WEB PHISHING DETECTION

1.INTRODUCTION

Nowadays Phishing has become a main area of concern for security researchers because it is not difficult to create a fake website which looks so close to a legitimate website. Experts can identify fake websites but not all the users can identify the fake website and such users become the victim of phishing attack. Main aim of the attacker is to steal banks account credentials. In United States businesses, there is a loss of US$2billion (about $6 per person in the US) per year because their clients become victim to phishing. In the 3rd Microsoft Computing Safer Index Report released in February 2014, it was estimated that the annual worldwide impact of phishing could be as high as $5 billion (about $15 per person in the US). Phishing attacks are becoming successful because of lack of user awareness. Since phishing attacks exploit the weaknesses found in users, it is very difficult to mitigate them, but it is very important to enhance phishing detection techniques.

The general method to detect phishing websites by updating blacklisted URLs, Internet Protocol (IP) to the antivirus database which is also known as “blacklist" method. To evade blacklists attackers uses creative techniques to fool users by modifying the URL to appear legitimate via obfuscation and many other simple techniques including fast flux, in which proxies are automatically generated to host the webpage; algorithmic generation of new URLs; etc. Major drawback of this method is that it cannot detect zero-hour phishing attack.

Heuristic based detection which includes characteristics that are found to exist in phishing attacks in reality and can detect zero-hour phishing attack, but the characteristics are not guaranteed to always exist in such attacks and false positive rate in detection is very high.

To overcome the drawbacks of blacklist and heuristics-based methods, many security researchers now focus on machine learning techniques. Machine learning technology consists of many algorithms which require past data to make a decision or prediction on future data. Using this technique, algorithms will analyze various blacklisted and legitimate URLs and their features to accurately detect phishing websites including zero- hour phishing websites.

1.1 Project Overview

In emerging technology industry which deeply influence today’s security problems has given a non-ease of mind to some employer and home users. Occurrences that exploit human vulnerabilities have been on the upsurge in recent years .In the dimension of new era there are many security systems being developed to ensure security is given the utmost priority and prevention to be taken from being hacked by those who are involved in cyber-criminal and essential prevention is also taken as high consideration in organization to ensure network security is not being breached. Cyber security employees are currently searching for trustworthy and steady detection techniques for phishing websites detection. Due to wide usage of internet to perform various activities such as online bill payment, banking transaction, online shopping, etc. Customer face numerous security threats like cybercrime. There are many cybercrimes that are extensively executed, for example spam, fraud, cyber terrorism and phishing. Among these phishing is known as the popular cybercrime today. Phishing has become one amongst the highest 3 most current forms of law-breaking in line with recent reports, and both frequency of events and user susceptible ness has enlarged in recent years, more combination the danger of economic damage.

Phishing is a type of practice done on the Internet where individual data are obtained by illegal approaches. It supplies us to obtain sensitive information, for example, usernames, passwords, and positive identification points of interest, often for malignant reasons, by taking up the looks of an electronic correspondence. Phishing attack will be enforced in varied kinds like email phishing, web site phishing, spear phishing, Whaling, Tab off his guard, Evil twin phishing etc. Phishing is known as webpage violence. Phishing is often done by email spoofing or texting, and it typically guides users to enter points of interest at a fake web site which look and feel the same. It tries to handle the increasing range of phishing got to be met by clients in awareness and alternative efforts to ascertain protection numerous anti-phishing tools. A number of sites have currently created optional instruments for applications, like maps for redirection but clients ought to not utilize similar passwords anywhere on the net. [8] The primary key feature is to allow user to inquire whether visited websites are original or fake. This paper proposes a security tool called Detecting Phishing Website Using Machine Learning.

1.2 Purpose

Phishing attack is used to steal confidential information of a user. Fraud websites appear like genuine websites with the logo and graphics of genuine website. This project aims to detect fraud or phishing websites using machine learning techniques. Phishing websites are one of the internet security problems that target human vulnerabilities rather than software vulnerabilities. It can be described as the process of attracting online users to obtain sensitive information such as usernames and passwords. The objective of this project is to train machine learning models and deep neural networks on the dataset created to predict phishing websites. Both phishing and legitimate URLs of websites are gathered to form a dataset and from them required URL and website content-based features are extracted. The performance level of each model is measured and compared.

