

In Process

Intelligent Decision Making

Abstract

Introduction

An average person makes between 300 and 400 decisions per day. Most are not critical or very important but some can be life changing. These can range from what color socks to wear to important decisions such as should one accept the job offer and accept the new position in a different city.

The same holds true for corporate entities, except that the number can be much larger, depending upon the size of the organization. And again, they can be minor to very critical. They could wonder whether to make the company shirts blue or gray or should they have the company picnic this weekend or next. On the other hand, they could have the opportunity to acquire another company at a large expense. This could make them a market leader and greatly increase both their stature and profitability. But, it also has the potential to be such a large expense that it bankrupts the company. Additionally one would wonder if the target company is truly what they think and would it be a beneficial acquisition.

There are also military decisions that need to be made. These too cover the range from mundane to hypercritical. The latter covers things like unknown object approaching at high speed, swarm attacks, friend or foe, unknown object, IEDs, etc. A poor decision could cost lives (from single digits to millions) as well as collateral damage, not to mention political problems.

Simple Decision Making

Some would decide to do something merely because they could. Others might like the name or it could be a lucky number. I knew someone who, at the dog races, would bet on the last dog that he saw urinate before the race. Flipping a coin (heads or tails) or throwing darts have also been employed. Freud

discussed the coin toss and said that one should not follow blindly the outcome of the toss but to rather use this to better understand ones feelings [Mackay].

Ben Franklin wrote of his “moral or prudential algebra” and explained his method of decision-making. He said to make a written list on paper with two columns, one for pros and the other for cons. When the list was completed, the columns are to be compared and balancing items crossed out. Then the side with the most remaining points would be the chosen one. [Letter to Joseph Priestley 9 September 1772]

Mathematics can be used to compare cost to purchase a service versus the cost to integrate vertically and bring the needed process in-house. Both fixed and variable costs must be considered as well as supervision and cost of money. With this information, a wise decision could be made. This does exclude the possibility of the need of this service attenuating, leaving the equipment and people underutilized. Time series forecasting applied to demand of this process would improve this decision process. This whole process is essentially building two models, one with the vertical integration; and one, without.

Early Decision Making

An old saying is that the best decisions are made based on knowledge and information. In pioneer days the Indian scout would put his ear to the ground and listen. The commanding officer would hear the report and take out his telescope and look across the plains and then make a decision based on the knowledge that he had. This method did not work too well for General George Armstrong Custer.

Decision Sciences, as an academic curriculum, was created when they applied inferential statistics to business decisions. Methods like regression analysis and time series forecasting further enhanced business decision making.

Origins of Decision Sciences

A group of professors headed by Dennis Grawoig met at Georgia State University (GSU) in Atlanta in 1968 to propose a society for Decision Sciences. This curriculum was new and cross disciplinary. Most of the applications were business oriented. This started when they discovered that they could use statistics to improve the quality of decisions. Time series forecasting could predict future values, cluster analysis described grouping and was helpful in classification, regression analysis could model the system, and the list goes on.

Some of the original people were accountants and actuaries. Mathematical and statistical methods that they had been using for years could be used to help

make better quality decisions. GSU started first with graduate degrees in 1964 and later offered an undergraduate degree.

It is often confused with Data Science, but these are similar but different. The former creates analytics and the latter uses these to help make a decision based upon these analytics. Many decision scientists are skilled in data science methods but their focus remains on making the highest possible quality decision.

Decision Making Methods

Simple Mathematics

Expected Monetary Value (EMV)

Decision Trees

Decision Tables

Model Based Decision Support Systems

Time Series Forecasting

Ensemble Learning and Random Forests

Applications of Decision Sciences

While most consider this to be a business application in reality it applies to all aspects of life.

References

Mackay, H, *Decision Making Defines the Leader*, In Wikipedia