Team ID	**PNT2022TMID26146**
Project Name	**Web Phishing Detection**

1. INTRODUCTION

1.1 Project Overview

Many consumers utilize e-banking to make purchases and payments for goods they find online. There are several e-banking websites that often request sensitive information from users—such as usernames, passwords, and credit card information—for harmful purposes. Phishing websites are this kind of online banking websites. Web service is one of the key communications software services for the Internet. Web phishing is one of many security threats to web services on the Internet.

Common threats of web phishing are: By appearing to be a trustworthy organization, web phishing seeks to obtain sensitive information including usernames, passwords, and credit card numbers, it will result in data leakage and property damage, large businesses may fall victim to various schemes.

The main goal of this project is to develop a machine-learning system to detect phishing websites. In order to detect and predict phishing websites, we proposed a smart, flexible and efficient system that is based on using classification algorithms. We implemented classification algorithms and techniques to extract the phishing datasets criteria to classify their legitimacy.

1.2 Purpose

The main goal of this project is to identify phishing or fake websites that are aiming to obtain or steal valuable information or by creating counterfeit websites and trying to gain user's credentials. This project aids to eliminate the cyber threat risk level and protect valuable corporate and personal data.

2. LITERATURE SURVEY

A literature review is an overview of the previously published works on a specific topic. The purpose of a literature review is to gain an understanding of the existing research and debates relevant to a particular topic or area of study and to present that knowledge in the form of a written report.

2.1 Existing problem

The existing system uses the Classifiers, Fusion Algorithm, and Bayesian Model to detect the phishing sites. The classifiers can classify the text content and image content. Text classifier is to classify the text content and Image classifier is to classify the image content. Bayesian model estimates the threshold value. Fusion Algorithm combines the both classifier results and decides whether the site is phishing or not. The performance of different classifiers based on correct classification ratio, F-score, Matthews’s correlation coefficient, False negative ratio, and False alarm ratio. The threshold value will be decided by the developer only. This leads to the problems like false positive and false negative. False positive means, the probability of being a phishing webpage is greater than the threshold value but that webpage is not a phishing webpage. False negative means, the probability of being a phishing webpage is less than the threshold value but that webpage is a phishing webpage. This results the reduction in security levels. The existing system handles the only one kind of phishing attacks.

If that was a phishing site then the existing system only warns the user. The active and passive warnings Yalavarthi Ravi Theja et al, International Journal of Computer Science and Mobile Computing alone were not enough to control the phishing sites. The active warning gives the user options to close the window or displaying the website. The passive warning displays the popup dialog box.

2.2 References

S. NO	TOPIC	YEAR	DESCRIPTION	AUTHORS	MERITS	DEMERITS
1.	Mitigation of Phishing Attacks	2013	This paper aims at a detection of phishing attacks. A high-level overview of various categoriesof phishing mitigation techniques is also presented, such as: detection, offensive defense, correction and prevention, which we belief is critical to present where the phishing detection techniquesfit in the overall mitigation process.	Mahmoud Khonji, Youssef Iraqi, AndyJones	1.It adds great value to the overall security to an organization 2. Use of different defense approaches.	1.Increased bandwidth demand. 2.The empirical effectiveness of this solution is bot accurately measured.
2.	Phishing Detection using Machine Learning based URL Analysis	2021	This paper tells that we are exposed to greater risks in the form of cybercrimes.URL based phishing attacks are one of the most common threats to the internet-users. The goal is to create a survey resource for researchers to learn and contribute in making phishing detection model that yields more results.	Arathi Krishna v, Anusree A, Blessy Jose, Karthika Anil Kumar, Ojus Thomas Lee	1.Uses performance evaluation metrics and confusion matrix adds value to the accuracy. 2.Effectiveness is ensured by various performance metrics.	1.Choosing the right approach best suited for the specific dataset or application is a challenging task.

3.	Applications of deep learning for phishing detection	2022	Deep neural network and hybrid deep learning provides best performance. This paper aims at phishing detection approaches were develop among which deep learning algorithms provided promising results. This paper address how deep learning algorithms have been used for phishing detection.	Cagatay Catal, GorkemGiray, Bedir Tekinerdogan, SandeepKumar, Suyash Shukla	1.Effective deep learning methods are used in prevention of phishing attacks. 2.Various methods such as Deep Neural Network and Hybrid deep learning.	1.Challenges in calculation of datasets. 2.Modelinter pretability is difficult.
4.	Survey on Phishing Websites Detection using Machine Learning	2022	Machine Learning isan effective method for combating phishing assaults. This paper examinesthe features utilized in detection as well as machine learning based detection approaches.	B.Ravi Raju, Sai Likitha, NDeepa, S Sushma	1.Uses zero-hour attack detection, Language independen cy and accuracy rate ensures phishing detection.	1.It lags in features election mechanism.
5.	A Survey of URL- based PHISHING detection	2019	This paper emphasizes on URL-based phishing detection techniques. It aims to understand the structure of URL based features and surveying their diverse detection techniques and mechanisms. It consists of summary of findings to promote better URL based phishing detection systems.	Eint Sandi Aung, ChawThetZan and Hayato Yamana	1,Use of more than one algorithm ensures accuracy. 2.Effective phishing detection is achieved using different machine learning algorithm.	1.Classificat ion of structured and unstructured dataset is difficult.

6.	Phishing website detection	2014	Phishing is an attempt to steal user's personal information through emails and other messaging services. Various researches have been done to prevent this phishing attack. They include firewalls, blacklisting certain domain and fake website detection.	Feon Jaison, Seenia Francis	1.web browsers have integrated an anticipating filter into browser itself. 2.Atleast one brand of security software has integrated anti-phishing filter.	1.Phishing attacks possess the detection of combination of customer reportage, pots in addition to technique.
7.	Phishing detection: A recent intelligent machine learning comparison based on models content and features	2017	Phishing possesses the characteristic of a singular fraud framework that usesa singular mixture possessed by designed what objective identify is additional advancement to sensitive in addition to data. Phishing attacks are becoming successful possessed by user awareness.	FadiThabtah, Neda Abdelhamid, Hussein Abdel-Jaber	1.Effective when minimal fp rates are required.	1.Mitigation of zero-hour phishing attacks. 2.Excessive queries with heavily loaded servers.

8.	Comparison of Phishing Detection Techniques	2014	Email has popular topic of discussion in today's world. Each month, more &more attacks are launched at the purpose of making web-users believe that they are dealingwith a trusted & reliable entity for the purpose of stealing logon credentials, account information and identity information. This study will help us to build much more strong and robust technique fordetection of phishedemails by combining multiple techniques and getting a better result.	Parth Parmar, Kalpesh Patel	1.It constructs classification models. 2.Mitigate zero-hour attacks.	1.High computation al cost. 2.Higher fp rate than blacklists.
9.	Detection of url based phishing attacks using machine learning	2019	This proposed system predicts the URL based phishingattacks with maximum accuracy. Different machine learning algorithms are used in the proposed system to detect URL based phishing attacks. The hybrid algorithm approach by combining the algorithms will increase accuracy.	Ms.Sophia Shikargar, Dr.S.D.Sawarkar, Mrs.Swati Narwane	1.Accuracy obtained by using different classifiers in the histogram graphical presentation. 2.More secured thanprevious systems.	1.Use of many classifiers give inaccurate result.

2.3 Problem Statement Definition

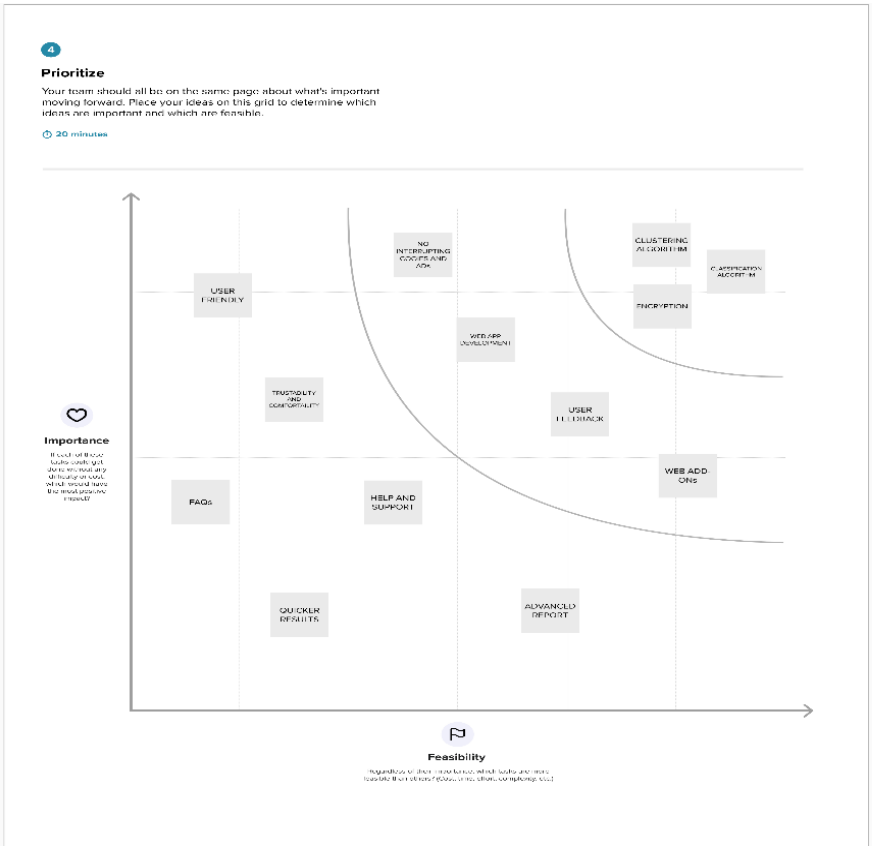
There are many security risks associated with web services on the Internet, including phishing websites. Online shopping and payments are popular among users. Some websites request sensitive information from users, such as usernames, passwords, and credit card numbers, often for malicious purposes. This type of website is known as a phishing website. A proper solution is needed to detect and prevent phishing websites.

