Assessing the importance of user-defined product dimensions in reviews

Louis-Charles Généreux

Problem definition

What **product features** are most important to consumer experience across various **product categories**?

Gourmet food
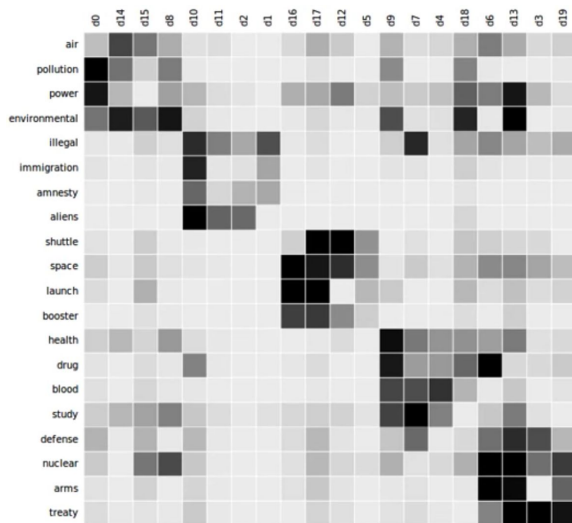

Toys & games

Fashion

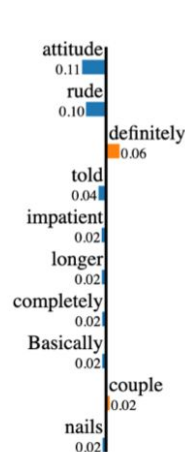Magazine subscriptions

Appliances

Musical instruments

Possible approaches to solving this problem…

MACRO (full corpus)

Latent semantic analysis (LSA)

MICRO (review per review)

Local interpretable model-agnostic explanations (LIME)

… But these methods are not ideal

MACRO (full corpus)

Assignment of documents to clusters using semantic analysis (LSA):

- **Completely unsupervised** method:
  - Classes may not capture incoming belief / hypothesis
  - Overlapping classes (some words present in different clusters)
  - Difficulty to interpret clusters
- Does not necessarily capture positive / negative sentiment

MICRO (review per review)

Localized interpretable explanations (LIME):

- Potentially **unstable** due to random sampling of words picked for reshuffling (could pick correlated words)
- **Not scalable** (interpretation of significant words is done for each document individually)

What if I could: define my own dimensions, and assess their importance in a scalable fashion?

Proposed approach to identifying drivers of user experience
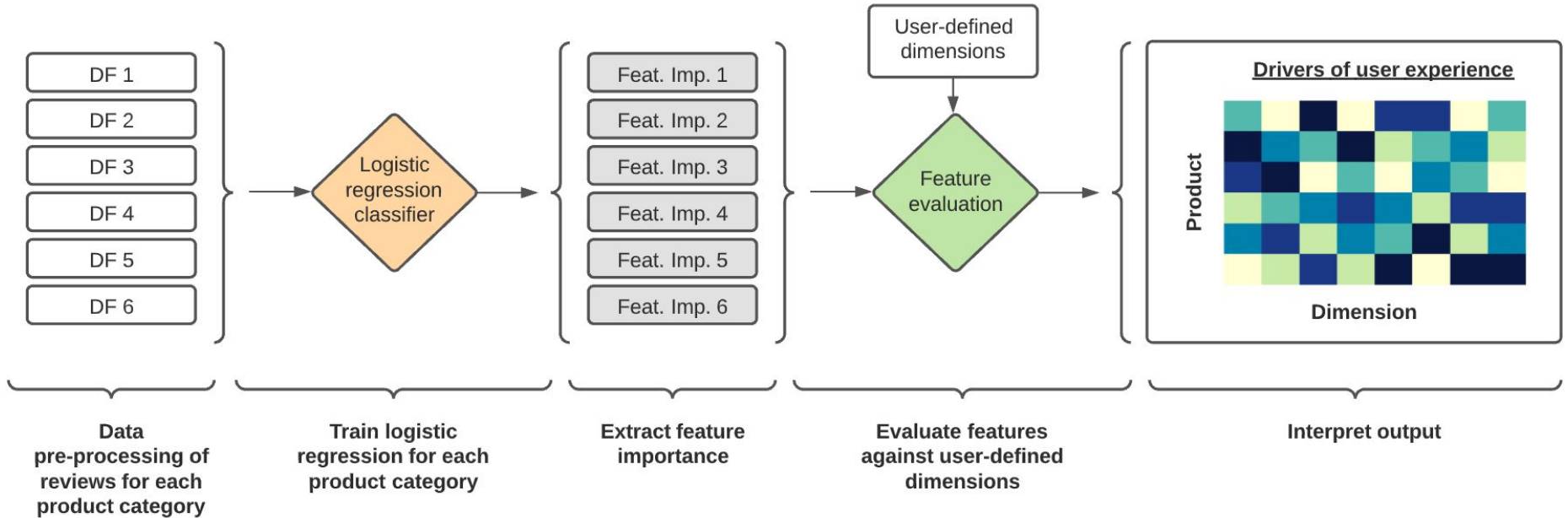
This approach allows users to test a set of hypotheses (by defining their own set of dimensions)

