Numeris Data: Consumer Product/Services Usage and Behavioural Patterns

Manifold Data Mining Inc.

Zhen Mei
zhen@ManifoldDataMining.com
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Numeris (formerly the **Bureau of Broadcast Measurement**, or **BBM Canada**) is a Canadian audience measurement organization. Established on May 11, 1944, as a division of the Canadian Association of Broadcasters, Numeris is the primary provider of viewership numbers for television and radio broadcasters in Canada.

Numeris has been conducting the Return-To-Sample Survey (RTS) survey for over 15 years. The RTS study is one of the most comprehensive sources of ongoing consumer and media information on Canada and major markets. It is conducted twice a year in the Spring and Fall among the respondents of their radio surveys. The objective of the RTS study is to enable advertisers, agencies and broadcasters to:

- define their current and potential customers
- target their creative ideas, and
- plan media placement.

The Numeris RTS gathers data at the individual level with the household as the unit. The sample is stratified by demographics and geography across Canada and covers 12 major markets. The survey represents Canadian consumers very well across the country.

Before 2013, the sample size of each survey was about 63,000 in each wave. Numeris has been gradually introducing electronic meters to improve the quality and efficiency of the data capture. The higher cost results in a reduction of the sample size to around 45,000 in each wave in recent years.

The RTS survey is self-reported in a diary form. Its consumer profile component is divided into retail, restaurants, leisure and cultural activities, media consumption, product consumption and ownership, automotive, financial services, business-to-business and consumer packaged goods. Questions are designed to collect respondents' habits, expenditures and attitudes as they relate to these products and services. Detailed demographic information is also included.

As a VAR partner of Numeris, Manifold has been licensing the RTS survey for 14 years. Cumulatively we have over 1.3 million respondents in our database. We have been continuously data mining patterns of consumer behaviours in the current and historical RTS surveys. Upon identifying valuable and robust patterns, we extrapolate them to all 6-digit postal codes across Canada with deep learning and predictive modelling techniques. The results are propensity scores that measure all kinds of things from how likely people in a 6-digit postal code consume media, to purchase and use certain products and services, to how often they shop at different retail stores, and to what they think about specific products.

In the deep learning and predictive modelling process, we combined geography with demographic, spending, and lifestyle cluster variables as well as re-arranged values of many variables to make them more predictive. This is not just an aggregation process of the respondent's data. For example, a student in Halifax shares more similar behaviour with another student in Vancouver than with her/his next-door neighbour in Halifax. In this situation, geography plays a much minor role than age and occupation. By going beyond geography we re-define "distance" or "similarity" between consumers with their demographic behavioural dimensions. This enables us to use deep learning, bundling data into powerful predictors of consumer behaviour and using the predictors to extrapolate the survey data to the 6-digit postal code level. Key components of our methodology include

- Multi-staged and adaptive nonlinear methods for dimension reduction;
- Effective statistical distance functions;
- Adaptive clustering techniques;
- Hybrid predictive modelling;
- Coherent structural approximations;
- Validation and refinement via independent data sources.

In the predictive modelling process, we set the error bound at 5% and the confidence level at 95%. We divided the input data into training and validation sets. The training set was used to build predictive models, and the validation set was used to verify the accuracy of predictions. We preserved structural coherence of the survey and made variables consistent by categories and by geographic levels.

The data products based on Numeris RTS cover consumer behavioural, products/services usage, consumption and psychographic patterns and are available at all standard geographic levels and custom geographies. These patterns are represented by propensity scores that measure how likely consumers in a 6-digit postal code purchase and use specific products and services. For example, the propensity score of consumer automobile usage includes:

- Number of vehicles
- Annual kilometres driven
- Make of primary vehicle
- Type of primary vehicle
- Year of primary vehicle
- Purchase of primary vehicle
- Purchase decision of primary vehicle
- Purchase/lease of vehicle
- Value of vehicle purchased/leased
- Plan of vehicle purchased/leased
- Auto service club membership

- Automotive aftermarket: repair/bodywork, oil change/lube, pain job, rust protection, tune-up, visits to gas station
- Car rental.

The following tables summarize the key contents of these data products.

