Chapter 4: Results and Discussion

This chapter presents the findings from an exploratory analysis of data (EDA) carried out on the information gathered. It is easier to understand the data, spot trends, and gain first insights which guide more investigation and model building with the aid of EDA.

**4.1 Initial Insights from EDA (Diagnostic Analytics)**

**4.1.1 Social Media Data Insights**

* **Engagement Patterns:** Identifying the most active users through the analysis of user engagement patterns such as shares, comments, and likes.
* **Demographic Trends:** User demographic trends, including age, gender, and location, must be analyzed in order to understand the target market.

**4.1.2 CRM Data Insights**

* **Recruitment Funnel Analysis:** involves looking at the various stages of the funnel to identify drop-off spots and areas that might need improvement.
* **Historical Data Trends:** looking through historical recruitment data to identify trends and seasonal patterns in student enrollment.

**4.1.3 Combined Data Insights**

* **Cross-Platform Behavior:** Identifying correlations between social media activity and CRM engagement to understand how online behavior translates to recruitment interest.
* **Profile Characteristics:** Determining common characteristics of students who successfully enrolled at UTS College to refine targeting strategies.

**4.2 Machine Learning (Predictive Analytics)**

**4.2.1 Model Selection**

The process of choosing the best machine learning algorithms, such as logistic regression, random forests, decision trees, and neural networks, depending on the specifications of the issue and the properties of the data.

**4.2.2 Model Training**

* **Training and Testing Sets:** Divide the data into training and testing sets to validate the model's performance.
* **Cross-validation:** Utilizing cross-validation techniques will prevent overfitting and ensure the model's durability.

**4.2.3 Model Evaluation**

* **Performance Metrics:** Metrics like F1-score, ROC-AUC, accuracy, precision, and recall are used to evaluate models.
* **Model Tuning:** Model tuning is the process of adjusting hyperparameters to maximize model output.

**4.2.4 Prediction**

* **Enrollment Likelihood:** Making predictions about potential students' enrollment at UTS College based on CRM data and social media activity.
* **Targeted Outreach:** Finding high-potential people to reach out to with tailored outreach and communications is known as targeted outreach.

**4.3 Visualizations and Descriptive Statistics with Tables**

**4.3.1 Descriptive Statistics**

* **Summary Statistics:** To comprehend the central tendency and the dispersion of numerical data, one can compute metrics such as the variance, mean, median, mode, and standard deviation.
* **Frequency Distributions:** The distribution of categories can be examined by tabulating the frequency distributions for categorical variables.

**4.3.2 Summary of Key Visualizations**

* **Engagement Trends:** Trends in social media engagement are displayed by line charts.
* **Recruitment Funnel:** A flowchart that shows the many phases of the hiring process together with the conversion rates at each one.
* **Geographical Distribution:** Maps displaying the geographical distribution of prospective students.
* **Prediction Scores:** Bar charts and tables showing the predicted enrollment likelihood scores for prospective students.

**4.3.3 Key Tables**

* **Descriptive Statistics:** Tables summarizing the descriptive statistics of key features.
* **Feature Importance:** Tables listing the importance of features used in the model.
* **Model Performance:** Tables comparing the performance metrics of different models.

**4.4 Interpretation of Results**

**4.4.1 Social Media Engagement Analysis**

* **Engagement Patterns:** Discussing the observed patterns in social media engagement, such as peak activity times and popular content types.
* **Demographic Insights:** Interpreting the demographic trends in the context of the target audience for UTS College.

**4.4.2 Recruitment Funnel Analysis**

* **Conversion Rates:** To identify areas for improvement, analyze the conversion rates at all stages of the recruitment funnel.
* **Historical Trends:** Discussing about past hiring patterns and how they relate to present tactics.

**4.4.3 Predictive Model Results**

* **Enrollment Likelihood:** Interpreting the predicted enrollment likelihood scores and identifying high-potential candidates.
* **Feature Impact:** Discussing the impact of key features on the predictions and their relevance to the recruitment process.

**4.5 Discussion of Implications**

**4.5.1 Recruitment Strategy**

* **Targeted Outreach:** Talking about how the results might guide plans for targeted outreach to increase conversion rates.
* **Resource Allocation:** Providing information on the best way to allocate resources in accordance with anticipated results and engagement trends.

**4.5.2 Personalized Communication**

* **Customization:** Highlighting the value of personalized interactions and the ways in which data-driven insights can improve the effectiveness of campaigns for outreach.
* **Engagement Tactics:** Recommending specific techniques for engagement on the basis of the behavioral and demographic information gathered from this research.