**Deliverable 7-Emergency Call Data Analysis**

Author

Affiliation

Course

Instructor

Due Date

**Part 2**

**Introduction**

In order to determine eligibility for further funds, a linear regression analysis is performed to determine the relationship between the number of incidents and the number of officers on the scene. An R-squared of 96.52% is obtained for data analysis through regression analysis. This implies a good correlation between the data in the model. The line of fit for the regression model is therefore accurate. There is a substantial association between the number of incidents and the number of cops on the scene, as indicated by the R-squared, also called the coefficient of determination. Regression analysis of the number of occurrences and officers at scene data shows that the City of Lincolnton police department has not attained the required 2.5 cops per event, meaning they are qualified for further funding. Given the following regression equation;

Y = 1.871\*number of events + 4.519

Where;

Y = Number of officers at the scene

The city deploys 1.91 police officers on average for every event. Consequently, more financing is needed to ensure that at least 2.5 police officers be sent to every event.

**Impact of the Outlier**

Significant disparities were revealed by the regression analysis's findings. For example, utilizing data from sectors H and W will produce unreliable outcomes. Regression analysis Utilizing data from sectors H and W yields the following equation for the regression: Y = 1.491\*number of events + 21.91.

**Residual Plot Analysis**

A residual plot of the site's residuals and projected police officers showed that the forecast was rather high. Positive residual values and negative residual values, in accordance with Alita et al., (2021) and Rath et al., (2020), indicate that a forecast was either exceptionally high or extremely low. It is likely that the forecast was correct if the residual value is 0.

Officers at scene were anticipated to be 3.0\*10^-14 given the regression equation Y = 3.0\*10^-16\*.

**Qualification for Additional Funding**

The association between officers at incidents and eligibility requirements determines the department’s eligibility for increased state funds, according to the linear regression analysis. Specifically, the analysis suggests that the department does not qualify for additional funds. Nevertheless, the underlying link may be obscured by data restrictions, such as missing variables or outliers, requiring careful interpretation and possibly more data gathering for an accurate assessment (Maulud & Abdulazeez, 2020; Schober & Vetter, 2021). For accurate depiction, missing data might need to be availed.

**Comparison Matrix**

Based on the comparative analysis of the events by sector of the district, each district has approximately two cops per event. When compared to other districts, the districts with the greatest average officer attendance per event were W, R, and M. Additional incidents indicate that sectors B and E require more officers to be on the scene due to the volume of incidents there. There are 83 events in Sector B, 38 of which are related to event NV and 45 to event V. There are 45 events for event V and 46 events for event NV out of the 91 activities in Sector M. There are 42 events for event V and 44 events for event NV out of the 86 events in Sector E.

**Impacts of Operations**

Regression analysis reveals a direct relationship between the number of events and the number of police dispatched to a location, with an R-squared of 85.02%. Furthermore, the district's various areas host a greater number of events than others. As a result, locations hosting more events should have more police officers assigned by the City of Lincolnton Police Department. As an alternative to district sectors O, L, C, and F, the department ought to think about assigning extra officers to districts B, M, and E.

**Precautions**

In this case, it is imperative to give data security and confidentiality priority while working with sensitive data. To protect sensitive information from unauthorized access or disclosure, precautions include encrypting data during transmission, limiting access to authorized personnel only, putting strong authentication measures in place, routinely auditing access logs, and abiding by applicable privacy regulations.

**Additional Tools and Technologies**

For upcoming projects, data collecting, storage, and analysis can be improved with the use of cutting-edge tools including machine learning algorithms, data visualization programs, and cloud-based storage options (Uyanık & Güler, 2013). Furthermore, novel ways of data management are provided by IoT devices, blockchain technology, and predictive analytics models, enabling more secure and effective information processing.

**References**

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Maulud, D., & Abdulazeez, A. M. (2020). A review on linear regression comprehensive in machine learning. *Journal of Applied Science and Technology Trends*, *1*(4), 140-147.

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