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 |
| 3/08/2023 | Day 17 | 4 hours and 15 minutes |
| Description:  **Self-learning Duration : 4 hours**  **Activity Report Duration : 15 minutes**  **Activities:**   1. **Time Series Decomposition (1 hour):**    * Delved into the concept of time series decomposition to break down time series data into its fundamental components: trend, seasonality, and residual.    * Understood the additive and multiplicative decomposition approaches and their applicability in different scenarios.    * Explored methods to perform decomposition using Python libraries such as **statsmodels** and **seasonal\_decompose**. 2. **Applying Decomposition (1 hour):**    * Applied additive decomposition to a sample time series dataset using the **seasonal\_decompose** function.    * Visualized the extracted components to better understand the individual contributions of trend and seasonality.    * Discussed the insights gained from the decomposition and its implications for forecasting. 3. **Introduction to ARIMA (1 hour):**    * Shifted focus towards AutoRegressive Integrated Moving Average (ARIMA) models for time series forecasting.    * Understood the three key components: AutoRegressive (AR) terms, Integrated (I) differencing, and Moving Average (MA) terms.    * Explored the process of identifying optimal values for these components (p, d, q) through autocorrelation and partial autocorrelation plots. 4. **ARIMA Model Building (1 hour):**    * Explored the step-by-step process of building an ARIMA model for time series forecasting.    * Selected a dataset suitable for ARIMA modeling and conducted necessary data preprocessing.    * Split the dataset into training and testing sets to evaluate the model's performance. 5. **Reflective Learning (15 minutes):**    * Took a moment to reflect on the progress made in understanding different time series forecasting techniques.    * Recognized the interconnectedness between decomposition, exponential smoothing, and ARIMA methods.    * Identified scenarios where ARIMA might outperform other techniques and vice versa.   **Challenges:** The ARIMA model building process introduced a new level of complexity, especially in determining the appropriate values for p, d, and q. Gaining an intuitive understanding of how differencing impacts the data required some additional research. However, the step-wise approach and hands-on implementation eased the learning curve. | | |