

# SMS Spam Classifier using Machine Learning

## 1. Problem Statement

Spam messages are a major nuisance in communication systems. They waste user time, may contain scams, and can lead to financial or personal harm. The goal of this project is to develop a machine learning model that classifies SMS messages as Spam or Ham (Not Spam).

## 2. Dataset

Dataset Used: SMS Spam Collection Dataset (UCI Machine Learning Repository). It contains 5,574 messages (4,827 ham, 747 spam). Each record has a label (ham/spam) and a text message.

## 3. Methodology

1. Data Preprocessing: - Text cleaning (lowercasing, removing punctuation, stopwords). - Tokenization & feature extraction using TF-IDF Vectorizer. 2. Model Training: - Logistic Regression (baseline model). - Compared with Multinomial Naive Bayes. 3. Evaluation: - Metrics: Accuracy, Precision, Recall, F1-score.

## 4. Results

Logistic Regression achieved about 97% accuracy, while Naive Bayes achieved about 95% accuracy. Both models are lightweight and work well in real-time classification of SMS messages.

## 5. Tools Used

- Python, Pandas, Numpy, Scikit-learn - Google Colab for training - GitHub for version control and hosting - Command Line Interface (CLI) for demo

## 6. Learning & Conclusion

This project provided hands-on experience in text preprocessing and feature extraction. I learned to apply classification models (Logistic Regression, Naive Bayes) to real-world datasets and evaluate them effectively. The project demonstrated the complete workflow of building an end-to-end machine learning application with a simple user interface.