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Week 2 - Homework 1

Prescriptive analysis suggests optimal actions using data-driven insights, considering constraints and objectives to guide decision-making and achieve desired outcomes. From a business analytics perspective:

Why is prediction important across diverse fields, and how does it influence decision-making processes?

Prediction is important no matter what industry it is utilized in. Organizations and companies must analyze data and predict future trends and user behavior, among other things, to make the best decisions possible for their purposes. For example, if a house insurance company in California predicted that there would be more wildfires in the upcoming year, they would know to charge their customers more so that they don't lose money. Another situation where prediction would be useful is in investment companies, as they need to predict future stock price trends to determine which stocks are the best to invest in. Yet another example is the supply chain—if there is a social media trend for a certain snack combination, grocery stores need to predict that in advance to get their products on shelves, especially since trends are only here for a short time.

What methods are commonly used to evaluate the effectiveness of prediction models?

Many metrics can be used to evaluate the effectiveness of prediction models. One that can be used for quick visualization is the confusion matrix; from there, it is easy to see if the predicted classification is accurate. Other measures that can be used to evaluate the performance of a model are accuracy, precision, MSE, ROC/AUC, etc. To test a model for overfitting, one could also employ training and validation sets. These would all help an organization test to see if the prediction models are accurate. If businesses inaccurately predict future trends/customer behavior, it could be detrimental to their bottom line.

What role do emerging technologies like artificial intelligence and deep learning play in advancing prediction capabilities and applications?

Artificial intelligence and deep learning make data analysis and prediction a lot quicker and more accurate. Deep learning, especially neural networks, could even come up with calculated fields that human data analysts may not think of, leading to better predictions, thereby leading to increased profits.