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Data driven Product Design with optimal features and messaging

Problem Statement

- Designing products with features that users most want, like and prefer over others is crucial to new product success of our client.
- Knowing most effective brand messages from a long list of possible messages is crucial for our client to fine tune brand messaging and positioning.
- Quantifying $ value of each potential feature is critical to our client to perform cost-benefit analysis of different competing features.

Our Solution

- We developed a robust Product Design solution based on brand choices and the trade offs individual consumers make in the market place. This robust methodology looks outside-in leveraging input from actual users of the product.
- Using customer data we estimated the most appealing features in the product from a long list of features.
- We quantified the contribution of each feature to product success.
- We generated and validated top resonating brand messages.

$U_{i_1 i_2 \ldots ij,k} = \sum_{j=1}^{J} w_{jk}\ u_{ijk}$ [Generally both u_{ijk} and w_{jk} are normalized such that $0 \le uijk \le 1, 0 \le wjk \le 1\ s.t. \sum_{j=1}^{J} w_{jk} = 1\ \forall\ k$]

Where

$\mathbf{i_j}$ = level i of attribute j

$\mathbf{j}$ = 1, 2, 3…J attributes

$\mathbf{k}$ = 1, 2, 3…K consumers

w_{jk} = Importance of attribute j for consumer k

u_{ijk} = Desirability of level *i* of attribute j for consumer k

Estimation of Attribute Importances

Output from constant- sum paired comparisons is a ratio of importances of 2 attributes at a time. Given these ratios, we estimate attribute importances using log-linear regression (OLS).

1. Let W_j be the importance of the attribute.
2. Ratio of importance of attribute j_1 to attribute j_2 is $r_{j1j2} = W_{j1}/W_{j2}$
3. Let $V_j = \log_{10}(W_j) \Rightarrow \log(r_{j1j2}) = \log(W_{j1}/W_{j2}) = \log W_{j1} - \log W_{j2} = V_{j1} - V_{j2}$
4. Without loss of generality, re-label attributes s.t. 1 denotes the most important attribute in the rankings from step 2. Let j=1,2,3……J denote attributes involved in the constant-sum paired comparisons.
5. Without loss of generality, set $V_1 = V_{highest} = a$ where $a>0$. When $a=2 \Rightarrow V_1 = \log(W_1) = a \Rightarrow W_1 = 100.$
6. Define Ω as an Nx(J-1) design matrix in which columns correspond to attributes and rows to paired comparisons such that,

$$\Omega_{N \times (J-1)} = \begin{array}{c|c} & j=2\quad 3\quad 4\ldots\ldots J \quad \text{Attributes} \\ \begin{array}{r} n=1 \\ =2 \\ \vdots \\ =N \end{array} & \begin{bmatrix} & & \\ & 1, -1, 0 & \\ & & \end{bmatrix} \\ \text{Paired Comparisons} & N \times (J-1) \end{array} \qquad \Omega(n_{ij}) = \begin{cases} 1 \text{ if j is the top attribute in the pair n} \\ -1 \text{ if j is the bottom attribute in the pair n} \\ 0 \text{ if attribute j is not in pair n} \end{cases}$$

Client Benefits

Cost
Reduce risk and uncertainty in product design by **50%**+ in the long run compared to traditional non-data approaches.

Integrated common goal
Galvanize all stakeholder teams around a shared product understanding and goal via clear connection to features.

Actionable
Achieve tangible understanding in Product Design via direct connection to product success via data driven product feature importance.

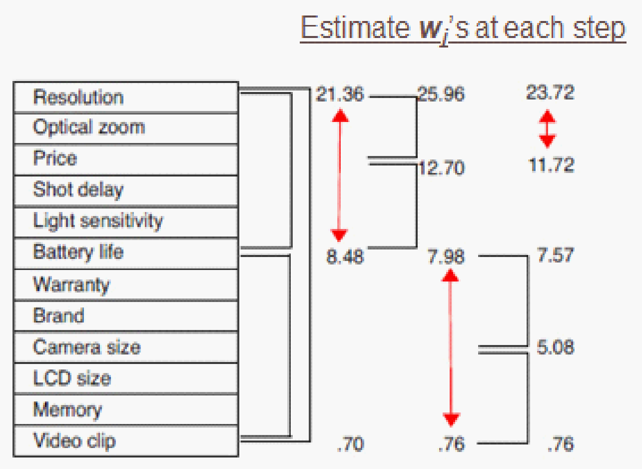
What we do

Design new products and re-make existing products with winning product features and brand messages.

Deliver full product design and messaging solution and work with product engineering and marketing to implement the solution.

Maintain and periodically re-train the Product Design solution.

Digital cameras



Optimal Digital Camera

Resolution: 24-30 megapixel
Optical zoom: 40x-50x
Digital zoom: 200x-300x
LCD size: 3'-4"
Battery life: 4-6 hours
Weight: 1.2-1.6lbs
Shot delay: Yes
Brand: XYZ
Price: $500-$700
Colour: Black

Process Flow

1. Deep dive into new product design goals
2. Product design program creation and approval
3. Data collection and pre-processing for a pilot PD solution
4. Post validation, full PD solution is developed and deployed in cloud or on-premises
5. Insights from PD data are shared with teams
6. Actionable product recommendations are generated
7. Most important PD features are validated and finalized
8. Periodically PD solution is retrained to improve accuracy level and actionability

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