Experience depends on…

As defined by synonyms and their neighbors

Product's aesthetics	[Beautiful, ugly, appearance]
Product's sensory appeal (smell/touch/taste)	[Aromatic, smelly, sensory]
Product's fit or size	[Fit, bulky, weight]
Product's delivery	[Delivery, timely, delay]
Product's ease of use	[Intuitive, demanding, straightforward]
Product's performance	[Functional, defective, operational]

The 5 nearest neighbor to each dimension synonym are extracted from pre-trained GLOVE embeddings to fully define a dimension
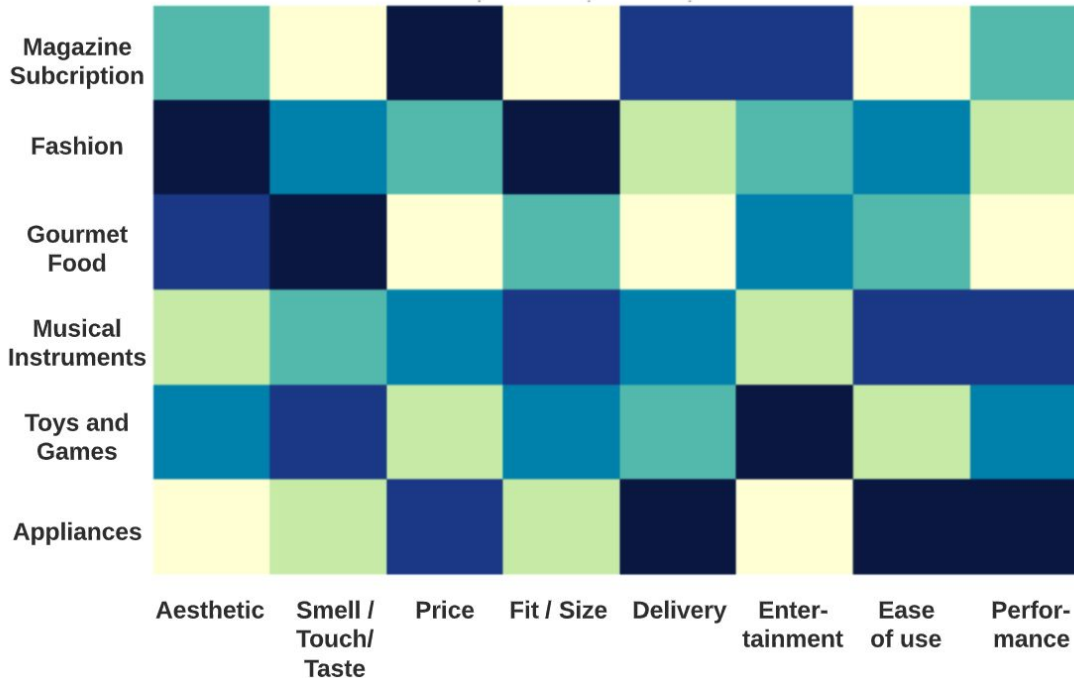
Running the algorithm allows us compare product categories easily

Product Category

Magazine Subcription · Fashion · Gourmet Food · Musical Instruments · Toys and Games · Appliances

Aesthetic · Smell / Touch/ Taste · Price · Fit / Size · Delivery · Enter-tainment · Ease of use · Perfor-mance

Relative Importance of Customer Experience Dimension

Row-wise:

What dimensions matter for buyers of this product

Column-wise:

Which product 'spikes' most on this dimension?

Direct comparisons of products can be achieved in the web app

App user inputs

NLP INDEPENDENT PROJECT: Assessing the importance of user-defined dimensions in product reviews

This tool allows users to compare the relative importance of various user-experience dimensions across different product categories

User input
Please enter two product categories.

Type product type 1

Type product type 2

Visualize

Enter **user-defined** product category names

Click on "**visualize**"

Output: