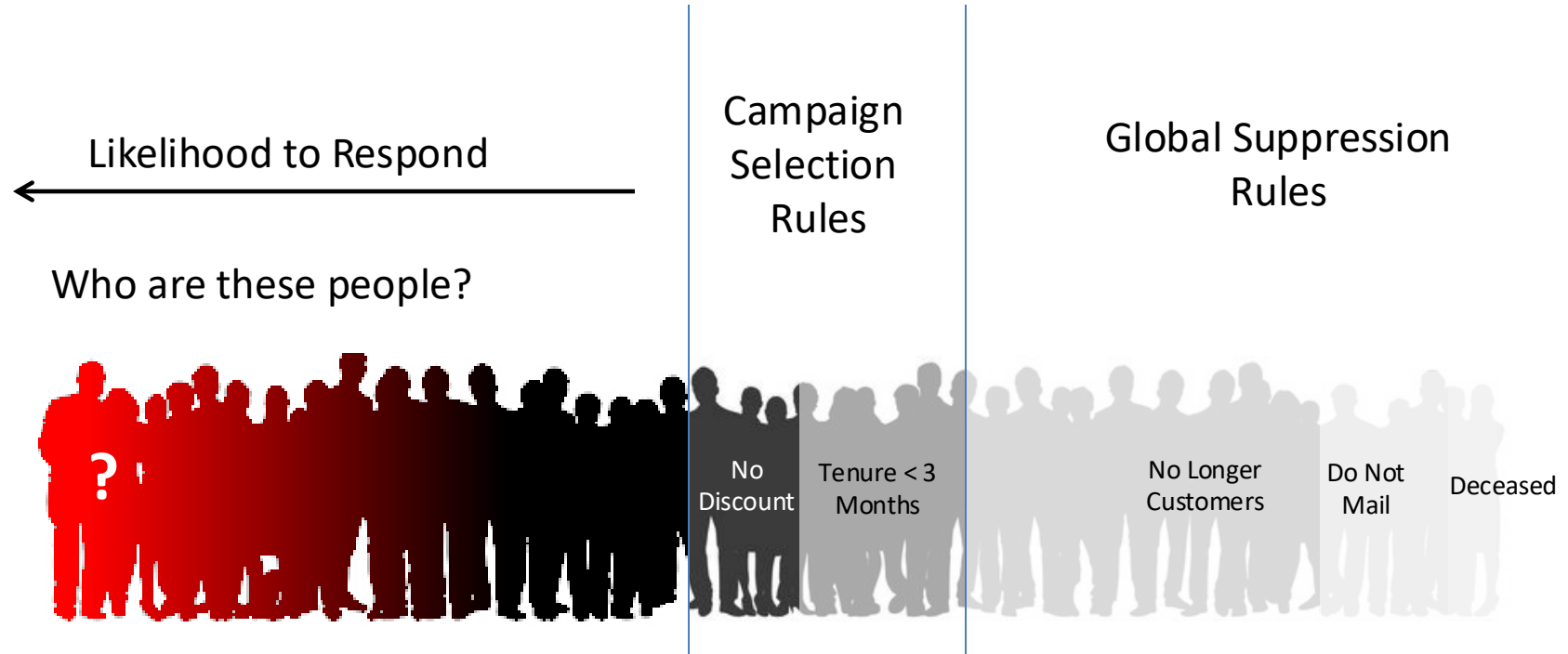
Predictive Modelling Techniques

- Predictive methods can include statistical, machine learning and AI approaches
- The predicted outcome can take the form of numerical values (e.g. revenue, social media likes, visitors, occurrences or time)
- Alternatively, predicted outcomes can take the form of categories (e.g. responded, upgraded, recommended, failed, cancelled or recovered)
- Depending on the business context, analysts may choose accuracy over insight or vice versa. This is because some techniques produce more transparent results than others.
- All these various methods, produce models which generate numerical values in the form of estimates or likelihood scores. These empower the business to make selections based on data-driven predictions.