2 LITERATURE SURVEY

Phishing Detection: Analysis of Visual Similarity Based Approaches

Abstract:

Phishing is one of the major problems faced by cyber-world and leads to financial losses for both industries and individuals. Detection of phishing attack with high accuracy has always been a challenging issue. At present, visual Similarities based techniques are very useful for detecting phishing websites efficiently. Phishing website looks very similar in appearance to its corresponding legitimate website to deceive users into believing that they are browsing the correct website. Visual Similarity based phishing detection techniques utilise the feature set like text content, text format, HTML tags, Cascading Style Sheet (CSS), image, and so forth, to make the decision. These approaches compare the suspicious website with the corresponding legitimate website by using various features and if the similarity is greater than the predefined threshold value then it is declared phishing. This paper presents a comprehensive analysis of phishing attacks, their exploitation, some of the recent visual Similarity based approaches for phishing detection, and its comparative study. Our survey provides a better understanding of the problem, current solution space, and scope of future research to deal with phishing attacks efficiently using visual Similarity based approaches.

1.Introduction

Phishing is a crime in which a perpetrator sends the fake e-mail, which appears to come from popular and trusted brand or organization, asking to input personal credential like bank password, username, phone number, address, credit card details, and so forth. The fake e-mails often look amazingly legitimate, and even the website where the Internet user is asked to input personal information also looks similar to legitimate one. Phishing messages propagate over e-mail, SMS, instant messengers, social networking sites, VoIP, and so forth, but e-mail is the popular way to perform this attack and 65% of the total phishing attack is achieved by visiting the hyperlink attached to the e-mail. Moreover, spear phishing attack is becoming popular nowadays. Business e-mail compromise (BEC) is observed as a major Internet threat in 2015. In BEC, the intruder uses spear phishing methods to fool organizations and Internet persons. More sophisticated spear phishing attacks targeted particular individual or groups within the organization. Phishing is metaphorically similar to fishing in the water, but instead of trying to catch a fish, attackers try to steal consumer's personal information. When a user opens a fake webpage and enters the username and protected password, the credentials of the user are acquired by the attacker which can be used for malicious purposes. Phishing websites look very similar in appearance to their corresponding legitimate websites to attract large number of Internet users. Recent developments in phishing detection have led to the growth of numerous new visual Similarity based approaches. Visual Similarity based approaches compare the visual appearance of the suspicious website to its corresponding legitimate website by using various parameters. Due to different phases of phishing detection, this paper contains the following

2.Background, History, and Statistics:

A phishing scam has attracted the attention of both academicians and corporate researchers as it is a serious privacy and web security threat. Phishing cannot be controlled by firewalls or any encryption software.

2.1. Brief History:

First phishing attack was observed on America online network systems (AOL) in the early 1990s where many fraudulent users registered on AOL website with fake credit card details. AOL passed these fake accounts with a simple validity test without verifying the legitimacy of the credit card. After activation of the fake account, attackers accessed the resources of America online system. At the time of billing, AOL determined that the accounts were fraudulent, and associated credit cards were also not valid; Therefore AOL ceased these accounts immediately. After this incident, AOL took measures to prevent this type of attack by verifying the authenticity of credit card and associated billing identity, which also enabled the attackers to change their way of obtaining AOL accounts. Instead of creating a fake account, attackers would steal the personal information of registered AOL user. Attackers contacted registered AOL users through instant messenger or e-mail and asked them to verify the password for security purposes. E-mail and instant messages appeared to come from an AOL employee. Many users provided their passwords and other personal information to the attackers. The attackers then used the variously billed portions of America online website on behalf of a legitimate user. Moreover, an attacker no longer restricts themselves to masquerading America online website but actively masquerade a large number of financial and electronic commerce websites.