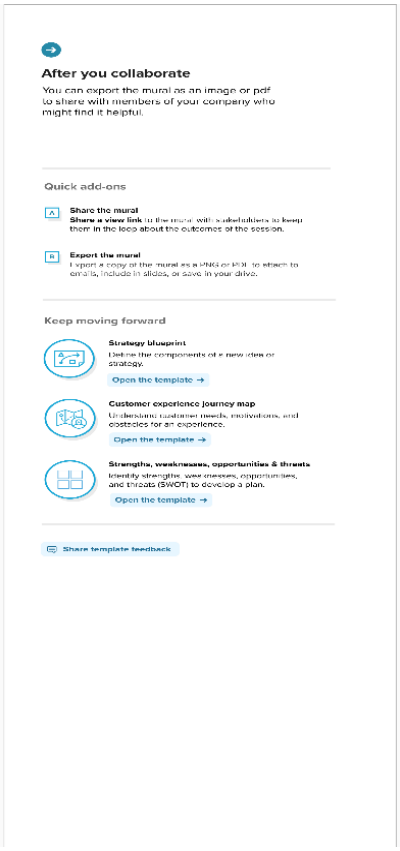
3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

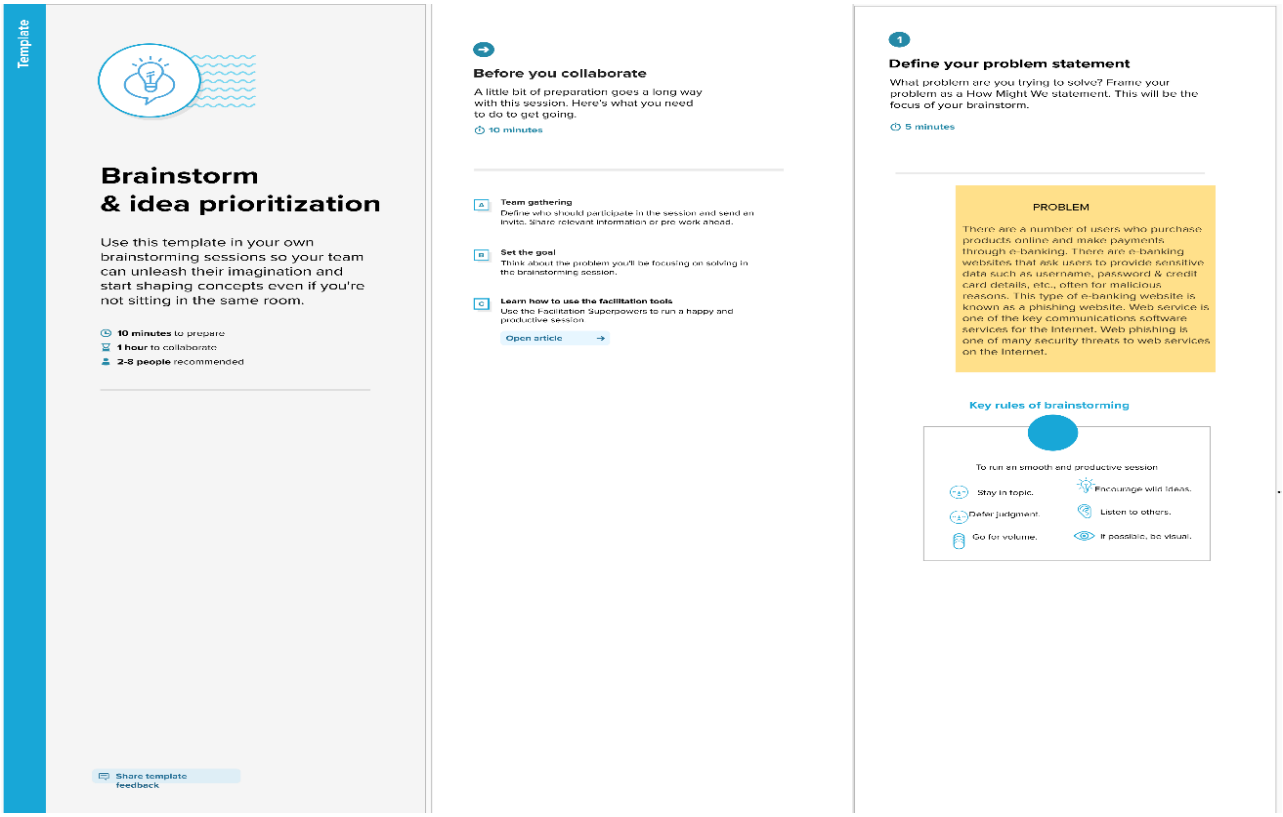
3.2 Ideation & Brainstorming

Step-1: Team Gathering, Collaboration and Select the Problem Statement

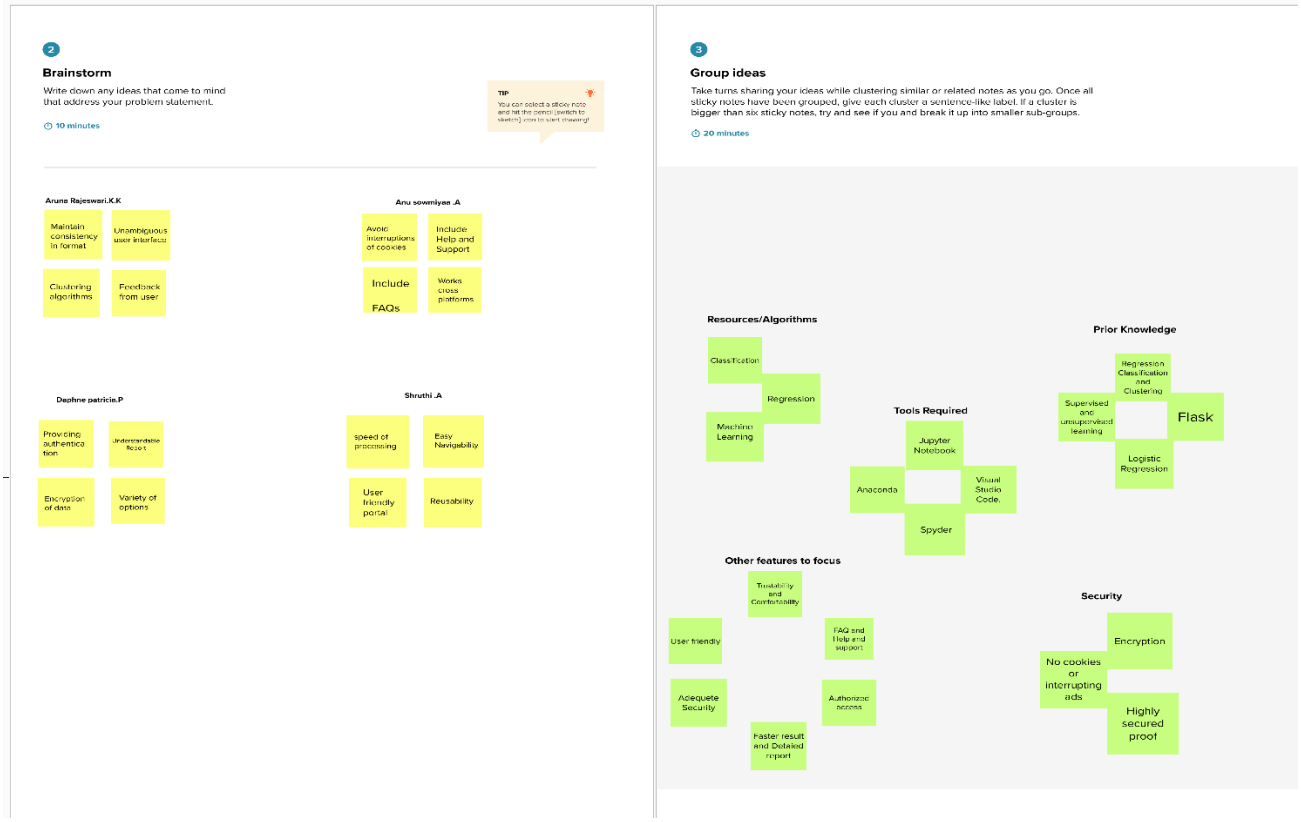




Step-2: Brainstorm, Idea Listing and Grouping



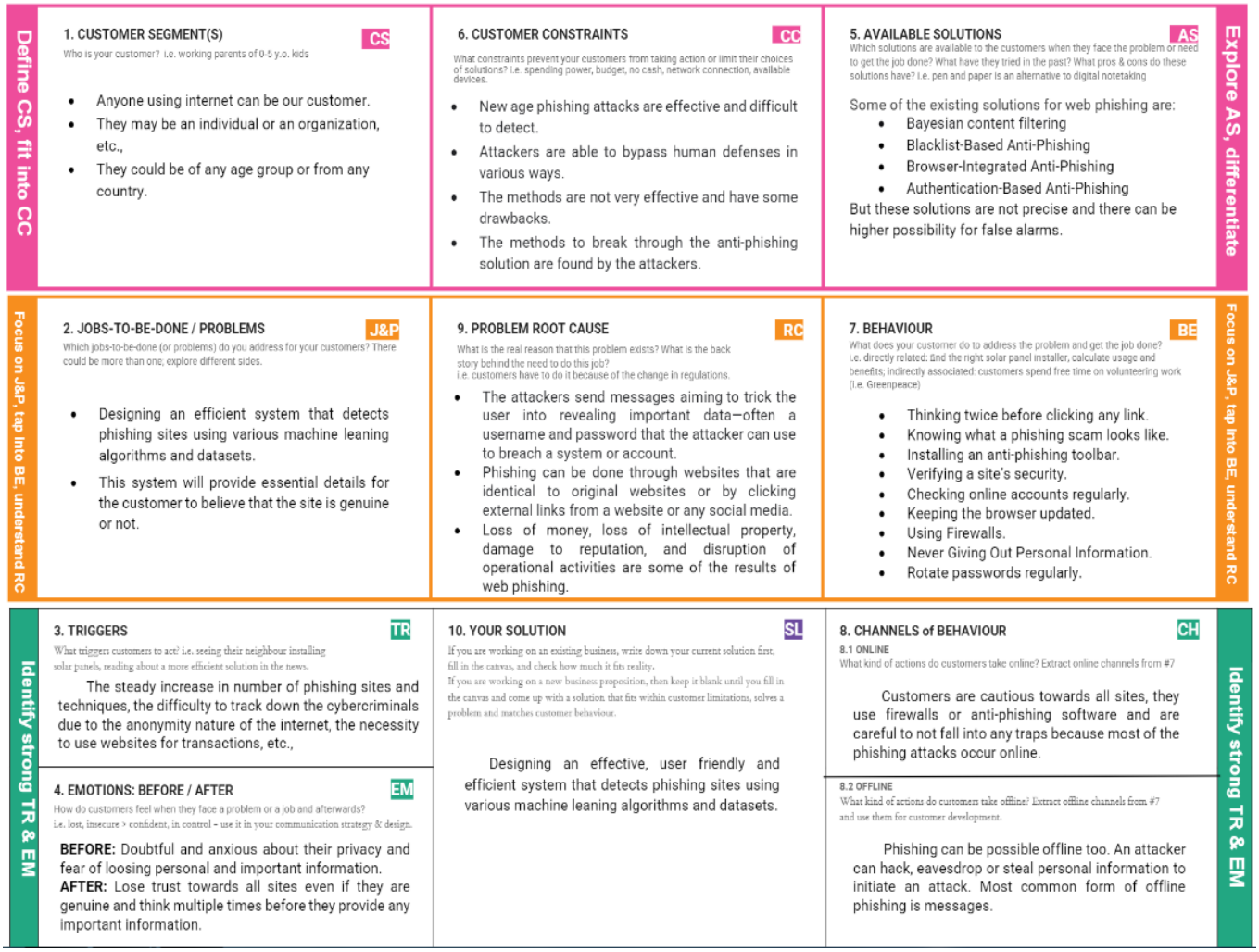
Step-3 Idea Prioritization



3.3 Proposed Solution

S.No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Low detection accuracy plagues novel phishing methods. The blacklist-based approach is the most widely utilized method. Due of the ease of registering a new domain, it has proven ineffective. A perfect up-to-date database cannot be guaranteed by any comprehensive blacklist.
2.	Idea / Solution description	Our solution is to develop an effective and knowledgeable system to identify phishing websites by using a machine learning algorithm that employs classification techniques and algorithms to extract the relevant facts from phishing datasets and categorize their authenticity.
3.	Novelty / Uniqueness	We have carefully analyzed and identified various factors that could be used to detect a phishing site. These elements fall under the domain-based, HTML- and JavaScript-based, address bar-based, and feature categories. With the use of these attributes, we can accurately identify phishing websites.
4.	Social Impact / Customer Satisfaction	By using this application, the customer has the sense of safety whenever he attempts to provide sensitive information to a site.
5.	Business Model (Revenue Model)	By generating leads, we can improve our business model. By detecting the phishing sites, people won't access them which will reduce the revenue of malicious site owners.
6.	Scalability of the Solution	You can use this programme for free online. You can use any browser of your choice to access it. It has high accuracy and can find any site.

3.4 Problem Solution fit



4. REQUIREMENT ANALYSIS

4.1 Functional requirement

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Website Evaluation	The model evaluates the website that has been entered by the user to check whether it is malicious or not.
FR-4	Prediction	The model predicts the malicious website using machine learning algorithms.
FR-5	Authentication-Results	The model predicts the website based on the evaluation results and alerts the user before providing any confidential information

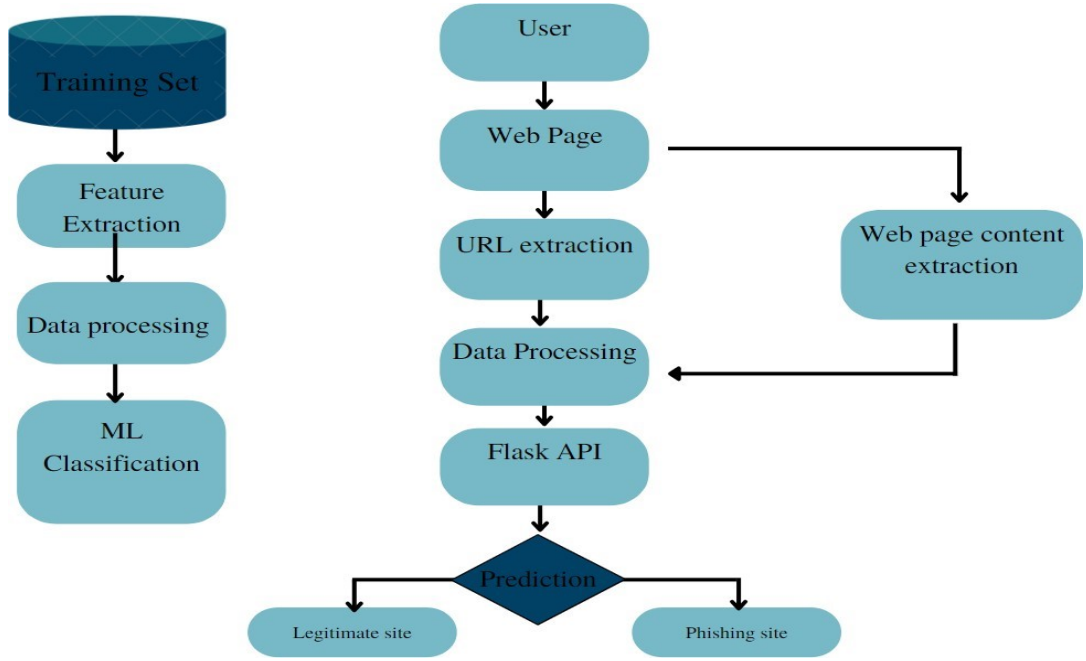
4.2 Non-Functional requirements

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Usability is a quality attribute that assesses how easy user interfaces are to use. In web phishing, users can use the website without any fear of losing their own credentials
NFR-2	Security	Security refers to protecting and securing users'a, networks, and software, from unauthorized access, misuse, theft, information loss, and other security issues. Here, users will be able to access the website without losing confidential data to an unauthorized person.
NFR-3	Reliability	Reliability is the probability that a product, system, or service will perform its intended function adequately for a specified period or will operate in a defined environment without failure. The website should detect phishing websites accurately without confusion.
