**PROJECT TITLE: PREDICTIVE ANALYTICS WITH IBM CLOUD WATSON STUDIO**

**Submitted By**

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**1. Project Overview**

This project involves using IBM Cloud Watson Studio to train a machine learning model and deploy it as a web service. The main goal is to gain proficiency in predictive analytics by creating a model capable of making real-time predictions. The project encompasses defining the predictive use case, selecting a suitable dataset, data preprocessing, model training, model deployment, and integrating the deployed model into applications.

**2. Objective**

The primary objective of this project is to develop a predictive analytics solution that can make real-time predictions based on a machine learning model. The specific steps involved in achieving this objective include:

* Defining a predictive use case.
* Selecting an appropriate dataset.
* Preprocessing the data for model training.
* Training a machine learning model.
* Deploying the model as a web service on IBM Cloud Watson Studio.
* Integrating the deployed model into applications to enable real-time predictions.

**3. Predictive Use Case**

Define a specific predictive use case that your project will address. For example, you might want to predict customer churn, stock prices, or disease outbreaks. Clearly outline the problem statement and the importance of solving it.

**Example Use Case:** Predicting customer churn in a telecommunications company to reduce customer attrition and improve customer retention strategies.

**4. Dataset Selection**

Select a dataset that is relevant to your predictive use case. Ensure that the dataset is representative and contains sufficient data for training a machine learning model. Provide information about the dataset, its source, and any data licensing considerations.

**Example Dataset:** Customer churn dataset containing customer demographics, usage patterns, and churn status.

* Source: [Kaggle](https://www.kaggle.com/)
* Licensing: Check dataset licensing for compliance.

**5. Data Preprocessing**

Describe the steps involved in preprocessing the dataset. This may include data cleaning, handling missing values, feature engineering, and data transformation. Data preprocessing is crucial for building an accurate predictive model.

**Example Data Preprocessing Steps:**

* Handling missing values.
* Encoding categorical variables.
* Scaling numerical features.
* Splitting the dataset into training and testing sets.

**6. Machine Learning Model**

Choose an appropriate machine learning algorithm for your use case and describe the model's architecture. Explain the rationale behind selecting this model and any hyperparameter tuning if applicable.

**Example Model:** Random Forest Classifier

* Rationale: Random forests are robust and perform well on a variety of classification tasks.
* Hyperparameter tuning: Grid search for optimal hyperparameters.

**7. IBM Cloud Watson Studio**

**Setting Up Watson Studio**

Explain how to set up IBM Cloud Watson Studio for your project. This should include creating an IBM Cloud account, provisioning Watson Studio services, and connecting to your project.

**Data Upload**

Provide instructions on how to upload your selected dataset to Watson Studio for further analysis and model training.

**Model Training**

Detail the process of training your machine learning model using Watson Studio. This should include configuring model training parameters and running the training job.

**8. Model Deployment**

**Creating a Web Service**

Explain how to deploy your trained model as a web service on IBM Cloud Watson Studio. Include steps for creating the deployment, selecting the model, and configuring the deployment settings.

**Scoring Endpoint**

Provide information on how to access the scoring endpoint for your deployed model. Explain how applications can send data to this endpoint to receive predictions.

**9. Integration into Applications Using the API**

Demonstrate how to integrate the deployed model into applications by using the API provided by the scoring endpoint. Provide code examples in relevant programming languages for making predictions in real-time.

**10. Conclusion**

Summarize the key achievements of your project, including the successful deployment of a predictive model as a web service and its integration into applications. Discuss any challenges faced and lessons learned during the project. Outline future improvements or additional use cases for the deployed model.