2.2. Statistics:

According to Internet world stats, total numbers of Internet users worldwide are 2.97 billion in 2014; that is, more than 38% of the world population uses Internet. Hackers take advantage of the insecure Internet system and can fool unaware users to fall for phishing scams. Phishing e-mail is used to defraud both individuals and financial organizations on the Internet. The Anti-Phishing Working Group (APWG) is an international consortium which is dedicated to promoting research, education, and law enforcement to eliminate online fraud and cyber-crime. In 2012, total phishing attack increased by 160% over 2011, signifying a record year in phishing volumes. The total phishing attacks detected in 2013 were approximately 450000 and led to financial losses more than 5.9 billion dollars. Total attack increases by 1% in 2013 as compared to 2012. The total number of phishing attacks noticed in Q1 (first quarter) of 2014 was 125,215, a 10.7 percent increase over Q4 (fourth quarter) of 2013. More than 55% of phishing websites contain the name of the target site in some form to fool users and 99.4% of phishing websites use port 80. According to the APWG report in the first quarter of 2014, second highest number of phishing attacks ever recorded was between January and March 2014 and payment services are the most targeted industry. During the second half of 2014, 123,972 unique phishing attacks were observed. In the year 2011, total financial losses were 1.2 billion, and they rose to 5.9 billion dollars in 2013. The financial losses due to phishing attack in 2014 and 2015 were 4.5 and 4.6, respectively. The growth of phishing attacks from 2005 to 2015

2.3. Phishing Mechanism.

The fake website is the clone of targeted genuine website, and it always contains some input fields (e.g., text box). When the user submits his/her personal details, the information is transferred to the attacker. An attacker steals the credential of the innocent user by performing following steps: Construction of Phishing Site. In the first step attacker identifies the target as a well-known organization. Afterward, attacker collects the detailed information about the organization by visiting their website. The attacker then uses this information to construct the fake website. URL Sending. In this step, attacker composes a bogus e-mail and sends it to the thousands of users. Attacker attached the URL of the fake website in the bogus e-mail. In the case of spear phishing attack, an attacker sends the e-mail to selected users. An attacker can also spread the link of phishing website with the help of blogs, forum, and so forth. Stealing of the Credentials. When user clicks on attached URL, consequently, fake site is opened in the web browser. The fake website contains a fake login form which is used to take the credential of an innocent user. Furthermore, attacker can access the information filled by the user. Identity Theft. Attacker uses this credential of malicious purposes. For example, attacker purchases something by using credit card details of the user.

2.4. Taxonomy of Phishing Attack:

Attacker performed the phishing attack by utilising the technical subterfuge and social engineering techniques. In social engineering techniques, attackers carry out this attack by sending bogus e-mail. Attackers often convince recipients to respond using names of banks, credit card companies, e-retailers, and so forth. Technical subterfuge strategies install malware into user's system to steal credentials directly using Trojan and keylogger spyware. The malware also misaddresses users to fake websites or proxy servers. Attackers attached malware or embedded malicious links in the fraudulent emails and when the user opens the fraud hyperlink, malicious software is installed on the user's system, which collected the confidential information from the system and sent it to the attacker (e.g., keylogger software sends the details of every key hit by the user). Attackers may also get remote access to victim's computer and collect data whenever attackers want. In this paper, we focus on social engineering schemes, as it is the most popular way to steal victim's information by phishing.

Antiphishing Technique:

Modus Operandi. A phishing scam starts with spreading bogus e-mail. After receiving an e-mail, Antiphishing techniques start working, either by redirecting the phishing mail in the spam folder or by showing a warning when an online user clicks on the link of phishing URL

The following steps are involved in phishing lifecycle:

Step 1. Attacker creates the fake copy of a popular organization and sends the URL of fake website to the large number of Internet users using e-mail, blog, social networking sites, and so forth.

Step 2. In the case of fake e-mail, every e-mail is first to pass through the DNS-based blacklist filters. If the domain is found in the blacklist, then e-mail is blocked before it reached to SMTP mail server. There are also various solutions available which block the fake e-mail based on structural features of mail.

Step 3. If a fake e-mail bypasses the blacklist and features based solutions and if the user opens attached link in the Email then some browser based blacklist techniques block the site at client side.

Step 4. Some other solutions like the heuristic and visual Similarities based approaches also blocked the webpage only when the browser requests for any suspicious webpage.

Step 5. If the phishing attack bypasses all the Solutions then it steals the credential of innocent users and sends it to the attacker. The attacker uses this information for financial or some other benefits.

3. Visual Similarity Based Phishing Detection and Filtering Approaches :

A user could become the victim of the phishing attack by looking the high visual resemblance of phishing website with the targeted legitimate site, such as page layouts, images, text content, font size, and font colour. The fake and genuine webpages of PayPal are shown in Figure 6, and both pages have same visual appearance but different URLs. It is not always necessary that the people carefully notice on URL and SSL (Secure Socket Layer) certificate of websites. If an attacker does not copy the visual appearance of targeted website well, then chances of inputting credentials by Internet users are very less.

