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| **Participant Name:** | Vignesh Goud, Mogutala |
| **Project Title:** | Operational Efficiency in Emergency Department |
| **Date:** | 12/15/2024 |

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| **Project Summary (Overview):** |
| The strategy undertaken for the project was to enhance operational efficiencies in hospitals by data analytics, by enabling predictions about the admission rate of patients, enhancing the scheduling of staff, and maintaining their inventory of medical supplies. The project started with a comprehensive analysis of historical data like patient admissions, the roster of staff, and their inventory levels. Both ARIMA and Gradient were used for forecasting future admission rates to enable better planning and resource allocation. Clustering algorithms segmented patient data, enabling the determination of peak times and patterns that affect hospital capacity. Besides, optimization techniques such as linear programming will be applied in smoothing staff scheduling and inventory management to ensure adequate coverage without being overstaffed or short of supplies. The same then visualized with results, using Power BI to present actionable recommendations in real time to the hospital administrator. This generally helped enhance the efficiency of the operational process in hospitals by improving on the reduction of wastes and waiting times while increasing staff productivity. |
| **Relationship to your MSBA program:** |
| The MSBA program has equipped me with the broad sets of analytical, technical, and problem-solving skills that were so instrumental in my Capstone project. This gave me an enabling capability to apply machine learning, data visualization, and predictive analytics by providing the necessary advanced algorithms toward making decisions based on data. I applied time series forecasting and clustering techniques that helped analyze and forecast the rate of patient admissions. These included skills on optimization strategies that would help in streamlining resource allocation. Data visualization applied to developing intuitive dashboards in Power BI was an additional skill learned. Another big program component was real problem-solving that allowed for the design of a project around key operational challenges within healthcare. In summary, the MSBA curriculum during my Capstone project provided both technical backbone and practical insight into how to develop and execute a full data-centric solution. |

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| **Learning Outcomes Achieved:** |
| Working on my Capstone project helped me understand how to apply Data Analytics to real-world challenges in healthcare. I learned how to handle and pre-process big, complicated datasets, especially in integrating and analyzing patient data, staff schedules, and inventory records. Building predictive models of ARIMA and Gradient boosting also helped me enhance my skill time series forecasting and anomaly detection. I also enhanced my capability in using techniques of optimization to achieve resource allocation, thus making the operations more efficient. In developing dashboards using Power BI, my strength in visualizing data was enhanced to clearly and powerfully present complex insights in data. Overall, this project reinstituted my capability in integrating technical skills into strategic thinking in solving practical business problems. |
| **Other comments:** |
| No other comments. |