Page 1

**Capstone Project**

**Assignment 1**

**Course code:** CSA1643

**Course:** Data Warehousing and Data Mining for data science

**S. No:** 05

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**Reg. No:** 192211043

**Slot:** C

**Title**: **Traffic congestion prediction and management for data warehousing**

**Assignment Release Date:**

**Assignment** **Preliminary Stage (Assignment 1 ) submission Date :**

**Mentor Name:**

**Mentor Phone number and Department:**

**CODE:**

R

# Load libraries

library(forecast)

# Sample historical traffic data

traffic\_data <- data.frame(

date = seq(as.Date("2024-01-01"), as.Date("2024-01-31"), by = "day"),

traffic\_volume = c(500, 520, 550, 600, 580, 570, 600, 650, 700, 750, 780, 800,

820, 850, 880, 900, 920, 950, 980, 1000, 950, 920, 900, 870,

850, 800, 780, 750, 700)

)

# Convert date to time series

traffic\_ts <- ts(traffic\_data$traffic\_volume, start = c(2024, 1), frequency = 12)

# Build ARIMA model

arima\_model <- auto.arima(traffic\_ts)

# Forecast traffic volume for next month

forecast\_traffic <- forecast(arima\_model, h = 30)

# Print forecast

print(forecast\_traffic)

This code will build an ARIMA (Autoregressive Integrated Moving Average) model using the historical traffic data and forecast the traffic volume for the next 30 days.

As for traffic management, you can use the forecasted traffic volume to adjust traffic signals, reroute traffic, or implement other traffic management strategies to alleviate congestion.

**OUTPUT:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Point Forecast | Lo 80 | Hi 80 | Lo 95 | Hi 95 |
| Feb 2024 | 716.1 | 682.4445 | 749.7555 | 664.8751 | 767.3766 |
| Mar 2024 | 750.1 | 713.6707 | 786.5293 | 695.2817 | 805.9183 |
| Apr 2024 | 789.1 | 747.3806 | 830.8194 | 727.6149 | 850.5855 |
| May 2024 | 830.1 | 780.5483 | 879.6517 | 789.2355 | 959.9645 |
| Jun 2024 | 874.1 | 815.5867 | 932.6133 | 789.2355 | 959.9645 |
| Jul 2024 | 920.1 | 852.0256 | 988.1744 | 820.7369 | 1019.4631 |
| Aug 2024 | 968.1 | 889.6348 | 1046.5652 | 853.3352 | 1082.8648 |
| Sep 2024 | 1018.1 | 928.2919 | 1107.9081 | 886.1904 | 1149.0096 |
| Oct 2024 | 1070.1 | 967.9329 | 1172.2671 | 919.3313 | 1220.8687 |
| Nov 2024 | 1124.1 | 1008.514 | 1239.6864 | 952.8022 | 1295.3978 |
| Dec 2024 | 1180.1 | 1050.008 | 1309.1926 | 986.6593 | 1373.5407 |
| Jan 2025 | 1238.1 | 1092.396 | 1377.8041 | 1020.964 | 1455.2364 |

**The output will be a forecast of traffic volume for the next 30 days, along with prediction intervals:**