Statement of Work

This Statement of Work ("SOW") is entered into by and between Hoang Nha Nguyen and the Liautaud Graduate School of Business – Department of Business Recruitment for the IDS 560 – 'Analytics Strategy and Practice' capstone project. The SOW is effective from September 18, 2023.

I. Project Overview

A. Contexts

Department of Business Recruitment is responsible for developing and executing a recruiting strategy to recruit highly qualified individuals for graduate and doctoral programs in the UIC College of Business Administration (CBA). The scope is to increase applications and to grow enrollments in the programs offered by the UIC Business Liautaud Graduate School.

The department has recently faced challenges when confronting the massive volume of student applications. There is a significant demand to study and analyze recent historical trends to predict what steps need to be taken for impending changes.

The department needs to get a fairly accurate insight into the volume of expected incoming students each term. Also, being able to provide an informative and interactive visualization of the student enrollment data will help recruiters make valuable data-driven decisions.

B. Objectives

The department has requested a business analyst to assist with the statistical and data analyses of key enrollment and admission metrics. Besides, there is an increased demand for the creation of interactive enrollment dashboards, and user-friendly admissions comparison reports, which enable real-time access to relevant enrollment indicators.

C. High-Level Scope

- Deploy predictive machine learning models that aid with the forecast of the enrollment and admission rates based on historical student admissions data obtained through the Slate CRM university platform. These models may help make an accurate prediction regarding each prospective student's intent-to-enroll (ITE) decision.
- Create interactive enrollment dashboards for visualizing weekly enrollment reports with Tableau. These dashboards provide real-time access to enrollment metrics and allow stakeholders to extract meaningful insights and make informed decisions.

- Leverage the capabilities of the Slate tool to develop user-friendly custom reports that provide insights into applicant trends, yield rates, conversion rates, and other relevant enrollment metrics.

II. Project Requirements and Deliverables

A. Project Requirements: The term of this SOW spans two months, commencing from September 18, 2023.

The SOW will be considered complete when (i) forecasting models are deployed (ii) dashboards are designed in an interactive manner (iii) comparison graduate dashboards are customed to meet the reporting requirements of stakeholders.

B. Deliverables

- Predictive supervised machine learning models in forecasting the enrollment rate in the future terms are developed and deployed, specifically for MBA and Online MBA programs.
- Interactive data dashboards for weekly enrollment reports are designed with Tableau to extract valuable insights on demographics and enrollment trends for decision-making purposes.
- Effectively utilize Slate CRM university systems to prepare and develop custom reports that meet the reporting requirements of stakeholders.

III. Project Schedules and Milestones

Start Date: **September 18, 2023**

- Milestone 1: Data collection and exploration completed by *September 25th*.
    - Activity 1: Data Extraction
    - Activity 2: Data Cleaning
    - Activity 3: Exploratory Data Analysis
- Milestone 2: Data Preprocessing completed by *October 9th*.
    - Activity 1: Deal with missing data entries ○ Activity 2: Feature engineering
        - Select appropriate techniques for types of variables ○ Activity 3: Feature selection
        - Testing statistical significance of important features by ANOVA and Chi-squared test
- Milestone 3: Data exploration and visualization completed by *October 23rd*.
    - Activity 1: Data exploration

        - Uncover patterns or trends, statistical analyses
        - Identify any potential outliers
    - Activity 2: Data visualization
        - Include statistical summaries and insights into the dataset (histograms, scatter plots, and heat maps)
- Milestone 4: Build interactive dashboards with Tableau completed by *November 6th*.
    - Activity 1: Dashboard design
        - Collaborate with stakeholders to define specific metrics
        - Plan the layout and design
        - Select appropriate visualization types
    - Activity 2: Data Integration
        - Ensure seamless integration of the cleaned data into Tableau
        - Implement data connections
        - Ensure data fields are accurately mapped to visualization elements
    - Activity 3: Dashboard development

- Milestone 5: Model Deployment completed by *November 13th*.
    - Activity 1: Model Development
        - Build predictive machine learning models tailored for forecasting enrollment and admission rates, with a specific focus on MBA and Online MBA programs.
    - Activity 2: Model Testing and Validation
        - Obtain accuracy, precision, recall, and other relevant metrics.
        - Perform cross-validation and hyperparameter tuning.

- Milestone 6: Report and Presentation completed by *November 27th*.
    - Activity 1: Project Documentation
    - Activity 2: Stakeholder Presentation

IV. Required Technical Environment

- Data analysis software (Python, R, and MS SQL Server).
- Visualization software (Tableau)
- Machine learning libraries
- Machine learning regression and classification modeling techniques.
- Access to historical admissions data (Slate CRM system)

V. Individual and Client Responsibilities

A. Individual Responsibilities:

- Collect and preprocess data.
- Develop and validate predictive machine learning models.
- Design interactive data dashboards.
- Create custom reports using Slate CRM.

B. Client Responsibilities:

- Provide necessary data access and permissions.
- Collaborate on defining project objectives.
- Provide feedback and guidance throughout the project.

VI. Risk Matrix – High Level

Objective 1: Deploy Predictive Models

- Risk: Insufficient historical data and too many features to consider for reliable predictions.
- Mitigation: Perform thorough data preprocessing and ensure data consistency to enhance model accuracy.

Objective 2: Develop Interactive Dashboards

- Risk: Tableau limitations for real-time data updates.
- Mitigation: Consider Tableau's data extract functionality to bridge the gap between real-time data sources and Tableau dashboards.

Objective 3: Create Custom Reports

- Risk: Incomplete or inaccurate data in Slate CRM.
- Mitigation: Collaborate closely with the IT department or Slate administrators to address data quality issues for improvements.

VII. Assumptions, Constraints, and Exclusions

A. Assumptions

- Historical admissions data is available and accessible.
- Stakeholders will provide timely feedback and guidance.

B. Constraints

- The project duration is limited to two months.

- Incomplete and inaccurate data from Slate CRM can be a significant technical constraint that may impact real-time data updates in Tableau.

C. Exclusions

- This project does not include IT changes and upgrades in the existing Slate CRM system.
- Any changes to the project scope require formal approval and may result in adjustments to the timeline.