## **ML For Business II Final Project**

**Predicting YouTube Spam Comments** 

#### **Group Members:**

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### Introduction

- Objective: Predict whether a YouTube comment is spam (1) or not (0).
- Dataset sourced from Kaggle, labeled in the CLASS column.

### **Dataset Overview**

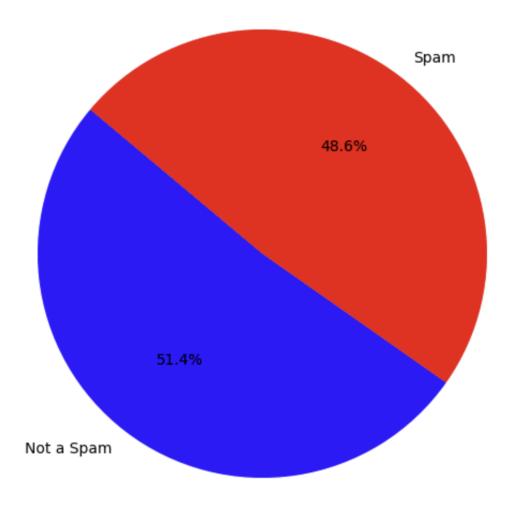
- Dataset contains labeled comments from YouTube.
- Key features include comment\_id, author, date, content and video name.
- Target column: class (1 = spam, 0 = not spam).

## **Exploratory Data Analysis (EDA)**

#### **Label Distribution**

Analyze distribution of spam vs. non-spam comments.

#### How is the labelled data distribution?



## **Exploratory Data Analysis (EDA)**

#### **Word Cloud**

• Visualizing common words in spam comments



### **Data Preprocessing**

- Data cleaning steps:
  - Handling missing values.
  - Removing duplicates.
  - Text vectorization using TF-IDF.

### **Model Selection**

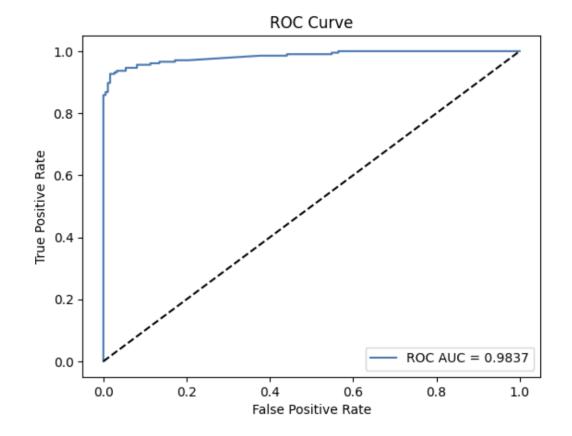
- Tried different models:
  - Logistic Regression (tested with both TF-IDF and Count Vectorizer)
  - Bernoulli Naive Bayes
  - XGBoost

### **Model Evaluation**

- Metrics used:
  - Accuracy
  - Precision
  - Recall
  - F1 Score
  - ROC-AUC (Receiver Operating Characteristic Area Under the Curve)
- Compared performance across models.

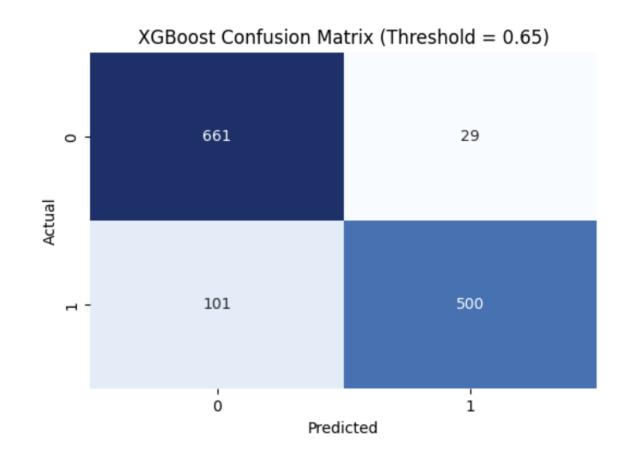
### **Best Model: XGBoost**

- Best performance observed with XGBoost.
- TF-IDF vectorization + hyperparameter tuning.
- Performance metrics:
  - Accuracy on test: 0.95
  - F1 Score: 0.95
  - ROC-AUC: 0.98



### **Results Visualization**

- Confusion matrix of the best model.
- Hyperparameters tuned:
  - learning rate = 0.2
  - $\circ$  max depth = 6
  - n estimators = 150



### Recap

- XGBoost + TF-IDF gave the best performance.
- Spam detection accuracy: 90%.

# Live demo time!

## **DevOps Structure**

### **Next Steps**

- Potential improvements:
  - Use deep learning models (e.g., LSTM, BERT).
  - Experiment with more feature engineering.
  - Use an even larger dataset to have an even more general model
- Sell it to Youtube and live off the profits!