Research Project Proposal: Patient Behavior

Introduction to the Topic

In the Joseph Pine TED talk video, Pine narrates the escalation of our economy from a grains economy to an experience economy where companies compete over delivering the best experience to consumers rather than just delivering the commodity. Pine concludes that in an experience economy, rendering authenticity becomes the most important aspect for companies to focus on. In an economy where companies are competing over the actual experience delivered rather than the product, companies must worry about how consumers receive their experience. In this sense, companies must actively measure their consumer loyalty and the consumer behaviors likely to lead to a loyal consumer.

In this project, I want to investigate the problem of predicting consumer behavior in healthcare. For the federal government, healthcare is a $22 billion dollar mess that is increasing at greater than 3% of GDP. Preventative medicine represents a promising field of study in medicine where patient health events are predicted based upon patient healthcare data. As a part of this study, I want to see if there is any overlap between consumer behavior in retail and consumer behavior in healthcare. I will apply predictive models to healthcare data that have been generated for consumer behavior algorithms in retail, finance and other industries besides healthcare. Traditionally, healthcare has not needed to worry about consumer behavior in the same regard as other sectors because providers control the referrals and medical advice of patients. However, with the onset of ACOs and value-based healthcare, healthcare providers are having to compete more and more on provider accountability for the triple aim of healthcare which is increased satisfaction, lower costs and better outcomes.

Specifically, in this project, I look to explore the relationship between patient demographics/behavior and patient service rate over a period of time. The behavior metrics will be activities such as did the patient check in on the patient portal for planned visits. What type of insurance did the patient have? Does the patient have a PCP?

Background

In the article, *Predicting Consumer Behavior* Kim and Park outline how consumer behavior along with consumer attitude are both important for understanding the long-term loyalty of a consumer. [3]

Some machine learning research on marketing effectiveness and consumer behavior show that Bayesian networks are slightly better at predicting marketing effectiveness than neural networks. [4] Yet, neural networks have proven valuable in predicting psychological conditions based on brain mapping. [7] In healthcare, I wonder

Multiple research studies are coming out regarding predicting patient behavior such as adoption of health information technology and prediction of healthcare use and referral trends. [1] One study, shows the importance of health intentions on adoption of health technology. [2] Interestingly, purchase intentions have already shown to be consequential to sales forecasting. [6] In addition, a google study shows the ability of google searches to predict housing prices and sales. [8] Maybe there is some relationship between health intentions and health usage.

Algorithm's

Bayesian Network : https://en.wikipedia.org/wiki/Bayesian_network

Neural Network: https://en.wikipedia.org/wiki/Artificial_neural_network

Logistic Regression: https://en.wikipedia.org/wiki/Logistic_regression

Simulated machine vectors: https://en.wikipedia.org/wiki/Support_vector_machine

Data Sources

Consumer Behavior Datasets:
https://research.chicagobooth.edu/nielsen/datasets/

Googls Brand Awareness Datasets:

http://research.google.com/university/marketingresearchawards/datasets.html

Other consumer behavior/entity datasets:

19 Sources for eye-opening, credible consumer research data http://wpcurve.com/consumer-research-data/ via @wpcurve

Major data source: **athenahealth de-identified patient data**

References

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[6] Morwitz, V. G., Steckel, J. H., & Gupta, A. (2007). When do purchase intentions predict sales?. *International Journal of Forecasting*, *23*(3), 347-364.

[7] Dabek, F., & Caban, J. J. (2015). A Neural Network Based Model for Predicting Psychological Conditions. In *Brain Informatics and Health* (pp. 252-261). Springer International Publishing.

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