TITLE: BUILDING SMARTER AI POWERED SPAM CLASSIFIER

I Project Overview

In this pre-final year project, we will explore a range of innovative ideas to bolster the capabilities of our AI-powered spam classifier. The project's focus will be on implementing advanced techniques and features that transcend conventional spam classification methods. Below, we outline some of the key innovation ideas

* Project Objectives: The primary objectives of this project are to enhance email security by improving the accuracy of spam classification, minimizing false positives and negatives, and optimizing user engagement in the email security process.
* Challenges Addressed: This project will address several key challenges in email security, including the detection of evolving spam tactics, user-friendly spam management, and email security education.
* Project Significance: In an era of increasing cyber threats, email security is of paramount importance. This project addresses a critical need in protecting users and organizations from email-based attacks, ultimately contributing to a safer digital environment.
* Interdisciplinary Approach: The project embraces an interdisciplinary approach by combining machine learning, natural language processing, cybersecurity, and user experience design to create an all-encompassing email security solution.
* Collaboration and Stakeholders: The project will involve collaboration with cybersecurity experts, machine learning engineers, and user experience designers. Stakeholders include users, organizations, and email service providers.
* Project Timeline: A defined project timeline will be established, encompassing key milestones and deadlines. The timeline ensures that the project progresses efficiently and according to the pre-final year project schedule.
* Project Constraints: Any potential limitations, such as budgetary constraints, resource availability, and technological restrictions, will be acknowledged and addressed in the project plan.
* Project Sustainability: The project will also explore methods for long-term sustainability, including considerations for updates, maintenance, and scalability beyond the pre-final year project.

These additional points provide a more detailed overview of our project, its objectives, challenges, and the collaborative and interdisciplinary nature of the work. They also highlight the significance of our project in addressing pressing email security issues and lay the foundation for the project's timeline and sustainability.

Ii Innovative Ideas for the Project

1. Multimodal Analysis: Incorporate advanced text, image, and attachment analysis to detect spam in various formats.

2. Multilingual Support: Ensure the spam classifier can effectively detect spam in multiple languages, catering to a diverse user base.

3. Personalized Classification: Develop a system that adapts to individual user behavior, customizing spam classification for each user.

4. Blockchain for Sender Verification: Investigate the use of blockchain technology to validate email senders and prevent email spoofing.

5. Behavioral Biometrics: Incorporate behavioral biometrics to identify deviations in user behavior as a means of detecting spam.

6. Zero-Day Threat Detection: Utilize advanced machine learning techniques to identify emerging spam tactics and zero-day threats.

7. Natural Language Understanding: Improve the classifier's ability to understand the context and intent of emails to reduce false positives and negatives.

8. AI-Powered Response Suggestions: Offer AI-generated response suggestions for reported spam, empowering users to take informed actions.

9. Email Fingerprinting: Use email fingerprinting to identify and block known spammers or repeat offenders more effectively.

10. Sentiment Analysis: Analyze email sentiments to detect harmful or manipulative content often present in spam.

Iii Program (code):

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# coding: utf-8

#Naive Bayes

import os

import io

import numpy

from pandas import DataFrame

from sklearn.feature\_extraction.text import CountVectorizer

from sklearn.naive\_bayes import MultinomialNB

#Function to read files (emails) from the local directory

def readFiles(path):

for root, dirnames, filenames in os.walk(path):

for filename in filenames:

path = os.path.join(root, filename)

inBody = False

lines = []

f = io.open(path, 'r', encoding='latin1')

for line in f:

if inBody:

lines.append(line)

elif line == '\n':

inBody = True

f.close()

message = '\n'.join(lines)

yield path, message

def dataFrameFromDirectory(path, classification):

rows = []

index = []

for filename, message in readFiles(path):

rows.append({'message': message, 'class': classification})

index.append(filename)

return DataFrame(rows, index=index)

#An empty dataframe with 'message' and 'class' headers

data = DataFrame({'message': [], 'class': []})

#Including the email details with the spam/ham classification in the dataframe

data = data.append(dataFrameFromDirectory('C:/Users/surya/Desktop/DecemberBreak/Data Science with Python & R/DataScience/DataScience-Python3/emails/spam', 'spam'))

data = data.append(dataFrameFromDirectory('C:/Users/surya/Desktop/DecemberBreak/Data Science with Python & R/DataScience/DataScience-Python3/emails/ham', 'ham'))

data = data.append(dataFrameFromDirectory('C:/Users/surya/Desktop/DecemberBreak/emails/spam', 'spam'))

data = data.append(dataFrameFromDirectory('C:/Users/surya/Desktop/DecemberBreak/emails/ham', 'ham'))

#Head and the Tail of 'data'

data.head()

print(data.tail())

vectoriser = CountVectorizer()

count = vectoriser.fit\_transform(data['message'].values)

print(count)

target = data['class'].values

print(target)

classifier = MultinomialNB()

classifier.fit(count, target)

print(classifier)

exampleInput = ["Hey. This is John Cena. You can't see me", "Free Viagra boys!!", "Please reply to get this offer"]

excount = vectoriser.transform(exampleInput)

print(excount)

prediction = classifier.predict(excount)

print(prediction)

iv output:

(0, 20104) 1 [0->1st sentence; 20104->word id; 1-> no. of times that the word occurs in the sentence]

(0, 15629) 1

(0, 30882) 1

(0, 50553) 1

(0, 36099) 1

(0, 44217) 1

(0, 58467) 1

(0, 51216) 1

(0, 10966) 1

(0, 47038) 1

(0, 46816) 1

(0, 54656) 1

(0, 43219) 2

(0, 16635) 1

(0, 38953) 1

(0, 14434) 1

(0, 16777) 1

(0, 36134) 1

(0, 35030) 1

(0, 46819) 1

(0, 12870) 1

(0, 58727) 1

(0, 22787) 1

(0, 22197) 2