NFR-4	Performance	Performance defines how fast a software system or a particular piece of it responds to certain users' actions under a certain workload. In most cases, this metric explains how long a user must wait before the target operation happens given the overall number of users now.
NFR-5	Availability	Availability describes how likely the system is accessible to a user at a given point in time. The phishing detection application must be readily available to detect the websites and intimate the user any time. There shouldn't be any delay in terms of responsiveness of web application.
NFR-6	Scalability	Scalability is the ability of the application to handle an increase in workload without performance degradation, or its ability to quickly enlarge. It is the ability to enlarge the architecture to accommodate more users, more processes, more transactions, and additional nodes and services as the business requirements change and as the system evolves to meet the future needs of the business. In web phishing detection, the increase in end users should not lead to decrease in performance. It must also diversify different sources of phishing (emails, websites) from vast number of users.

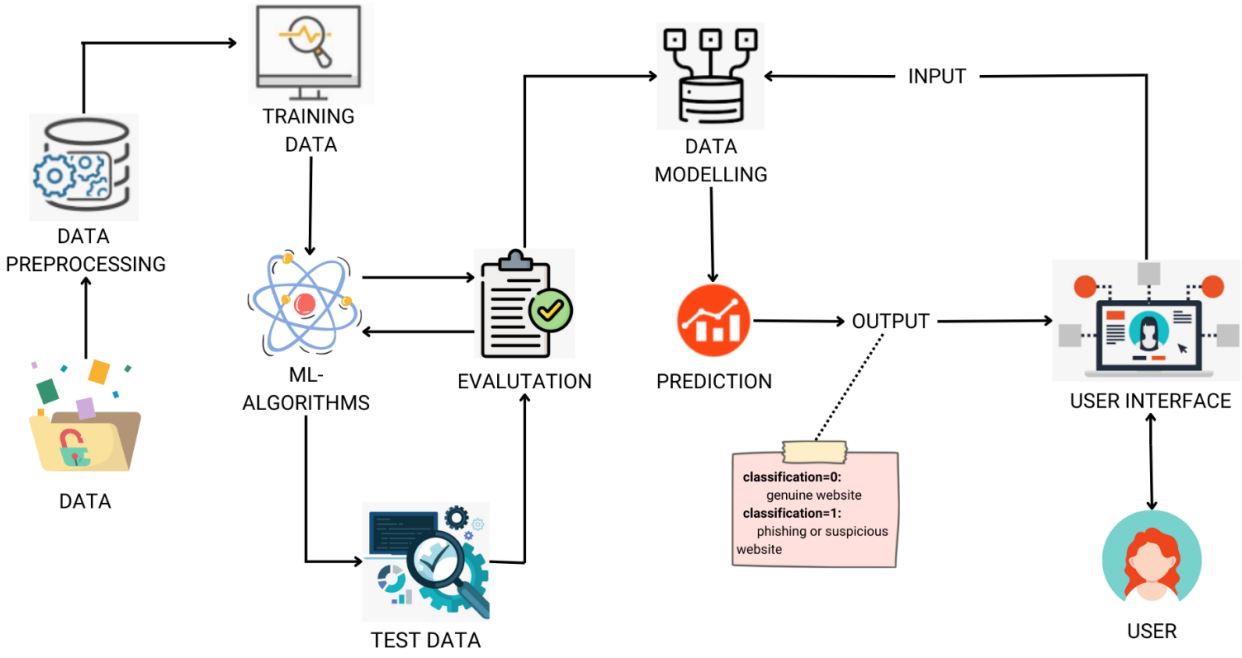
5. PROJECT DESIGN

5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



5.2 Solution & Technical Architecture



5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming the password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard					
Customer (Web user)	User input	USN-1	As a user, I can input the particular URL in the required field and waiting for validation.	I can go access the website without any problem	High	Sprint-1
Customer Care Executive	Feature extraction	USN-1	After I compare in case if none found on comparison then we can extract feature using heuristic and visual similarity approach.	As a User I can have comparison between websites for security.	High	Sprint-1

Administrator	Prediction	USN-1	Here the Model will predict the URL websites using Machine Learning algorithms such as Logistic Regression, KNN	In this I can have correct prediction on the particular algorithms	High	Sprint-1
	Classifier	USN-2	Here I will send all the model output to classifier in order to produce final result.	This will find the correct classifier for producing the result	Medium	Sprint-2

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Product backlog and sprint schedule:

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team members
Sprint-1	Homepage	USN-1	As a user, I can explore the resources of the homepage for the functioning	10	Low	Aruna Rajeswari.K.K, Anu Sowmiyaa.A
Sprint-1		USN-2	As a user, I can learn about the various sides of the web phishing and be aware of the scams	5	High	Daphne Patricia.P, Shruthi.A
Sprint-2	Final page	USN-3	As a user, I can explore the resources of the final page for the functioning	15	Low	Anu Sowmiyaa.A, Shruthi.A
Sprint-3	Prediction	USN-4	As a user, I can predict the URL easily for detecting whether the website is legitimate or not	10	High	Aruna Rajeswari.K.K, Anu Sowmiyaa.A, Daphne Patricia.P Shruthi.A
Sprint-4	Chat	USN-5	As a user, I can share the experience or contact the admin for the support	10	High	Aruna Rajeswari.K.K, Anu Sowmiyaa.A, Daphne Patricia.P, Shruthi.A
Sprint-1	Homepage	USN-6	As a admin, we can design interface and maintain the functioning of the website	5	High	Aruna Rajeswari.K.K, Daphne Patricia.P