Product Name	Product Description
Consumer Media Patterns	Propensity score of consumer media usages including: -Community newspaper reach and reading patterns -Daily newspaper reach and reading patterns -Internet reach and usage -Magazines/publications reach and reading patterns -Radio: listening patterns -Radio format reach: weekly and daily -Radio station reach: weekly and daily -Radio, television, daily paper, community paper, internet - Time spent reading, viewing and listening -Television/cable: programs -Television/cable: reach -Television/cable: specialty channels -Television/cable: viewing patterns
Household Automobile Usage Patterns	Propensity score of consumer automobile usages including: -Number of vehicles -Annual kilometers driven -Make of primary vehicle -Type of primary vehicle -Year of primary vehicle -Purchase of primary vehicle -Purchase decision of primary vehicle -Purchase/lease of vehicle -Value of vehicle purchase/leased -Plan of vehicle purchase/leased -Auto service club membership -Automotive aftermarket: repair/body work, oil change/lube, pain job, rust protection, tune up, visits of gas station -Car rental
Consumer Beverage Consumption	Propensity score of beverage consumption including: -Brand and consumption of beers -Wine and alcohol consumptions -Coffee/tea consumptions -Brand and consumption of soft drinks -Type and consumption of milk/juice

Product Name	Product Description
Household Energy Conservation Patterns	Propensity score of energy conservation behaviours including: -Ownership of energy conserving items -Frequency of environmentally friendly actions, e.g., recycling, composting, taking public transit, ... -Home innovation to improve energy conservation
Household Financial Patterns	Propensity score of consumer financial behaviours including: -Personal savings and investments -Personal debts -Home banks -Use of investment institutions and financial advisors -Financial products and/or services -Usage of financial services -RRSP -Donation -Ownership and usage of credit card -Insurance
Consumer Food Consumption	Propensity score of consumption on food-related items including: -Over 50 individual food items, e.g., bread, fish, chicken, beef, ... -Fruit, vegetables and juice used in food -Condiments used in food -Purchase of health food -Usage of household products, e.g., facial tissue, detergent, air fresheners, ... -Spending on dry cleaning -Pet food -Weekly spending on grocery
Consumer Health Care Patterns	Propensity score of consumer health care patterns including: -Usage of over-the-counter medicine, e.g., cough drops, vitamins, sleeping tablets, bandages, ... -Usage of skin protectant -Actions of weight control -Visits of various type of therapists, e.g., acupuncturists, chiropractors, ... -Usage of assistant devices, e.g., hearing aid, walker, ... -Usage of esthetic services -Usage of cosmetic services -Spending on perfume and cologne -Usage of various personal care products, e.g., mouthwash, shaving creams, ... -Usage of feminine hygiene products

Product Name	Product Description
Household Home Improvement Patterns	Dwelling statistics including: -Dwelling statistics -Home ownership -Home Maintenance -Dwelling construction year -Dwelling Type -Dwelling value -Length of residence -Moving and home buying plan -Source of cooking, heating, hot water Propensity score of home improvement including: -Home renovation and addition -Do-It-Yourself or contractors -Spending on home improvement/maintenance
Consumer Leisure Activities	Propensity score of consumer leisure activities including: -Video/DVD rental activities and spending -Purchase of lottery tickets -Visit of Casinos -Attendance of school and learning centres -Search for jobs -Live events like weddings, childbirth, retirement parties, promotion, … -Attendance of local attractions -Attendance of concerts/theatre -Attendance of live sports events -Visits of consumer shows -Participation of general leisure activities -Participation in sports activities & events, e.g., golfing, skiing, jogging, …
Consumer Psychographic Patterns	Propensity score of consumer psychographics including: -Attitude about advertising -Health consciousness -Opinion about new products -Brand loyalty -Cost sensitivity -Social activities -Opinion on relationship between work and man, woman -Attitude regarding sexual matters -Attitude regarding family life -Attitude regarding self-esteem