An attacker fools the user by the following ways:

(1) Visual Appearance. The phishing website looks similar to its legitimate website. Attackers used to copy the HTML source code of genuine website to build the fake website.

(2) Address Bar. Attackers also cover the address or URL bar of website by script or image. The user would believe that they are inputting information on the right website.

(3) Embedded Objects. Attackers use embedded objects (images, scripts, etc.) to hide the textual content and HTML coding from the phishing detection approaches.

(4) Favicon Similarity. Favicon is an image icon associated with the particular website. An attacker may copy the favicon of targeted website. If the favicon shown in the address bar is other than the current website, then it is considered as a phishing attempt.

Dhamija et al. conducted a survey on various participants to identify whether a website is phishing or genuine. Participants were unable to identify 90% of phishing sites. Many participants wrongly judged the site on the basis of their text content and visual appearance. They also found that even an experienced user could also be fooled by the visual appearance of a fake website, and 23% of the users do not look at the address bar of a website. Therefore , we can say that if the appearance of a phishing site is similar to its legitimate one and domain is different then also users can easily be trapped by the attackers.

6. Open Issues and Challenges:

Various types of Anti-phishing techniques based on visual similarity approach have been given in the literature. However, still there is no single technique that can detect all types of phishing attacks (i.e., zero-hour phishing attack, embedded objects, DNS poisoning, etc.). Day by day phishing attack is increasing continuously and becomes the most popular e-crime. Consistently, when researchers design a new technique to control phishing attack, attackers change their way to perform attack or exploit the vulnerability in the solution. Hence, there is the tight race between attackers and Anti-phishing developers. There are various issues which have to take care while designing a new antiphishing technique. The first problem is the zero-hour phishing attack. Most of the antiphishing techniques compare the suspicious website from the pool of legitimate sites using feature set including URL, keyword, and visual appearances. These techniques required a large dataset and still fail to detect zero-hour phishing attack. If attacker designs a new webpage and its target (corresponding legitimate page) is not available in the dataset, then technique fails to detect new fake webpages (zero- hour attack). Liu et al. Presented a technique which can detect zero-hour phishing attack; However this technique depends on the TF-IDF algorithm and hyperlinks. Therefore, detection of zero-hour phishing attack with high accuracy is still an open challenge. The second issue is the language independence. Various text languages are worldwide used in the websites, and the ecommerce and banking websites also have different text languages in various countries for example, Amazon, eBay, and Citibank. The layout of e-commerce and banking sites is almost similar in different languages. Heuristics based phishing detection Techniques use the keywords, and they are language dependent. As we discussed, some of the visual Feature based techniques can detect this attack because they utilise the webpage features like the logo of the company, CSS Structure, DOM tree, and so forth. Such techniques only detect the attack if the layout of phishing website is similar to the real one. However, these techniques are unable to detect a new phishing attack (zero-hour) because they compare the current website with the stored database. The third issue is the embedded objects present in the webpage as attackers use images, JavaScript, and so forth, to bypass the antiphishing system. As we discussed, image Processing based techniques can detect the embedded objects present in suspicious webpage because these techniques take the snapshot of the webpage and compare it with the corresponding legitimate webpage. But identifying the correct corresponding legitimate webpage is the major problem in image Processing based solutions. Image Processing based approaches also consumed a lot of time to compare a suspicious website with the pool of websites. Therefore detection of phishing site which uses embedded objects is still an open challenge. The fourth issue is determining an appropriate threshold to take appropriate decision. The threshold is the matching score between two websites. As we discussed, attacker constructs a phishing website which looks similar to legitimate one. If the phishing website is partially copied (less than 50%) from the legitimate website, then none of the visual similarity based approach can detect it. Therefore, adjusting the appropriate threshold to detect a maximum number of phishing websites is a challenging task. If antiphishing system increases the threshold then the false negative rate increases and if it decreases the threshold then false positive rate increases. A good antiphishing system requires that both false negative and false positive rate should be as minimal as possible.