Sprint-2	Final page	USN-7	As a admin, we can design the complexity of the website for making it user-friendly	5	Medium	Anu Sowmiyaa.A, Shruthi.A
Sprint-3	Prediction	USN-8	As a admin, we can use various ML classifier model for the accurate result for the detection of URL	10	High	Aruna Rajeswari.K.K, Anu Sowmiyaa.A, Daphne Patricia.P, Shruthi.A
Sprint-4	Chat	USN-9	As a admin, we can response to the user message for improvement of the website	10	Medium	Anu Sowmiyaa.A, Daphne Patricia.P

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	12 Nov 2022

Velocity:

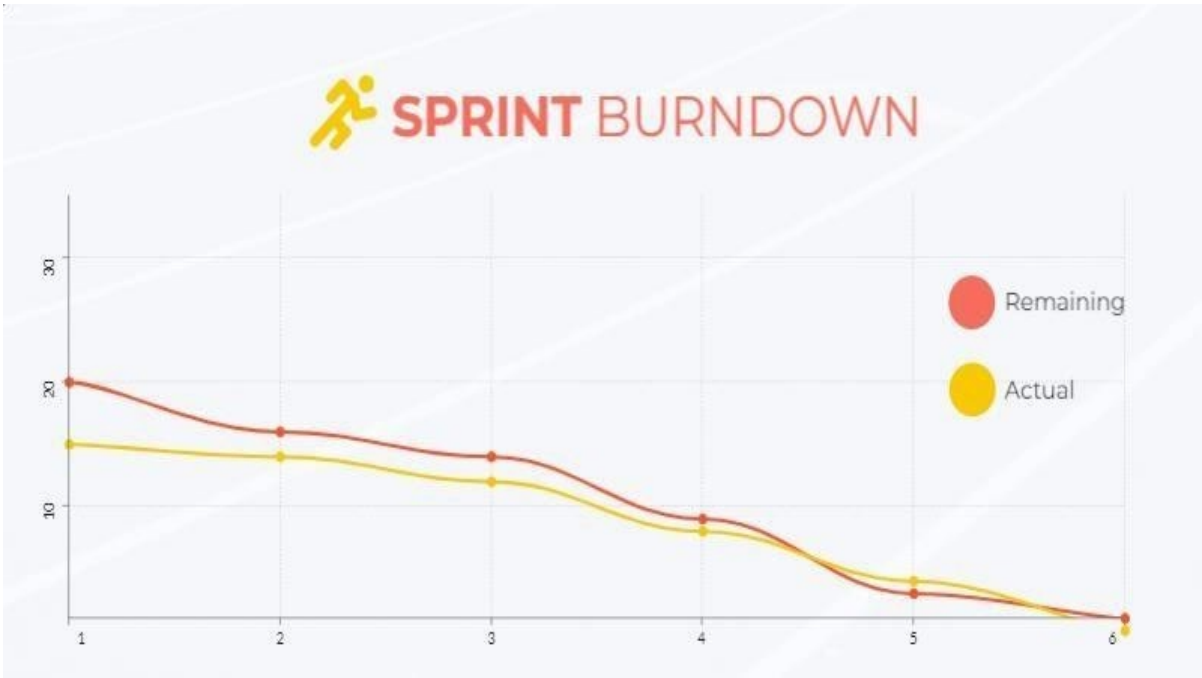
Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

We have a 6-day sprint duration, and the velocity of the team is 20 (points per sprint). So our team's average velocity (AV) per iteration unit (story points per day)

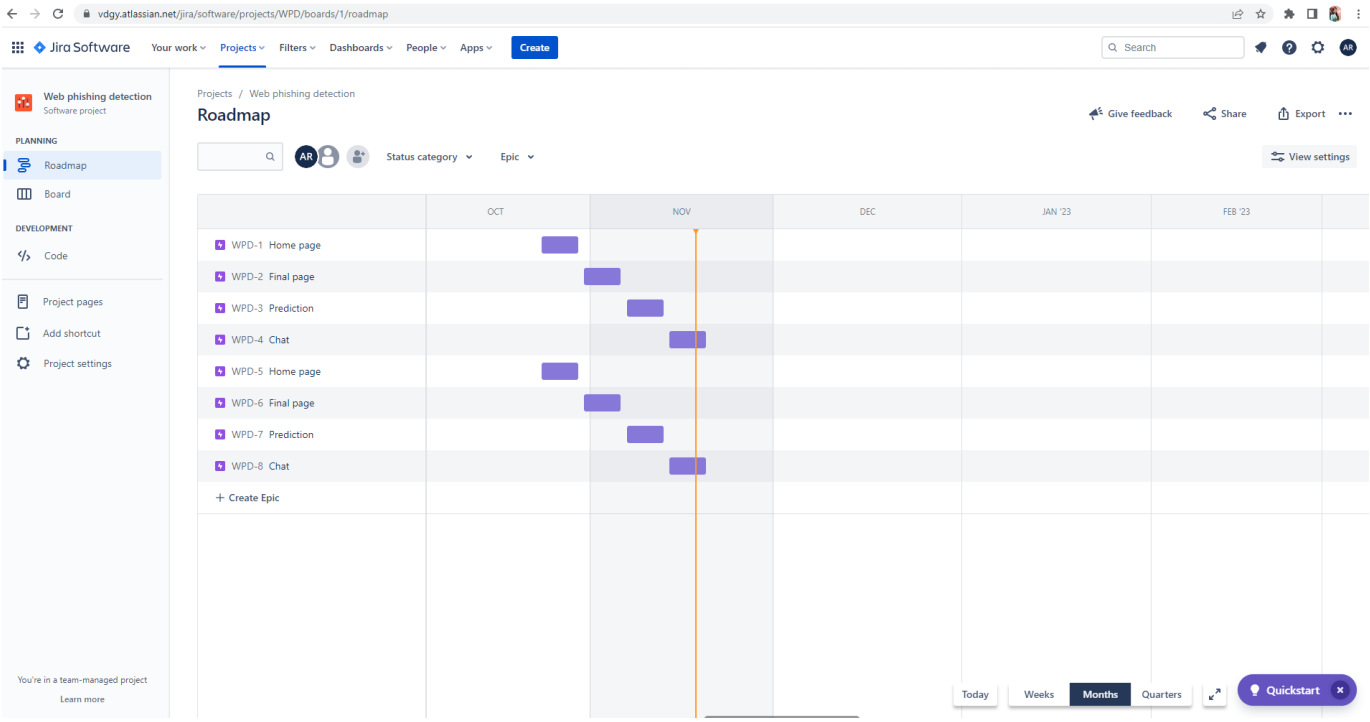
$$AV = (\text{Sprint Duration} / \text{Velocity}) = 20 / 6 = 3.33$$

Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



6.3 Reports from JIRA



7. CODING & SOLUTIONING

CODE:

