**Fundamentals of Big Data & Business Analytics**

**NMIMS Solved Assignments for December 2024**

**Q1. A retail chain wants to improve customer experience by using big data to understand and predict customer behavior. Discuss how the company can aggregate and process data from transactions, online browsing, and social media to build customer profiles. Explain the role of predictive analytics in forecasting customer needs and prescriptive analytics in creating personalized marketing strategies. Address the challenges of handling large-scale data and suggest solutions.**

**Answer:**

**Introduction:**

In today’s competitive retail landscape, understanding customer behavior is essential for delivering a personalized shopping experience. A retail chain aiming to leverage big data can gain valuable insights into customer preferences, needs, and trends. By aggregating data from various sources, such as in-store transactions, online browsing patterns, and social media interactions, the company can build comprehensive customer profiles. Predictive analytics plays a crucial role in forecasting future customer needs, allowing the company to anticipate demand and tailor offerings. Meanwhile, prescriptive analytics can guide marketing strategies, enabling the creation of personalized campaigns. However, handling and processing large-scale data come with challenges, including data integration, storage, and privacy concerns. Implementing scalable data solutions, using advanced analytics tools, and ensuring robust data security can help the company effectively utilize big data for enhanced customer experience.

**This is partially solved sample answer**

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**Q2. An energy company wants to optimize power grid operations using data from smart meters, weather forecasts, and real-time energy consumption. Discuss how descriptive analytics can help understand energy usage patterns and detect anomalies. Explain the importance of scalability and real-time processing, and how predictive analytics can forecast energy demand. Describe how prescriptive analytics can optimize energy distribution and reduce costs, considering data management challenges.**

**Answer:**

**Introduction:**

In today’s energy sector, optimizing power grid operations is crucial for efficiency and sustainability. By leveraging data from smart meters, weather forecasts, and real-time energy consumption, energy companies can gain insights into usage patterns, detect anomalies, and make informed decisions. Descriptive analytics plays a key role in understanding historical and current energy usage, revealing trends and identifying irregularities. However, as data volume grows, scalability and real-time processing capabilities become essential for managing large datasets swiftly. Moving beyond description, predictive analytics can help forecast future energy demand, allowing companies to anticipate and prepare for consumption spikes. Finally, prescriptive analytics can guide optimal energy distribution, balancing supply and demand while minimizing costs. This approach presents data management challenges, yet it promises to revolutionize energy distribution and operational efficiency.

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**Q3a. An e-commerce company wants to streamline warehouse operations by analyzing data on order fulfillment, stock levels, and shipping delays. Describe how descriptive analytics can identify bottlenecks in warehouse processes. Discuss data integration challenges and how visualization tools can present findings to management.**

**Answer:**

**Introduction:**

The question explores how an e-commerce company can leverage descriptive analytics to enhance warehouse efficiency. By analyzing data on order fulfillment, stock levels, and shipping delays, the company can pinpoint bottlenecks in operations. It also addresses the challenges of data integration across various sources and highlights the role of visualization tools in effectively presenting insights to management for informed decision-making and streamlined processes.

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**Q3b. The company also needs to anticipate global supply chain disruptions, such as weather or geopolitical factors. Discuss how predictive analytics can forecast disruptions and the importance of a robust infrastructure. Explain how prescriptive analytics can develop contingency plans and optimize shipping routes, considering data processing challenges.**

**Answer:**

**Introduction:**

In today’s complex global economy, companies face increasing risks from supply chain disruptions caused by factors like severe weather or geopolitical issues. Predictive analytics can help anticipate these disruptions, enabling businesses to prepare in advance. Additionally, prescriptive analytics aids in formulating contingency plans and optimizing logistics, although data processing challenges must be addressed. This question explores the role of analytics in building a resilient and adaptable supply chain infrastructure.

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