CSI 500 Final Project

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Abstract

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1 Introduction

2 Background

The diffusion of innovation is the study of how, why, and the velocity of the spread of new ideas, products, and innovations a socially dessiminated.

Innovation takes place via a process whereby a new 'thought, behavior, or thing' is conceived of and brought into reality. No innovation springs full-blown out of nothing; it must have antecedents. Diffusion of innovation occurs along a curve or statistical distribution where the initial participants are the most socially influential in the diffusion of innovation. This can be more valuable than traditional advertising, a fact that the marketing industry has noted and now is academically included in relevant curriculum. This is evident in the current market selection of social influencers, and can be tracked through new product releases through such individuals in social media: this agrees with the final point of the article, in that it shows the history of concerns expressed being mitigated by marketing innovators through specific action [1].

Diffusion studies rely on the study of change in behavior rather than an observation at a fixed time, offering advantages over other types of research. However, focus had been lost on the value of innovations during the 1970s, as well as focus on well-conducted scientific study, seeing the rise of the misuse or ignoring of such factors as causality, unitary measurement, and other cognitive biases. The author noted that this was being overcome at the time by reapplying social structure in diffusion research via such methods as network analysis [2].

3 Methods

A Python model was constructed to illustrate the Diffusion of Innovation as applied to the iPad. The behaviors being simulated were adoption and disposal of an innovation. In order to do simulate these behaviors a series of Python classes were created. In order to simulate the adoption and disposal of an innovation, numerical rates representing these items were defined as Beta and Gamma. Beta represents the adoption rate, while Gamma represents the disposal rate.

3.1 Data

As an example of the Diffusion of Innovation, one can consider the sales of consumer electronics. For this study, the data to be examined will be that of sales data for the iPad.

Fiscal Quarter	iPad Sales (M Units)
Jan-10	0.00
Mar-10	0.00
Jul-10	3.27
Oct-10	4.19
Jan-11	7.33
Apr-11	4.69
Jul-11	9.25
Oct-11	11.12
Jan-12	15.30
Apr-12	11.80
Jul-12	17.00
Oct-12	14.04
Jan-13	22.86
Apr-13	19.48
Jul-13	14.62
Oct-13	14.08
Jan-14	26.04
Apr-14	16.35
Jul-14	13.28
Oct-14	12.32
Jan-15	21.42
Apr-15	12.62
Jul-15	10.93
Oct-15	8.88
Jan-16	16.12
Apr-16	10.25
Jul-16	9.95
Oct-16	9.27
Jan-17	13.08
Apr-17	8.90
Jul-17	11.42
Oct-17	10.33
Jan-18	13.17
Apr-18	9.11
Jul-18	11.55
Oct-18	9.67

3.2 Python Methods

The first class created was the Person class. This contained a status for instantiated Person objects along with function definitions to update statuses. Next, the Population class was created. This class contained the population features for adoption and disposal rates and contained a group of Person objects in three compartments based on the Person object's current status. This class also contained the triggers for moving a Person object to the subsequent status in the model based on

comparing the adoption and disposal rates, Beta and Gamma, to randomly generated numbers. The final class was the model itself. The model instantiates a population with defined parameters, then iterates through updates to shift the population through the process of adopting and disposing of an innovation a set number of times. Finally, the model class creates a visualization of the resulting curves.

4 Results

5 Discussion

6 Conclusions

7 References

References

[1] Thomas S Robertson. The process of innovation and the diffusion of innovation. *The Journal of Marketing*, pages 14–19, 1967.

[2] Everett M Rogers. New product adoption and diffusion. *Journal of Consumer Research*, 2(4):290–301, 1976.