7.1 feature.py

```
import ipaddress
import re
from urllib import response
import urllib.request
from bs4 import BeautifulSoup
import socket
import requests
from googlesearch import search
import whois
from datetime import date, datetime
import time
from dateutil.parser import parse as date_parse
from urllib.parse import urlparse

class FeatureExtraction:
    features = []
    def __init__(self,url):
        self.features = []
        self.url = url
        self.domain = ""
        self.whois_response = ""
        self.urlparse = ""
        self.response = ""
        self.soup = ""

        try:
            self.response = requests.get(url)
            self.soup = BeautifulSoup(response.text, 'html.parser')
        except:
            pass

        try:
            self.urlparse = urlparse(url)
            self.domain = self.urlparse.netloc
        except:
            pass

        try:
            self.whois_response = whois.whois(self.domain)
        except:
            pass
```

```
    self.features.append(self.UsingIp())
    self.features.append(self.longUrl())
    self.features.append(self.shortUrl())
    self.features.append(self.symbol())
    self.features.append(self.redirecting())
    self.features.append(self.prefixSuffix())
    self.features.append(self.SubDomains())
    self.features.append(self.Hppts())
    self.features.append(self.DomainRegLen())
    self.features.append(self.Favicon())


    self.features.append(self.NonStdPort())
    self.features.append(self.HTTPSDomainURL())
    self.features.append(self.RequestURL())
    self.features.append(self.AnchorURL())
    self.features.append(self.LinksInScriptTags())
    self.features.append(self.ServerFormHandler())
    self.features.append(self.InfoEmail())
    self.features.append(self.AbnormalURL())
    self.features.append(self.WebsiteForwarding())
    self.features.append(self.StatusBarCust())

    self.features.append(self.DisableRightClick())
    self.features.append(self.UsingPopupWindow())
    self.features.append(self.IframeRedirection())
    self.features.append(self.AgeofDomain())
    self.features.append(self.DNSRecording())
    self.features.append(self.WebsiteTraffic())
    self.features.append(self.PageRank())
    self.features.append(self.GoogleIndex())
    self.features.append(self.LinksPointingToPage())
    self.features.append(self.StatsReport())


 # 1.UsingIp
def UsingIp(self):
    try:
        ipaddress.ip_address(self.url)
        return -1
    except:
        return 1

# 2.longUrl
def longUrl(self):
    if len(self.url) < 54:
```

```
            return 1
        if len(self.url) >= 54 and len(self.url) <= 75:
            return 0
        return -1

    # 3.shortUrl
    def shortUrl(self):
        match = re.search('bit\.ly|goo\.gl|shorte\.st|go2l\.ink|x\.co|ow\.ly|t\.co|tinyurl|tr\.im|is\.gd|cli\.gs|'
                    'yfrog\.com|migre\.me|ff\.im|tiny\.cc|url4\.eu|twit\.ac|su\.pr|twurl\.nl|snipurl\.com|'
                    'short\.to|BudURL\.com|ping\.fm|post\.ly|Just\.as|bkite\.com|snipr\.com|fic\.kr|loopt\.us|'
                    'doiop\.com|short\.ie|kl\.am|wp\.me|rubyurl\.com|om\.ly|to\.ly|bit\.do|t\.co|lnkd\.in|'
                    'db\.tt|qr\.ae|adf\.ly|goo\.gl|bitly\.com|cur\.lv|tinyurl\.com|ow\.ly|bit\.ly|ity\.im|'
                    'q\.gs|is\.gd|po\.st|bc\.vc|twitthis\.com|u\.to|j\.mp|buzurl\.com|cutt\.us|u\.bb|yourls\.org|'

'x\.co|prettylinkpro\.com|scrnch\.me|filoops\.info|vzturl\.com|qr\.net|1url\.com|tweez\.me|v\.gd|tr\.im|link\.zip\.net',
self.url)
        if match:
            return -1
        return 1

    # 4.Symbol@
    def symbol(self):
        if re.findall("@",self.url):
            return -1
        return 1

    # 5.Redirecting//
    def redirecting(self):
        if self.url.rfind('//')>6:
            return -1
        return 1

    # 6.prefixSuffix
    def prefixSuffix(self):
        try:
            match = re.findall('\-', self.domain)
            if match:
                return -1
            return 1
        except:
            return -1

    # 7.SubDomains
    def SubDomains(self):
        dot_count = len(re.findall("\.", self.url))
        if dot_count == 1:
            return 1
        elif dot_count == 2:
```

```
        return 0
    return -1

# 8.HTTPS
def Hppts(self):
    try:
        https = self.urlparse.scheme
        if 'https' in https:
            return 1
        return -1
    except:
        return 1

# 9.DomainRegLen
def DomainRegLen(self):
    try:
        expiration_date = self.whois_response.expiration_date
        creation_date = self.whois_response.creation_date
        try:
            if(len(expiration_date)):
                expiration_date = expiration_date[0]
        except:
            pass
        try:
            if(len(creation_date)):
                creation_date = creation_date[0]
        except:
            pass

        age = (expiration_date.year-creation_date.year)*12+ (expiration_date.month-creation_date.month)
        if age >=12:
            return 1
        return -1
    except:
        return -1

# 10. Favicon
def Favicon(self):
    try:
        for head in self.soup.find_all('head'):
            for head.link in self.soup.find_all('link', href=True):
                dots = [x.start(0) for x in re.finditer('\.', head.link['href'])]
                if self.url in head.link['href'] or len(dots) == 1 or domain in head.link['href']:
                    return 1
        return -1
    except:
        return -1
```

```
# 11. NonStdPort
def NonStdPort(self):
    try:
        port = self.domain.split(":")
        if len(port)>1:
            return -1
        return 1
    except:
        return -1

# 12. HTTPSDomainURL
def HTTPSDomainURL(self):
    try:
        if 'https' in self.domain:
            return -1
        return 1
    except:
        return -1

# 13. RequestURL
def RequestURL(self):
    try:
        for img in self.soup.find_all('img', src=True):
            dots = [x.start(0) for x in re.finditer('\.', img['src'])]
            if self.url in img['src'] or self.domain in img['src'] or len(dots) == 1:
                success = success + 1
            i = i+1

        for audio in self.soup.find_all('audio', src=True):
            dots = [x.start(0) for x in re.finditer('\.', audio['src'])]
            if self.url in audio['src'] or self.domain in audio['src'] or len(dots) == 1:
                success = success + 1
            i = i+1

        for embed in self.soup.find_all('embed', src=True):
            dots = [x.start(0) for x in re.finditer('\.', embed['src'])]
            if self.url in embed['src'] or self.domain in embed['src'] or len(dots) == 1:
                success = success + 1
            i = i+1

        for iframe in self.soup.find_all('iframe', src=True):
            dots = [x.start(0) for x in re.finditer('\.', iframe['src'])]
            if self.url in iframe['src'] or self.domain in iframe['src'] or len(dots) == 1:
                success = success + 1
            i = i+1

        try:
            percentage = success/float(i) * 100
```

```
            if percentage < 22.0:
                return 1
            elif((percentage >= 22.0) and (percentage < 61.0)):
                return 0
            else:
                return -1
        except:
            return 0
    except:
        return -1

# 14. AnchorURL
def AnchorURL(self):
    try:
        i,unsafe = 0,0
        for a in self.soup.find_all('a', href=True):
            if "#" in a['href'] or "javascript" in a['href'].lower() or "mailto" in a['href'].lower() or not (url in a['href'] or self.domain in a['href']):
                unsafe = unsafe + 1
            i = i + 1

        try:
            percentage = unsafe / float(i) * 100
            if percentage < 31.0:
                return 1
            elif ((percentage >= 31.0) and (percentage < 67.0)):
                return 0
            else:
                return -1
        except:
            return -1

    except:
        return -1

# 15. LinksInScriptTags
def LinksInScriptTags(self):
    try:
        i,success = 0,0

        for link in self.soup.find_all('link', href=True):
            dots = [x.start(0) for x in re.finditer('\.', link['href'])]
            if self.url in link['href'] or self.domain in link['href'] or len(dots) == 1:
                success = success + 1
            i = i+1

        for script in self.soup.find_all('script', src=True):
            dots = [x.start(0) for x in re.finditer('\.', script['src'])]
```

```
            if self.url in script['src'] or self.domain in script['src'] or len(dots) == 1:
                success = success + 1
            i = i+1

        try:
            percentage = success / float(i) * 100
            if percentage < 17.0:
                return 1
            elif((percentage >= 17.0) and (percentage < 81.0)):
                return 0
            else:
                return -1
        except:
            return 0
    except:
        return -1

# 16. ServerFormHandler
def ServerFormHandler(self):
    try:
        if len(self.soup.find_all('form', action=True))==0:
            return 1
        else :
            for form in self.soup.find_all('form', action=True):
                if form['action'] == "" or form['action'] == "about:blank":
                    return -1
                elif self.url not in form['action'] and self.domain not in form['action']:
                    return 0
                else:
                    return 1
    except:
        return -1

# 17. InfoEmail
def InfoEmail(self):
    try:
        if re.findall(r"[mail\(\)|mailto:?]", self.soap):
            return -1
        else:
            return 1
    except:
        return -1

# 18. AbnormalURL
def AbnormalURL(self):
    try:
        if self.response.text == self.whois_response:
            return 1
```

```
        else:
            return -1
    except:
        return -1

# 19. WebsiteForwarding
def WebsiteForwarding(self):
    try:
        if len(self.response.history) <= 1:
            return 1
        elif len(self.response.history) <= 4:
            return 0
        else:
            return -1
    except:
        return -1

# 20. StatusBarCust
def StatusBarCust(self):
    try:
        if re.findall("<script>.+onmouseover.+</script>", self.response.text):
            return 1
        else:
            return -1
    except:
        return -1

# 21. DisableRightClick
def DisableRightClick(self):
    try:
        if re.findall(r"event.button ?== ?2", self.response.text):
            return 1
        else:
            return -1
    except:
        return -1

# 22. UsingPopupWindow
def UsingPopupWindow(self):
    try:
        if re.findall(r"alert\(", self.response.text):
            return 1
        else:
            return -1
    except:
        return -1

# 23. IframeRedirection
```

```
def IframeRedirection(self):
    try:
        if re.findall(r"[<iframe>|<frameBorder>]", self.response.text):
            return 1
        else:
            return -1
    except:
         return -1

# 24. AgeofDomain
def AgeofDomain(self):
    try:
        creation_date = self.whois_response.creation_date
        try:
            if(len(creation_date)):
                creation_date = creation_date[0]
        except:
            pass

        today  = date.today()
        age = (today.year-creation_date.year)*12+(today.month-creation_date.month)
        if age >=6:
            return 1
        return -1
    except:
        return -1

# 25. DNSRecording
def DNSRecording(self):
    try:
        creation_date = self.whois_response.creation_date
        try:
            if(len(creation_date)):
                creation_date = creation_date[0]
        except:
            pass

        today  = date.today()
        age = (today.year-creation_date.year)*12+(today.month-creation_date.month)
        if age >=6:
            return 1
        return -1
    except:
        return -1

# 26. WebsiteTraffic
def WebsiteTraffic(self):
    try:
```

```
            rank = BeautifulSoup(urllib.request.urlopen("http://data.alexa.com/data?cli=10&dat=s&url=" + url).read(),
"xml").find("REACH")['RANK']
            if (int(rank) < 100000):
                return 1
            return 0
        except :
            return -1

    # 27. PageRank
    def PageRank(self):
        try:
                        prank_checker_response  =  requests.post("https://www.checkpagerank.net/index.php",  {"name":
self.domain})

            global_rank = int(re.findall(r"Global Rank: ([0-9]+)", rank_checker_response.text)[0])
            if global_rank > 0 and global_rank < 100000:
                return 1
            return -1
        except:
            return -1


    # 28. GoogleIndex
    def GoogleIndex(self):
        try:
            site = search(self.url, 5)
            if site:
                return 1
            else:
                return -1
        except:
            return 1

    # 29. LinksPointingToPage
    def LinksPointingToPage(self):
        try:
            number_of_links = len(re.findall(r"<a href=", self.response.text))
            if number_of_links == 0:
                return 1
            elif number_of_links <= 2:
                return 0
            else:
                return -1
        except:
            return -1

    # 30. StatsReport
    def StatsReport(self):
```

```
        try:
            url_match = re.search(
        'at\.ua|usa\.cc|baltazarpresentes\.com\.br|pe\.hu|esy\.es|hol\.es|sweddy\.com|myjino\.ru|96\.lt|ow\.ly', url)
            ip_address = socket.gethostbyname(self.domain)
                                                                                ip_match =
re.search('146\.112\.61\.108|213\.174\.157\.151|121\.50\.168\.88|192\.185\.217\.116|78\.46\.211\.158|181\.174\.165\.13|46\.242\.145\.103|121\.50\.168\.40|83\.125\.22\.219|46\.242\.145\.98|'

'107\.151\.148\.44|107\.151\.148\.107|64\.70\.19\.203|199\.184\.144\.27|107\.151\.148\.108|107\.151\.148\.109|119\.28\.52\.61|54\.83\.43\.69|52\.69\.166\.231|216\.58\.192\.225|'

'118\.184\.25\.86|67\.208\.74\.71|23\.253\.126\.58|104\.239\.157\.210|175\.126\.123\.219|141\.8\.224\.221|10\.10\.10\.10|43\.229\.108\.32|103\.232\.215\.140|69\.172\.201\.153|'

'216\.218\.185\.162|54\.225\.104\.146|103\.243\.24\.98|199\.59\.243\.120|31\.170\.160\.61|213\.19\.128\.77|62\.113\.226\.131|208\.100\.26\.234|195\.16\.127\.102|195\.16\.127\.157|'

'34\.196\.13\.28|103\.224\.212\.222|172\.217\.4\.225|54\.72\.9\.51|192\.64\.147\.141|198\.200\.56\.183|23\.253\.164\.103|52\.48\.191\.26|52\.214\.197\.72|87\.98\.255\.18|209\.99\.17\.27|'

'216\.38\.62\.18|104\.130\.124\.96|47\.89\.58\.141|78\.46\.211\.158|54\.86\.225\.156|54\.82\.156\.19|37\.157\.192\.102|204\.11\.56\.48|110\.34\.231\.42', ip_address)
            if url_match:
                return -1
            elif ip_match:
                return -1
            return 1
        except:
            return 1

    def getFeaturesList(self):
        return self.features
```

