# Spam Message Detection

Abstract : Unsolicited spam messages pose significant challenges in modern communication networks, leading to inconvenience, financial losses, and privacy concerns. This study addresses the crucial task of **Spam Message detection** and prevention through machine learning techniques, aiming to improve the accuracy and efficiency of filtering systems. The proposed approach leverages mobile network data and message content, analyzing parameters such as message text, sender behavior, and message timing for predictive modeling. Machine learning algorithms, including **Naïve Bayes**, **K-Nearest Neighbors (KNN)**, **Decision Tree**, **Random Forest**, and **Logistic Regression**, are employed to classify messages as spam or non-spam. A comprehensive comparative analysis evaluates the performance of these algorithms based on metrics like **True Positive (TP)** and **False Negative (FN)** rates, visualized through **Confusion Matrices**. Additionally, optimization and regularization techniques are integrated to enhance model accuracy and reliability. Results indicate that Logistic Regression with 98 percent Accuracy achieves superior performance in detecting spam messages, demonstrating the potential of machine learning to significantly strengthen spam filtering systems. This research provides valuable insights for mobile network operators, contributing to the development of more effective spam detection frameworks and safeguarding user experience.

Key Words :

Naïve Bayes, K-Nearest Neighbors (KNN), Decision Tree, Random Forest, and Logistic Regression

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