7. Conclusion:

Phishing is an appalling threat in the web security domain. In this attack, the user inputs his/her personal information to a fake website which looks like a legitimate one. We have presented a survey on phishing detection approaches based on visual similarity. This survey provides a better understanding of phishing website, various solution, and future scope in phishing detection. Many approaches are discussed in this paper for phishing detection; however most of the approaches still have limitations like accuracy, the countermeasure against new phishing websites, failing to detect embedded objects, and so forth. These approaches use various features of a webpage to detect phishing attacks, such as text similarity, font colour, font size, and images present in the webpage. Text based similarity approaches are relatively fast, but they are unable to detect phishing attack if the text is replaced with some image. Image processing based approaches have high accuracy rate while they are complex in nature and are time-consuming. Furthermore, most of the work is done offline. These involve data collection and profile-creation phases to be completed first. A comparative table is prepared for easy glancing at the advantages and drawbacks of the available approaches. No single technique is enough for adopting it for phishing detection purposes. Detection of phishing websites with high accuracy is still an open challenge for further research and development.

References

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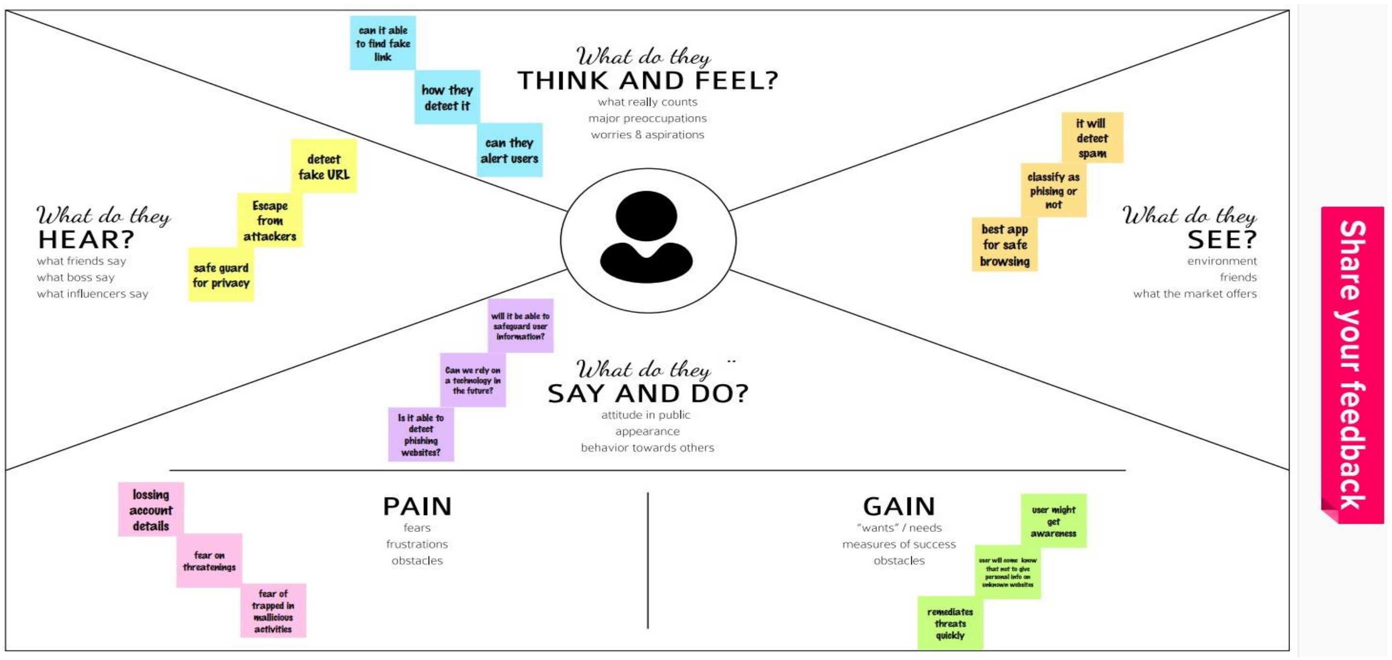
3.1 EMPATHY MAP CANVAS

Build empathy and keep your focus on the user by putting yourself in their shoes.