7.2 app.py

```
#importing required libraries

from flask import Flask, request, render_template
import numpy as np
import pandas as pd
from sklearn import metrics
import warnings
import pickle
warnings.filterwarnings('ignore')
from feature import FeatureExtraction

file = open("pickle/model.pkl","rb")
gbc = pickle.load(file)
file.close()
```

```
app = Flask(__name__)

@app.route("/", methods=["GET", "POST"])
def index():
    if request.method == "POST":
        url = request.form["url"]
        obj = FeatureExtraction(url)
        x = np.array(obj.getFeaturesList()).reshape(1,30)
        y_pred =gbc.predict(x)[0]
        #1 is safe
        #-1 is unsafe
        y_pro_phishing = gbc.predict_proba(x)[0,0]
        y_pro_non_phishing = gbc.predict_proba(x)[0,1]
        # if(y_pred ==1 ):
        pred = "It is {0:.2f} % safe to go ".format(y_pro_phishing*100)
        return render_template('index.html',xx =round(y_pro_non_phishing,2),url=url )
    return render_template("index.html", xx =-1)


if __name__ == "__main__":
    app.run(debug=True)
```

7.3 Main.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta name="description" content="This website is develop for identify the safety of url.">
    <meta name="keywords" content="phishing url,phishing,cyber security,machine learning,classifier,python">
    <meta name="author" content="VAIBHAV BICHAVE">

    <!-- BootStrap -->
    <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.0/css/bootstrap.min.css"
        integrity="sha384-9aIt2nRpC12Uk9gS9baDl411NQApFmC26EwAOH8WgZl5MYYxFfc+NcPb1dKGj7Sk"
crossorigin="anonymous">

    <link href="static/styles.css" rel="stylesheet">
    <title>URL detection</title>

</head>

<body>
<div class=" container">
    <div class="row">
        <div class="form col-md" id="form1">
```

```
        <h2>PHISHING URL DETECTION</h2>

        <br>
        <form action="/" method ="post">
            <input type="text" class="form__input" name ='url' id="url" placeholder="Enter URL" required="" />
            <label for="url" class="form__label">URL</label>
            <button class="button" role="button" >Check</button>
        </form>

    </div>

    <div class="col-md" id="form2">

        <br>
        <h6 class = "right "><a href= {{ url }} target="_blank">{{ url }}</a></h6>

        <br>
        <h3 id="prediction"></h3>
          <button class="button2" id="button2" role="button" onclick="window.open('{{url}}')" target="_blank" >Still want to Continue</button>
                        <button class="button1" id="button1" role="button" onclick="window.open('{{url}}')" target="_blank">Continue</button>
    </div>
</div>
<br>

</div>

    <!-- JavaScript -->
    <script src="https://code.jquery.com/jquery-3.5.1.slim.min.js"
        integrity="sha384-DfXdz2htPH0lsSSs5nCTpuj/zy4C+OGpamoFVy38MVBnE+IbbVYUew+OrCXaRkfj"
        crossorigin="anonymous"></script>
    <script src="https://cdn.jsdelivr.net/npm/popper.js@1.16.0/dist/umd/popper.min.js"
        integrity="sha384-Q6E9RHvbIyZFJoft+2mJbHaEWldlvI9IOYy5n3zV9zzTtmI3UksdQRVvoxMfooAo"
        crossorigin="anonymous"></script>
    <script src="https://stackpath.bootstrapcdn.com/bootstrap/4.5.0/js/bootstrap.min.js"
        integrity="sha384-OgVRvuATP1z7JjHLkuOU7Xw704+h835Lr+6QL9UvYjZE3Ipu6Tp75j7Bh/kR0JKI"
        crossorigin="anonymous"></script>


    <script>

            let x = '{{xx}}';
            let num = x*100;
            if (0<=x && x<0.50){
                num = 100-num;
            }
            let txtx = num.toString();
```

```
        if(x<=1 && x>=0.50){
            var label = "Website is "+txtx +"% safe to use...";
            document.getElementById("prediction").innerHTML = label;
            document.getElementById("button1").style.display="block";
        }
        else if (0<=x && x<0.50){
            var label = "Website is "+txtx +"% unsafe to use..."
            document.getElementById("prediction").innerHTML = label ;
            document.getElementById("button2").style.display="block";
        }

    </script>

 </body>

</html>
```

7.4 style.css

```
*,
*::after,
*::before {
  margin: 0;
  padding: 0;
  box-sizing: inherit;
  font-size: 62,5%; }

body {
    padding: 10% 5%;
    background: #3E4D5B;
    justify-content: center;
    align-items: center;
    height: 100vh;
    color: #fff;
}

.form__label {
  font-family: 'Roboto', sans-serif;
  font-size: 1.2rem;
  margin-left: 2rem;
  margin-top: 0.7rem;
  display: block;
  transition: all 0.3s;
  transform: translateY(0rem);
}

.form__input {
  top: -24px;
```

```
  font-family: 'Roboto', sans-serif;
  color: #333;
  font-size: 1.2rem;
  padding: 1.5rem 2rem;
  border-radius: 0.2rem;
  background-color: rgb(255, 255, 255);
  border: none;
  width: 75%;
  display: block;
  border-bottom: 0.3rem solid transparent;
  transition: all 0.3s;
}

.form__input:placeholder-shown + .form__label {
  opacity: 0;
  visibility: hidden;
  -webkit-transform: translateY(+4rem);
  transform: translateY(+4rem);
}


.button {
  appearance: button;
  background-color: transparent;
  background-image: linear-gradient(to bottom, #fff, #f8eedb);
  border: 0 solid #e5e7eb;
  border-radius: .5rem;
  box-sizing: border-box;
  color: #482307;
  column-gap: 1rem;
  cursor: pointer;
  display: flex;
    font-family:  ui-sans-serif,system-ui,-apple-system,system-ui,"Segoe  UI",Roboto,"Helvetica  Neue",Arial,"Noto Sans",sans-serif,"Apple Color Emoji","Segoe UI Emoji","Segoe UI Symbol","Noto Color Emoji";
  font-size: 100%;
  font-weight: 700;
  line-height: 24px;
  margin: 0;
  outline: 2px solid transparent;
  padding: 1rem 1.5rem;
  text-align: center;
  text-transform: none;
  transition: all .1s cubic-bezier(.4, 0, .2, 1);
  user-select: none;
  -webkit-user-select: none;
  touch-action: manipulation;
  box-shadow: -6px 8px 10px rgba(81,41,10,0.1),0px 2px 2px rgba(81,41,10,0.2);
}
```

```
.button:active {
  background-color: #f3f4f6;
  box-shadow: -1px 2px 5px rgba(81,41,10,0.15),0px 1px 1px rgba(81,41,10,0.15);
  transform: translateY(0.125rem);
}

.button:focus {
  box-shadow: rgba(72, 35, 7, .46) 0 0 0 4px, -6px 8px 10px rgba(81,41,10,0.1), 0px 2px 2px rgba(81,41,10,0.2);
}


.main-body{
  display: flex;
  flex-direction: row;
  width: 75%;
  justify-content:space-around;
}

.button1{
  appearance: button;
  background-color: transparent;
  background-image: linear-gradient(to bottom, rgb(160, 245, 174), #37ee65);
  border: 0 solid #e5e7eb;
  border-radius: .5rem;
  box-sizing: border-box;
  color: #482307;
  column-gap: 1rem;
  cursor: pointer;
  display: flex;
    font-family:  ui-sans-serif,system-ui,-apple-system,system-ui,"Segoe  UI",Roboto,"Helvetica  Neue",Arial,"Noto Sans",sans-serif,"Apple Color Emoji","Segoe UI Emoji","Segoe UI Symbol","Noto Color Emoji";
  font-size: 100%;
  font-weight: 700;
  line-height: 24px;
  margin: 0;
  outline: 2px solid transparent;
  padding: 1rem 1.5rem;
  text-align: center;
  text-transform: none;
  transition: all .1s cubic-bezier(.4, 0, .2, 1);
  user-select: none;
  -webkit-user-select: none;
  touch-action: manipulation;
  box-shadow: -6px 8px 10px rgba(81,41,10,0.1),0px 2px 2px rgba(81,41,10,0.2);
  display: none;
}
```

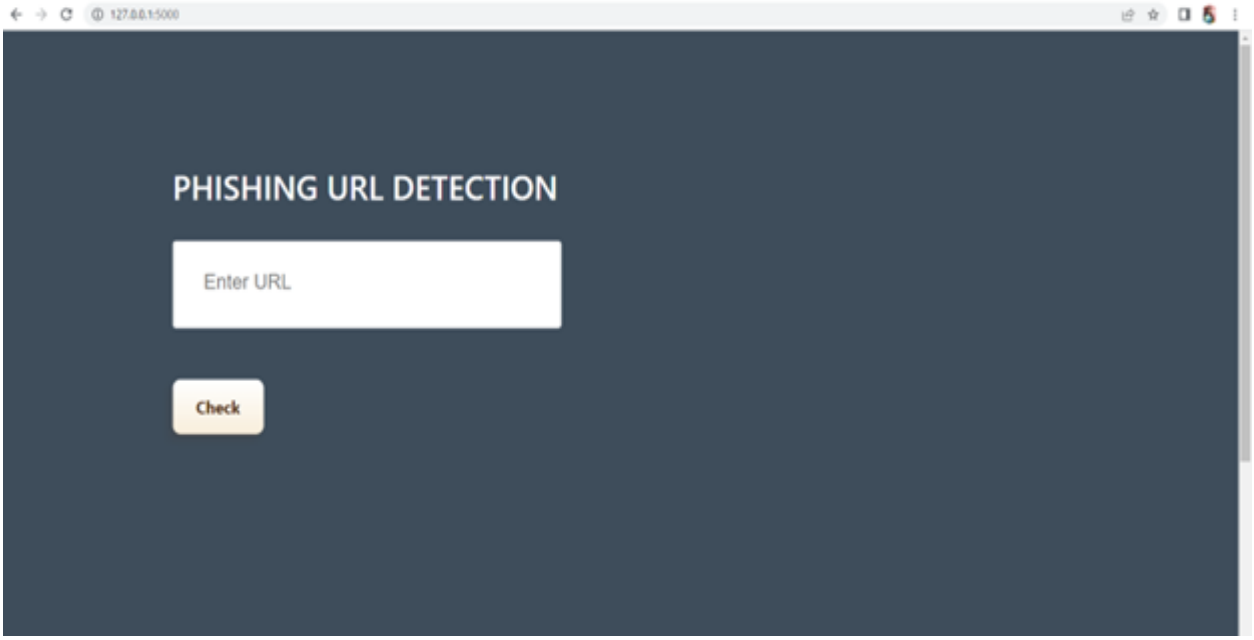
```
.button2{
  appearance: button;
  background-color: transparent;
  background-image: linear-gradient(to bottom, rgb(252, 162, 162), #ee3737);
  border: 0 solid #e5e7eb;
  border-radius: .5rem;
  box-sizing: border-box;
  color: #482307;
  column-gap: 1rem;
  cursor: pointer;
  display: flex;
     font-family:  ui-sans-serif,system-ui,-apple-system,system-ui,"Segoe  UI",Roboto,"Helvetica  Neue",Arial,"Noto Sans",sans-serif,"Apple Color Emoji","Segoe UI Emoji","Segoe UI Symbol","Noto Color Emoji";
  font-size: 100%;
  font-weight: 700;
  line-height: 24px;
  margin: 0;
  outline: 2px solid transparent;
  padding: 1rem 1.5rem;
  text-align: center;
  text-transform: none;
  transition: all .1s cubic-bezier(.4, 0, .2, 1);
  user-select: none;
  -webkit-user-select: none;
  touch-action: manipulation;
  box-shadow: -6px 8px 10px rgba(81,41,10,0.1),0px 2px 2px rgba(81,41,10,0.2);
  display: none;
}
.right {
  right: 0px;
  width: 300px;
}

