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(57) Abstract :
ABSTRACT [0011] The exponential growth of digital communication has made email an indispensable tool in both personal and professional contexts. However, this convenience is accompanied by the persistent issue of spam emails, which pose risks ranging from wasted productivity to serious cybersecurity threats. This project focuses on developing an intelligent email spam detection system using Natural Language Processing (NLP) techniques and deep learning models. The objective is to accurately classify email messages as either "spam" or "ham" (non-spam), thereby enhancing the security and reliability of email communication.To achieve this, a comprehensive methodology was adopted starting with data preprocessing. A publicly available labeled email dataset was used, containing examples of spam and ham messages. The dataset was cleaned by retaining only relevant fields, followed by text normalization techniques such as lowercasing, tokenization, and sequence padding. The labels were encoded into binary format for supervised learning. A deep learning model was then constructed using TensorFlow and Keras, incorporating an embedding layer for word representation, an LSTM (Long Short-Term Memory) layer for capturing sequential dependencies in text, and dense layers for final classification. [0012] The model was trained and validated using an 80-20 train-test split. The experimental results demonstrated high accuracy, precision, and recall, indicating the model's strong performance in distinguishing between spam and legitimate emails. The use of LSTM significantly improved the model's ability to understand context and sequence within email content, leading to better classification outcomes. The success of this approach underscores the potential of deep learning in automating spam detection tasks. In future work, this model can be integrated into email clients for real-time filtering or extended to multilingual spam detection scenarios. Overall, the project delivers an effective and scalable solution to the growing problem of email spam.

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