INTERNSHIP: STUDENT DAILY REPORT

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| Name of the Student | Vivek kumar Shriwas |
| Internship Project Topic | TCS iON RIO-125: Forecasting System - Project Demand of Products at a Retail Outlet Based on Historical Data |
| Name of the Organization | TCS iON |
| Name of the Industry Mentor | Sreekathiayini Ruthraiyah |
| Name of the Institute | Viswakarma University |

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| Date | Day | Hours Spent |
| 1/08/2023 | Day 15 | 3 hours and 30 minutes |
| Description:  **Self-learning Duration : 3 hours**  **Activity Report Duration : 30 minutes**  **Activities:**   1. **Exploring Advanced Forecasting Techniques (1 hour):**    * Investigated advanced time series forecasting techniques, including Seasonal ARIMA (SARIMA) and Seasonal Decomposition of Time Series (STL).    * Understood the incorporation of seasonality and performed seasonal decomposition on sample data.    * Explored the necessity of these techniques for capturing complex temporal patterns. 2. **Hands-on SARIMA Implementation (1 hour):**    * Explored the extension of ARIMA to seasonal data with the SARIMA model.    * Utilized the **statsmodels** library to implement a SARIMA model on a seasonal time series dataset.    * Tuned the seasonal hyperparameters and observed their impact on the forecasting performance. 3. **Comparing ARIMA and SARIMA (45 minutes):**    * Conducted a comparative analysis between the ARIMA and SARIMA models on different types of time series data.    * Analyzed the cases in which the inclusion of seasonality significantly improved forecasting accuracy.    * Discussed the challenges and considerations of applying SARIMA to real-world datasets. 4. **Reviewing STL Decomposition (30 minutes):**    * Reviewed the Seasonal Decomposition of Time Series (STL) method for capturing trend, seasonality, and remainder components.    * Explored the application of STL decomposition using the **statsmodels** library.    * Discussed scenarios where STL might be preferred over other forecasting approaches. 5. **Updating Learning Journal (15 minutes):**    * Recorded insights gained from exploring advanced forecasting techniques like SARIMA and STL.    * Documented the process of implementing SARIMA and the observed impact on forecasting accuracy.    * Reflected on the challenges encountered during the SARIMA implementation and their resolutions.   **Challenges:** Implementing the SARIMA model for the first time required careful consideration of both the non-seasonal and seasonal components. Understanding how to appropriately set the hyperparameters for seasonal differencing and lag orders was challenging but eventually resolved through iterative experimentation and reference to documentation. | | |