@media (max-width: 576px) {
  .form {
    width: 100%;
  }
 }
.abc{
  width: 50%;
}
```

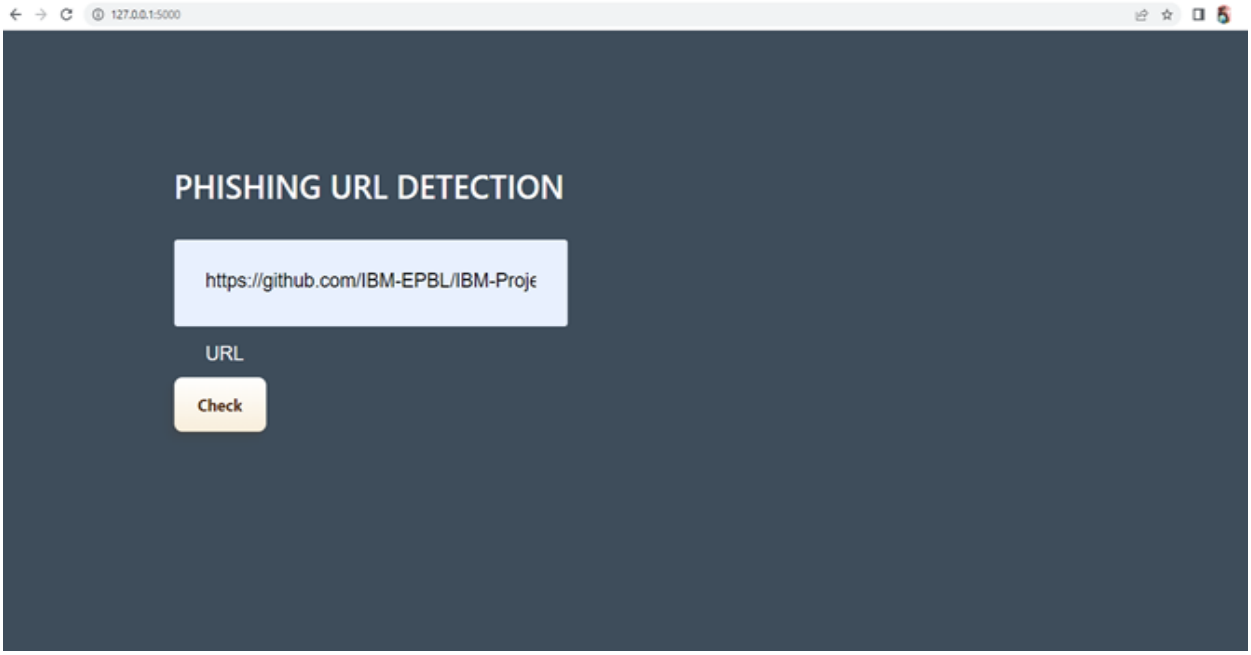
SOLUTIONING:

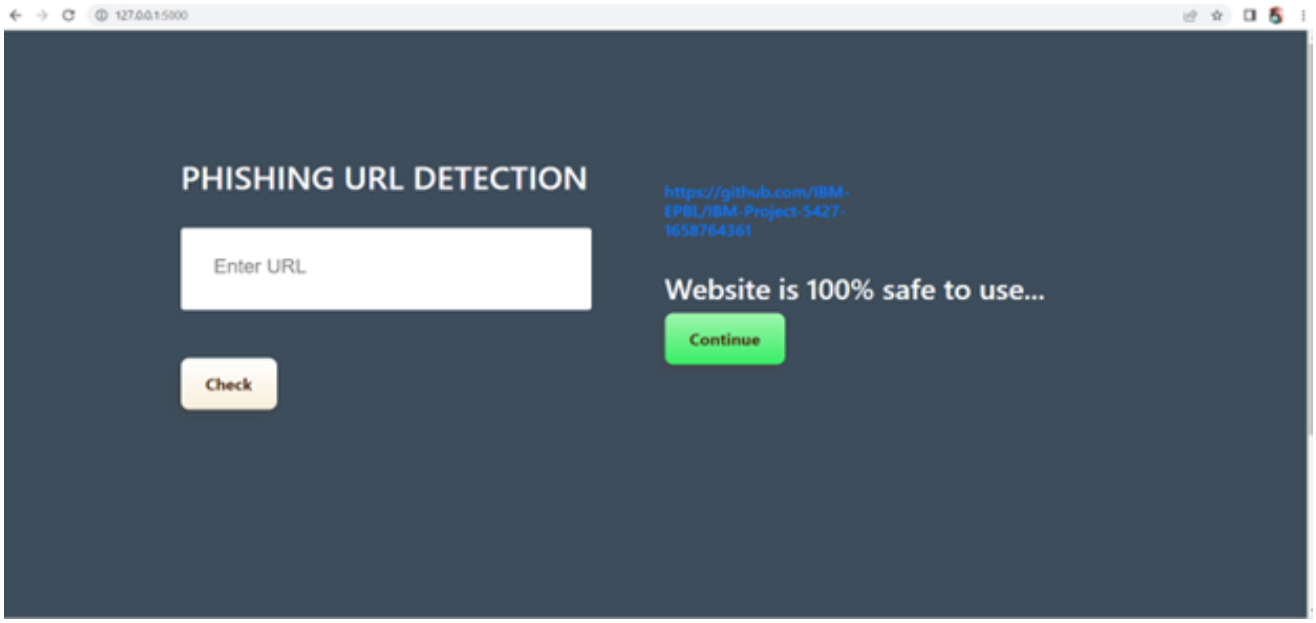
app.py in anaconda prompt

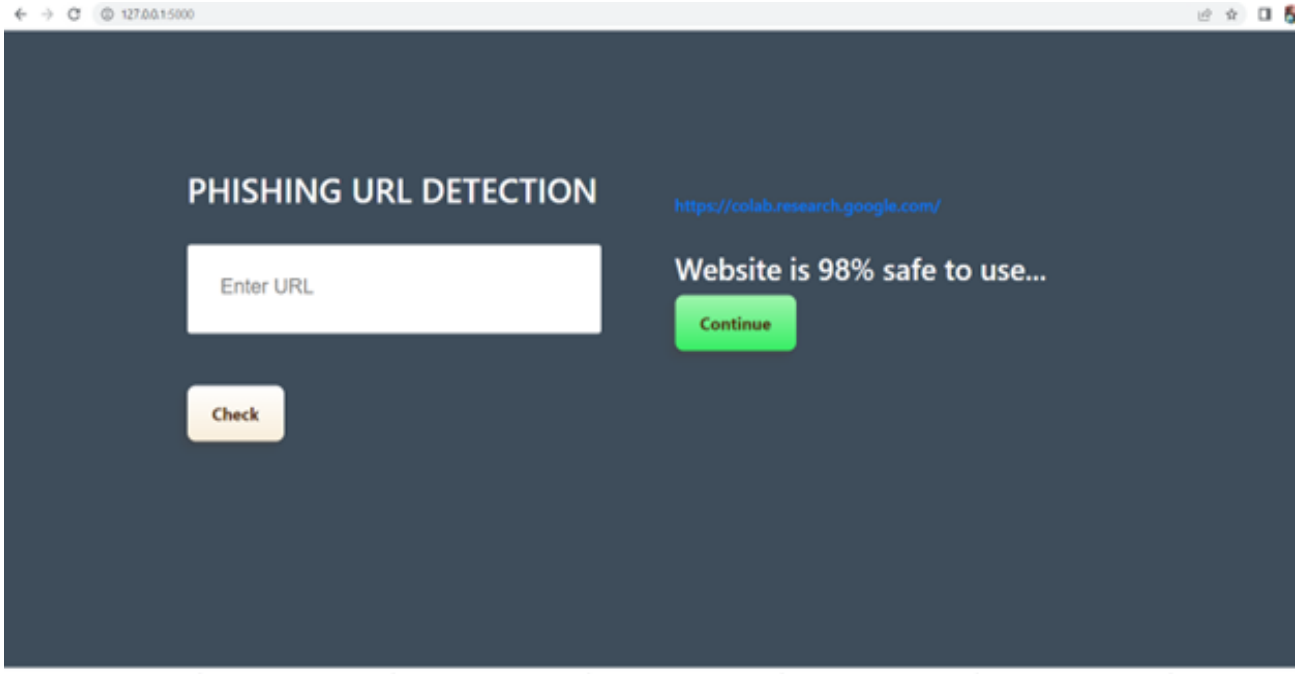
```
(base) C:\WINDOWS\system32>cd C:\Users\Aruna Rajeswari\Downloads\26146\Final_Deliverables\Project_Folder\Flask

(base) C:\Users\Aruna Rajeswari\Downloads\26146\Final_Deliverables\Project_Folder\Flask>flask run
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: off
 * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
127.0.0.1 - - [17/Nov/2022 03:48:15] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [17/Nov/2022 03:48:16] "GET /static/styles.css HTTP/1.1" 200 -
127.0.0.1 - - [17/Nov/2022 03:48:17] "GET /favicon.ico HTTP/1.1" 404 -
127.0.0.1 - - [17/Nov/2022 03:48:39] "POST / HTTP/1.1" 200 -
```

This is the home page of the web application(index.html)









8. TESTING

Testing is a process of identifying the correctness of software by considering its all attributes (Reliability, Scalability, Portability, Re-usability, Usability) and evaluating the execution of software components to find the software bugs or errors or defects. The benefits of testing include preventing bugs, reducing development costs and improving performance.

8.1 Test Cases

Test case ID	Feature Type	Component	Test Scenario	Pre-Requisite	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_001	Functional	Home Page	Verify user is able to see the Landing Page when user can type the URL in the box		1.Enter URL and click go 2.Type the URL 3.Verify whether it is processing or not.	https://phishingshield.herokuapp.com/	Should Display the Webpage	Working as expected	Pass		N		Aruna Rajeswari.K.K
LoginPage_TC_002	UI	Home Page	Verify the UI elements is Responsive		1.Enter URL and click go 2. Type or copy paste the URL 3. Check whether the button is responsive or not 4. Reload and Test Simultaneously	https://phishing shield.herokuapp.com/	Should Wait for Response and then gets Acknowledge	Working as expected	Pass		N		Daphne Patricia.P
LoginPage_TC_003	Functional	Home page	Verify whether the link is legitimate or not		1.Enter URL and click go 2. Type or copy paste the URL 3. Check the website is legitimate or not 4. Observe the results	https://phishingshield.herokuapp.com/	User should observe whether the website is legitimate or not.	Working as expected	Pass		N		Anu Sowmiyaa.A
LoginPage_TC_004	Functional	Home Page	Verify user is able to access the legitimate website or not		1.Enter URL and click go 2. Type or copy paste the URL 3. Check the website is legitimate or not 4. Continue if the website is legitimate or be cautious if it is not legitimate.	https://phishingshield.herokuapp.com/	Application should show that Safe Webpage or Unsafe.	Working as expected	Pass		N		Shruthi.A
LoginPage_TC_005	Functional	Home Page	Testing the website with multiple URLs		1.Enter URL (https://phishingshield.herokuapp.com/) and click go 2.Type or copy paste the URL to test 3. Check the website is legitimate or not 4. Continue if the website is secure or be cautious if it is not secure	1. https://ayhaisee.github.io /welcome 2. totalpad.com 3. https://www.klnce.edu 4. salescript.info 5. https://www.google.com/ 6. delgets.com	User can able to identify the websites whether it is secure or not	Working as expected	Pass		N		Anu Sowmiyaa.A

8.2 User Acceptance Testing

Purpose of Document:

The purpose of this document is to briefly explain the test coverage and open issues of the [Web Phishing Detection] project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis:

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	10	2	4	20	36
Not Reproduced	0	0	1	0	1
Skipped	0	0	0	0	0
Won't Fix	0	0	2	1	3
Totals	23	9	12	25	70

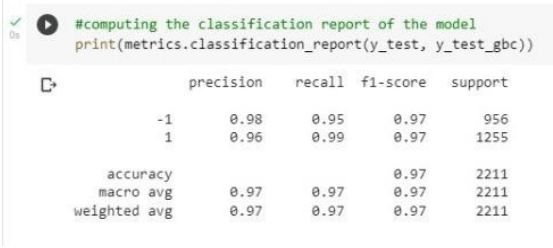
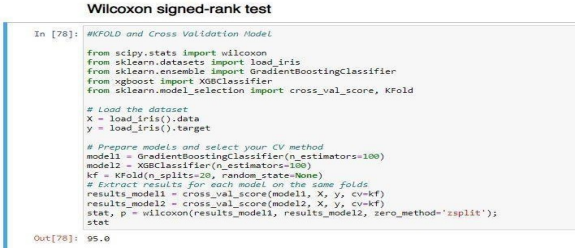
Test Case Analysis:

This report shows the number of test cases that have passed, failed, and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	10	0	0	10
Client Application	50	0	0	50
Security	5	0	0	4
Outsource Shipping	3	0	0	3
Exception Reporting	10	0	0	9
Final Report Output	10	0	0	10
Version Control	4	0	0	4

9. RESULTS

9.1 Performance Metrics

S.No.	Parameter	Values	Screenshot
1.	Metrics	Classification Model: Gradient Boosting Classification Accuray Score- 97.1%	
2.	Tune the Model	Hyperparameter Tuning - 97% Validation Method – KFOLD & Cross Validation Method	

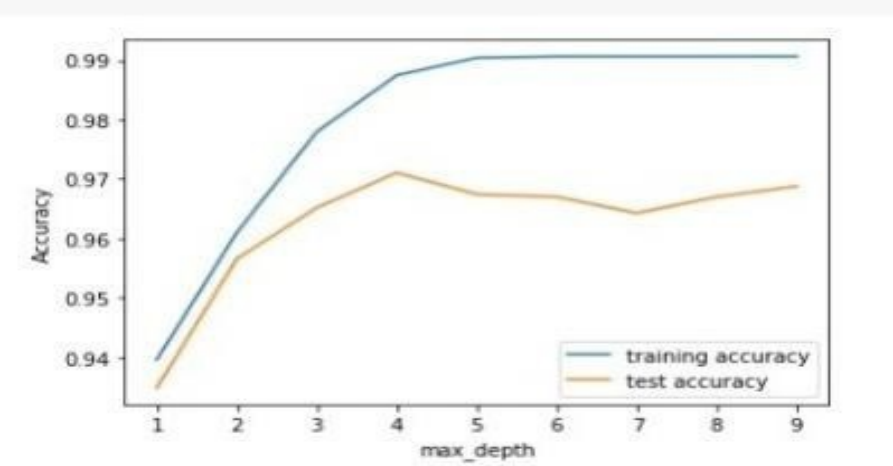
1.METRICS:

CLASSIFICATION REPORT:

```
#computing the classification report of the model
print(metrics.classification_report(y_test, y_test_gbc))
```

```
              precision    recall  f1-score   support

          -1       0.98      0.95      0.97       956
           1       0.96      0.99      0.97      1255

    accuracy                           0.97      2211
   macro avg       0.97      0.97      0.97      2211
weighted avg       0.97      0.97      0.97      2211
```

PERFORMANCE:



	ML Model	Accuracy	f1_score	Recall	Precision
0	Logistic Regression	0.924	0.933	0.947	0.927
1	K-Nearest Neighbors	0.953	0.959	0.990	0.989
2	Support Vector Machine	0.957	0.963	0.982	0.966
3	Decision Tree	0.958	0.963	0.992	0.991
4	Random Forest	0.965	0.970	0.995	0.987
5	Gradient Boosting Classifier	0.971	0.975	0.992	0.985

2. TUNE THE MODEL – HYPERPARAMETER TUNING

```
# fit the model
gbc.fit(X_train,y_train)
```

```
GradientBoostingClassifier(learning_rate=0.7, max_depth=4)
```

```
GridSearchCV

GridSearchCV(cv=5,
             estimator=GradientBoostingClassifier(learning_rate=0.7,
                                                  max_depth=4),
             param_grid={'max_features': array([1, 2, 3, 4, 5]),
                         'n_estimators': array([ 10,  20,  30,  40,  50,  60,  70,  80,  90, 100, 110, 120, 130,
       140, 150, 160, 170, 180, 190, 200])})

estimator: GradientBoostingClassifier

GradientBoostingClassifier(learning_rate=0.7, max_depth=4)

GradientBoostingClassifier

GradientBoostingClassifier(learning_rate=0.7, max_depth=4)
```

VALIDATION METHODS: KFOLD & Cross Folding

Wilcoxon signed-rank test

In [78]:
```
#KFOLD and Cross Validation Model

from scipy.stats import wilcoxon
from sklearn.datasets import load_iris
from sklearn.ensemble import GradientBoostingClassifier
from xgboost import XGBClassifier
from sklearn.model_selection import cross_val_score, KFold

# Load the dataset
X = load_iris().data
y = load_iris().target

# Prepare models and select your CV method
model1 = GradientBoostingClassifier(n_estimators=100)
model2 = XGBClassifier(n_estimators=100)
kf = KFold(n_splits=20, random_state=None)
# Extract results for each model on the same folds
results_model1 = cross_val_score(model1, X, y, cv=kf)
results_model2 = cross_val_score(model2, X, y, cv=kf)
stat, p = wilcoxon(results_model1, results_model2, zero_method='zsplit');
stat
```

Out[78]: 95.0

5x2CV combined F test

```
In [89]: from mlxtend.evaluate import combined_ftest_5x2cv
         from sklearn.tree import DecisionTreeClassifier, ExtraTreeClassifier
         from sklearn.ensemble import GradientBoostingClassifier
         from mlxtend.data import iris_data

         # Prepare data and clfs
         X, y = iris_data()
         clf1 = GradientBoostingClassifier()
         clf2 = DecisionTreeClassifier()

         # Calculate p-value
         f, p = combined_ftest_5x2cv(estimator1=clf1,
                                     estimator2=clf2,
                                     X=X, y=y,
                                     random_seed=1)

         print('f-value:', f)
         print('p-value:', p)

         f-value: 1.727272727272733
         p-value: 0.2840135734291782
```

10. ADVANTAGES & DISADVANTAGES

Advantages:

- We used the data gradient boosting algorithm in our system since it performs better than other conventional classifications algorithms.
- Users may confidently and securely make online purchases and payments.

Disadvantages:

- This system won’t work without internet.

11. CONCLUSION

Phishing is becoming an increasing threat to our rapidly developing world of technology. Now, people do not trust the web as much as they used to. People who are completely unaware of how to recognize security risks should never make money-related online exchanges. The goal of the study is to look into this area by demonstrating how machine learning may be used to identify phishing websites.

The project was developed in Python and completed in Anaconda IDE. The proposed method uses six algorithms were used. These six algorithms are Logical Regression, K-Nearest neighbor, Support vector machine, Decision tree, Random Forest and Gradient Boosting classifier. Detection of phishing websites is done using machine learning technique called the Gradient Boosting classifier. A good accuracy score of 97.1% was also achieved. The accuracy score might vary while using other datasets and other algorithms might provide better accuracy. This model could be used in real time to identify whether a URL is legitimate or phishing.

12. FUTURE SCOPE

Phishing can be improved by using multiple classifiers trained on different aspects of the same training set. The project can also include other variants of phishing like smishing, vishing, etc. to complete the system. The collections will ideally grow incrementally over time so there will need to be a way to apply a classifier incrementally to the new data.

13. APPENDIX

GitHub Link:
https://github.com/IBM-EPBL/IBM-Project-5427-1658764361

Project Demo Link:
https://github.com/IBM-EPBL/IBM-Project-5427-1658764361/blob/main/Final%20Deliverables/Demo%20link.mp4