Product Name	Product Description
Consumer Purchasing, Spending and Loyalty Patterns	Propensity score of consumer purchasing, spending and participating loyalty programs including: -Households who purchased big-ticket items like HDTV, major appliances ... -Households who plan to purchase big-ticket items like HDTV, major appliances ... -Participation in and activities of loyalty programs like Air Miles, Aeroplan, HBC Rewards, .. -Most frequent shopping times -Spending on groceries, small appliances, auto service, clothing, bath and bedding, tableware, cross-border shopping, flowers, garden supplies, hair salon, gift certificates, shoes, sporting goods, toys and games, jewellery, music, attorney fees and online shopping, ...
Household Restaurant Visits	Propensity score of consumer restaurant visits including: -Frequency of coffee restaurant visits, e.g., Coffee Time, Tim Hortons, Starbucks, ... -Frequency of fast food restaurant visits, e.g., A&W, Burger King, McDonald's, Subway, Wendy's, ... -Frequency of restaurant visits, e.g., Boston Pizza, Pizza Hut, Swiss Chalet, ... -Frequency of visits by restaurant type -Usage of services like take-out, home delivery, online order, ... -Spending on regular and formal restaurants
Household Telecom Patterns	Propensity score of consumer usage of telecommunications including -Current local telephone service suppliers like Aliant, Bell, Primus, Telus, VoIP and Cable companies, ... -Current long telephone service suppliers like Aliant, Bell, Primus, Telus, VoIP and Cable companies, ... -Spending on long distance calls -Ownership of mobile phones and PDAs -Wireless network suppliers like Aliant mobility, Bell or Telus Mobility, Rogers, FIDO, ... -Spending on wireless

Product Name	Product Description
Household Shopping Patterns	Propensity score of consumer shopping activities including: -Shopping at grocery stores like IGA, Loblaws, Metro, Safeway, Sobeys, ... -Shopping at convenience stores like 7-Eleven, gas station, ... -Shopping at drug stores like Guardian, Pharma Plus, Shoppers, ... -Shopping at department stores like The Bay, Canadian Tire, Zellers, ... -Shopping at clothing stores like Banana Republic, the Gap, Laura, Moore's, Winners, department stores, ... -Shopping at shoe stores like Aldo, Bata, Pegabo, Transit, department stores, ... -Shopping at book stores like Chapters, Coles, Amazon and other online, ... -Shopping at jewellery stores like Birks, People's, department stores and online, ... -Shopping at furniture stores like Ikea, Leon's, the Brick, department store and online, ... -Shopping at home improvement stores like Canadian Tire, Home Depot, Rona, department store and online, ... -Using of eyewear and shopping at optical stores like Lenscrafters, Sunglass Hut, department store and online, … -Shopping at photo/camera stores like Black's, Japan Camera, department store and online, ... -Shopping at stereo/video/computer stores like Future Shop, Office Depot, the Source, department store and online, ... -Shopping at office supply stores like Staples, Grand and Toy, Office Depot, department store and online, ... -Shopping at toy stores like Disney Store, Mastermind, Toys 'R Us, department store and online, ... -Ownership of pet and shopping at pet/pet supply stores like Petsmart, Pet Valu, department store and online, ... -Shopping by store type

Product Name	Product Description
Consumer Snack Consumption	Propensity score of snack consumptions including -Hard candies, chewy candies -Cookies -Peanuts and nuts -Chocolate bars -Granola bars -Potato chips -Popcorn -Ice creams -Crackers -Rice cakes,... Consumption of ready-to-eat breakfast like -Cold, hot cereals -Breakfast bars -Pancakes -Frozen waffles
Consumer Travelling Patterns	Propensity score of consumer travelling including -Spending on vacations -Accommodation types like resort, bed and breakfast, boat, camping, cottage, cruise ship, hotel, motel, package tours, ... -Vacation by place like Vancouver, Banf, Ottawa, Toronto, PEI, Alaska, Hawaii, ..., and over 40 in land and oversea locations -Booking methods for vacation like using full service agent, direct via hotel, online, ... -Use of airlines like Air Canada, British Airways, Asian airline, ... -Travelling distance as driver or passenger -Usage of local bus and streetcar
Consumer Work Patterns	Propensity score of work-related activities including -Time driving to work -Number of people in vehicle when driving to work -Public transit time to work -Involvement of business purchase decisions and value Involvement of business purchase decisions on -travelling -Computer hardware, software, education/training -Convention arrangement -Courier services -Handheld communications -Long-distance telephone services -Office equipment -Office food catering -Office supplies and phones -Office furniture -Business trips