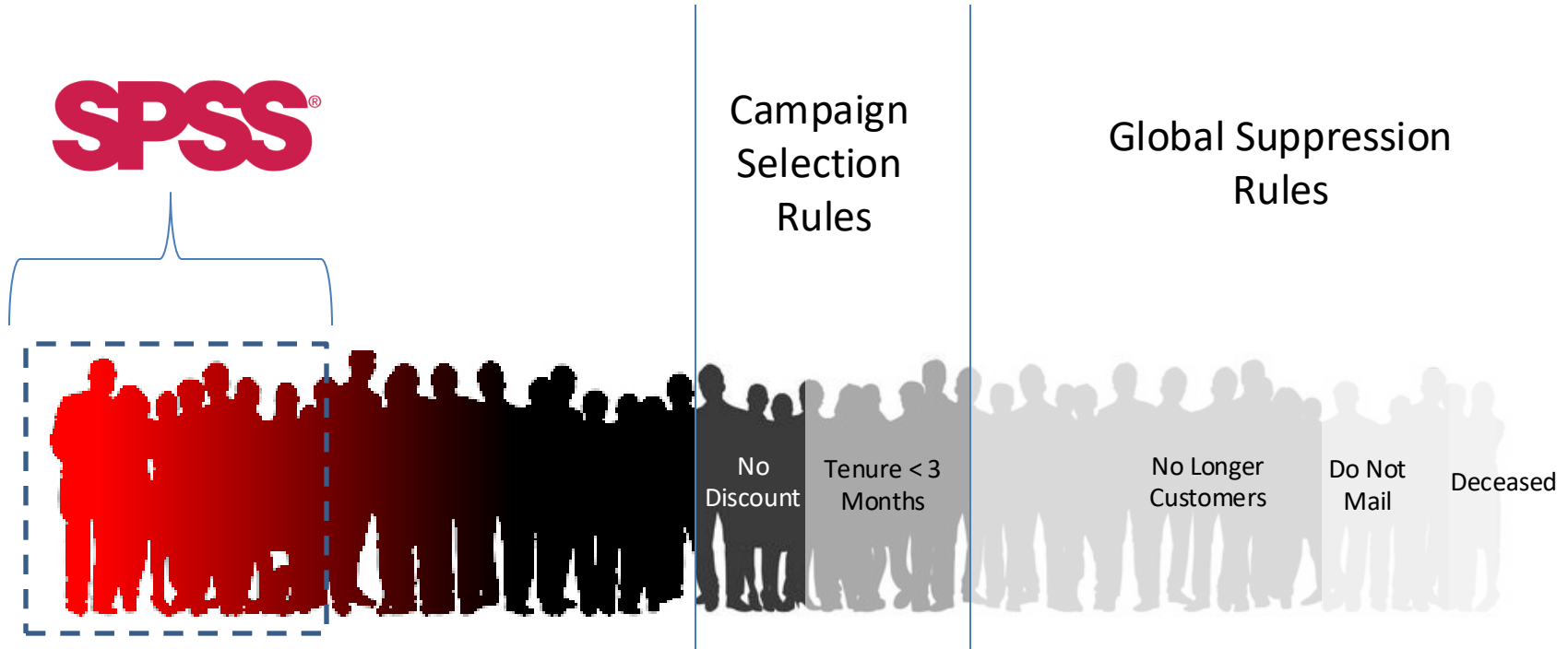
Smart Vision Europe: Examples of Predictive Methods

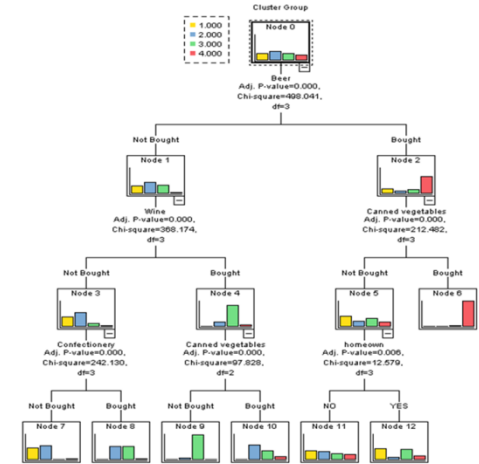
- Regression Techniques (Predicting numerical *and* category outcomes)
- Neural Networks (Predicting numerical *and* category outcomes)
- Discriminant Analysis (Predicting category outcomes)
- Decision Trees (Creating profiles and predictions)
- Poisson Regression (Predicting occurrences of events)
- Survival Analysis (Elapsed time to a critical event)
- Time Series Analysis (Forecasting demand)

In direct marketing, predictive methods enhance the existing campaign selection process..



By creating a model that identifies the *most likely* responders...





Example Technique: Decision Trees in SPSS Statistics

Where do Decision Trees fit within Predictive Analytics?

- Decision trees are used *extensively and widely* within Predictive Analytics
- Decision trees can be used to
 - Build profiles of customers/employees/clients
 - Find key behavioural segments
 - Generate predictive models
- Decision Trees can be expressed as a series of hierarchical rules which means that they can be converted in languages like SQL for database scoring
- Decision Trees are especially popular because
 - they are fairly visual representations of models
 - relatively easy to understand

Understanding Decision Trees – a worked example

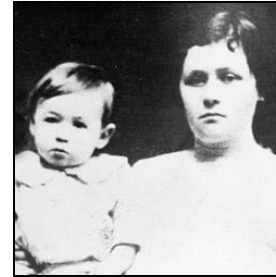
- What were the most important factors determining survival during the sinking of the RMS Titanic?

Survival on the RMS Titanic

| | | Count | Percent % |
|---------|-----------------|-------|-----------|
| survive | Did not survive | 1490 | 68% |
| | Survived | 711 | 32% |
| | Total | 2201 | 100% |



Gender?



Age?



Class?

Statistical Tests Like Chi Square help to answer this

Survival on the RMS Titanic

| | | sex | | | |
|---------|-----------------|--------|------------------|-------|------------------|
| | | female | | male | |
| | | Count | Column Percent % | Count | Column Percent % |
| survive | Did not survive | 126 | 26.8% | 1364 | 78.8% |
| | Survived | 344 | 73.2% | 367 | 21.2% |
| | Total | 470 | 100.0% | 1731 | 100.0% |

Pearson Chi-Square Tests

| | | sex |
|---------|------------|---------|
| survive | Chi-square | 456.874 |
| | df | 1 |
| | Sig. | .000* |

Statistical Tests Like Chi Square help to answer this

Survival on the RMS Titanic

| | | age | | | |
|---------|-----------------|-------|------------------|-------|------------------|
| | | adult | | child | |
| | | Count | Column Percent % | Count | Column Percent % |
| survive | Did not survive | 1438 | 68.7% | 52 | 47.7% |
| | Survived | 654 | 31.3% | 57 | 52.3% |
| | Total | 2092 | 100.0% | 109 | 100.0% |

Pearson Chi-Square Tests

| | | age |
|---------|------------|--------|
| survive | Chi-square | 20.956 |
| | df | 1 |
| | Sig. | .000* |

Statistical Tests Like Chi Square help to answer this

Survival on the RMS Titanic

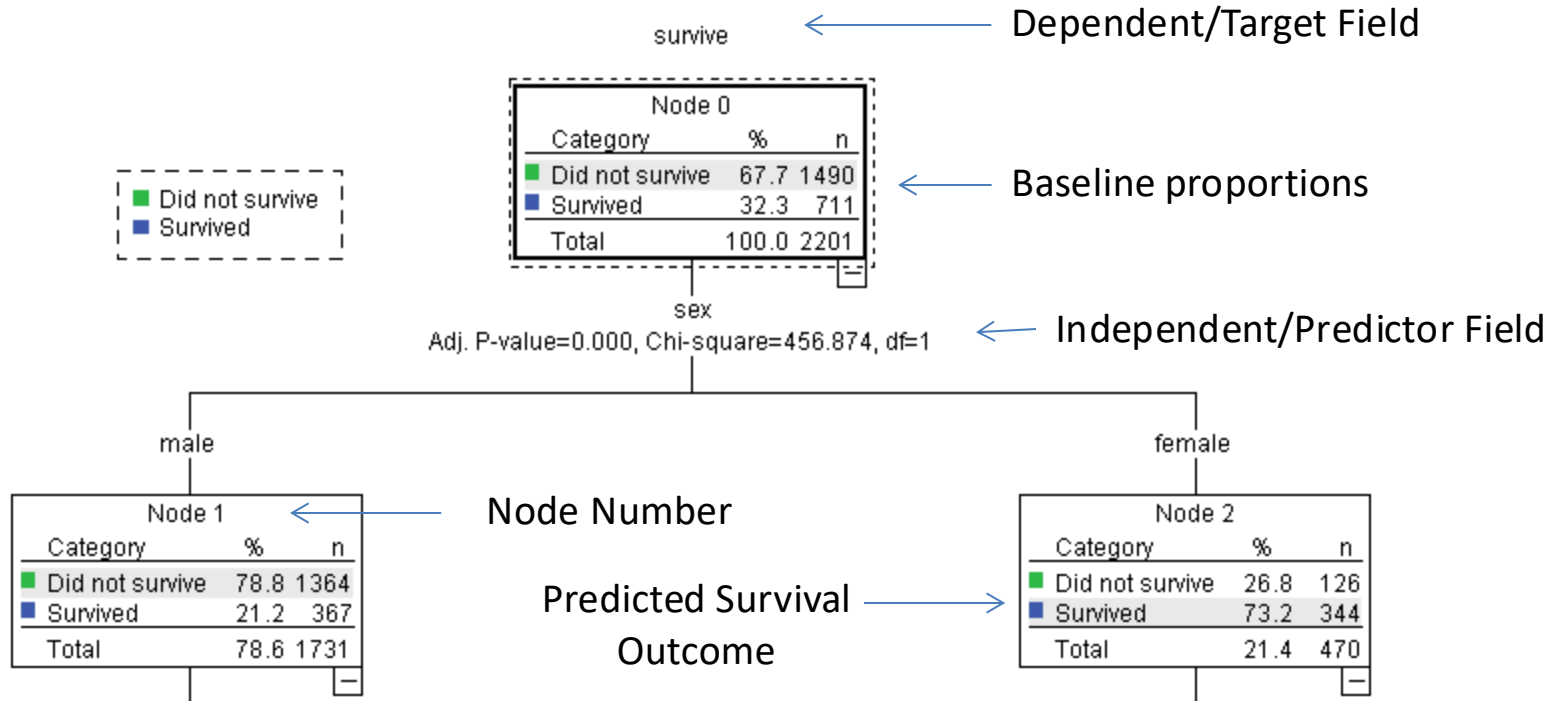
| | | class | | | | | | | |
|---------|-----------------|-------|------------------|-------|------------------|-------|------------------|-------|------------------|
| | | 1st | | 2nd | | 3rd | | crew | |
| | | Count | Column Percent % | Count | Column Percent % | Count | Column Percent % | Count | Column Percent % |
| survive | Did not survive | 122 | 37.5% | 167 | 58.6% | 528 | 74.8% | 673 | 76.0% |
| | Survived | 203 | 62.5% | 118 | 41.4% | 178 | 25.2% | 212 | 24.0% |
| | Total | 325 | 100.0% | 285 | 100.0% | 706 | 100.0% | 885 | 100.0% |

Pearson Chi-Square Tests

| | | class |
|---------|------------|---------|
| survive | Chi-square | 190.401 |
| | df | 3 |
| | Sig. | .000* |

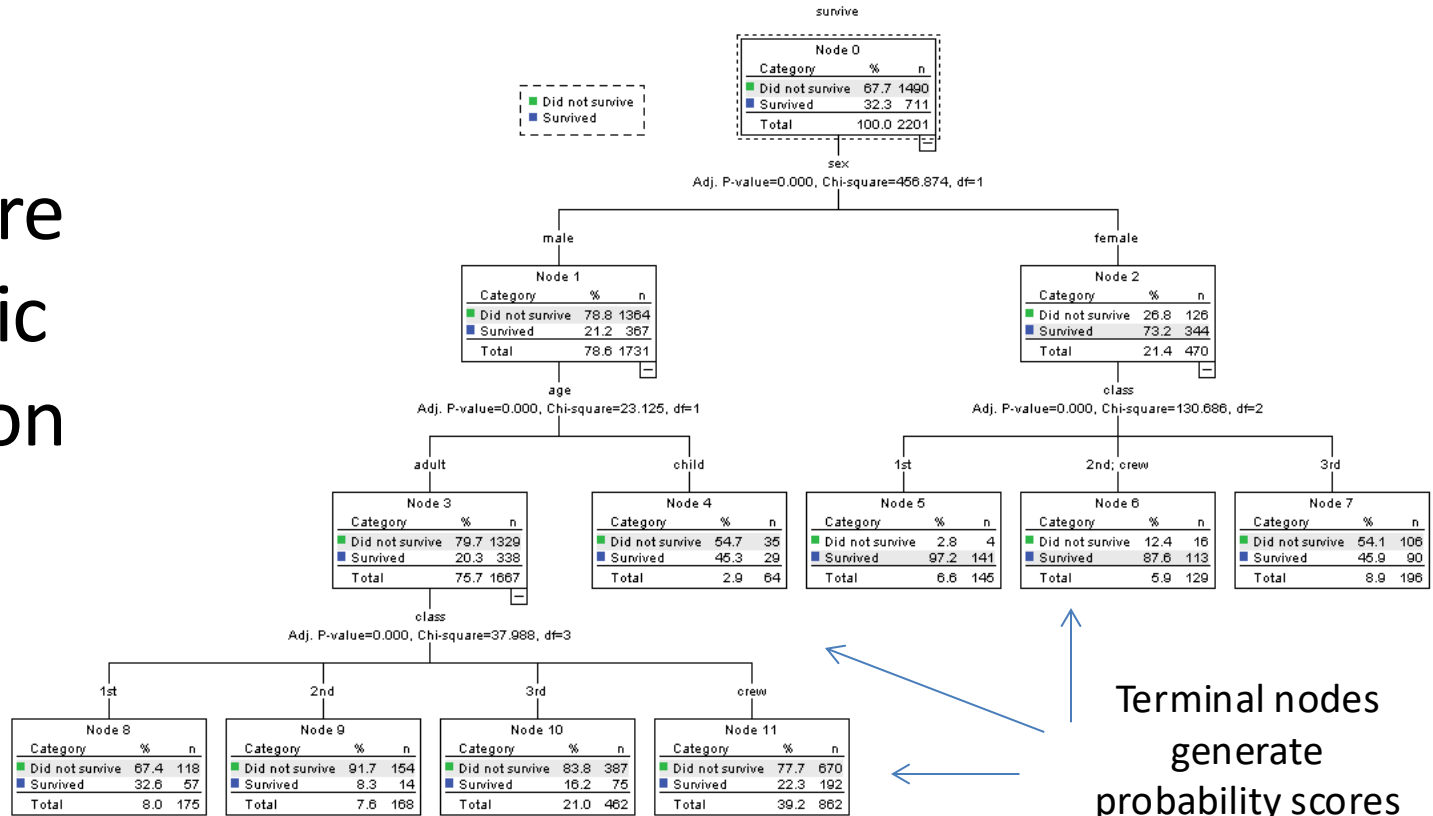
Gender is most important

...and a CHAID Decision tree will reflect this....



Full CHAID Decision Tree

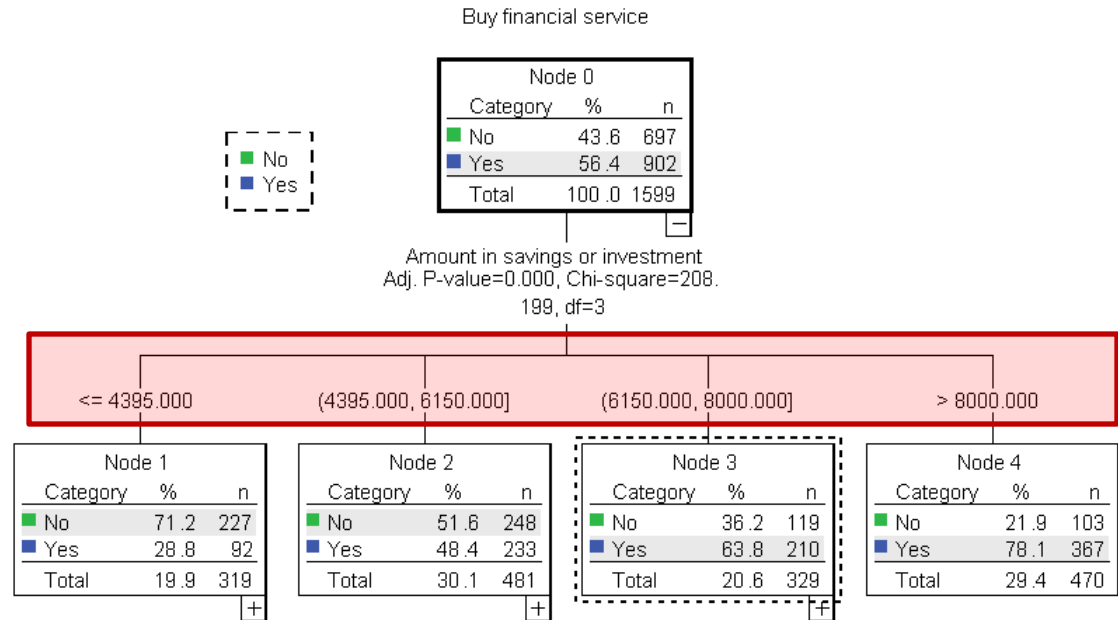
C.H.A.I.D
Chi-Square
Automatic
Interaction
Detector



Merging/Splitting in CHAID Trees

Decision Trees can
merge values of numeric
and categorical
predictors together

This makes the tree
more efficient and easier
to read





Let's take a look...

Working with Smart Vision Europe

- **Consulting Services**

Project Support

Purchase 1-2 days of consultancy time to have an expert work alongside you on your own project

Analytics Advice

Give us 3-5 days to investigate your data & analytical strategy and we'll present our recommendations re: improvements & alternatives

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 - Delivery of classroom training courses / side by side training support
 - Identification & recruitment of analytical skills into your organisation
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