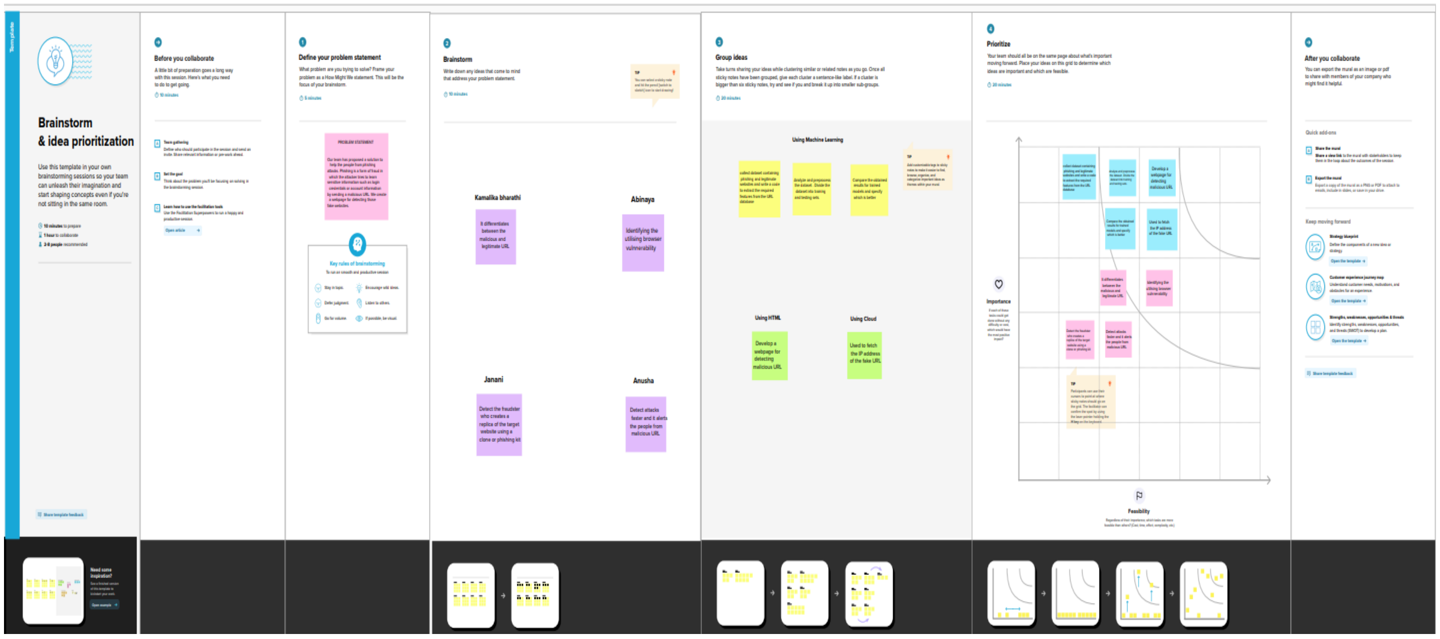
The empathy map represents a principal user and helps teams better understand their motivations, concerns, and user experience. Empathy mapping is a simple yet effective workshop that can be conducted with a variety of different users in mind, anywhere from stakeholders, individual use cases, or entire teams of people.

An empathy map canvas helps brands provide a better experience for users by helping teams understand the perspectives and mindset of their customers. Using a template to create an empathy map canvas reduces the preparation time and standardizes the process so you create empathy map canvases of similar quality. Empathy is important because it helps us understand how others are feeling so we can respond appropriately to the situation. It is typically associated with social behavior and there is lots of research showing that greater empathy leads to more helpful behavior.

3.2 IDEATION & BRAIN STORMING

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich number of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.


Brainstorm & idea prioritization
Before you collaborate
Define your problem statement
Brainstorm
Kamalika bharathi
It differentiates between the malicious and legitimate URL
Abinaya
Identifying the utilising browser vulnerability
Janani
Detect the fraudster who creates a replica of the target website using a clone or phishing kit
Anusha
Detect attacks faster and it alerts the people from malicious URL
Group ideas
Using Machine Learning
collect dataset containing phishing and legitimate websites and write a code to extract the required features from the URL database
Analyze and preprocess the dataset . Divide the dataset into training and testing sets
Compare the obtained results for trained models and specify which is better
Using HTML
Develop a webpage for detecting malicious URL
Using Cloud
Used to fetch the IP address of the fake URL
Prioritize
Importance
Feasibility
After you collaborate

3.3 Proposed solution

Date	25 October 2022
Team ID	PNT2022TMID01032
Project Name	WEB PHISHING DETECTION
Maximum Marks	2 Marks

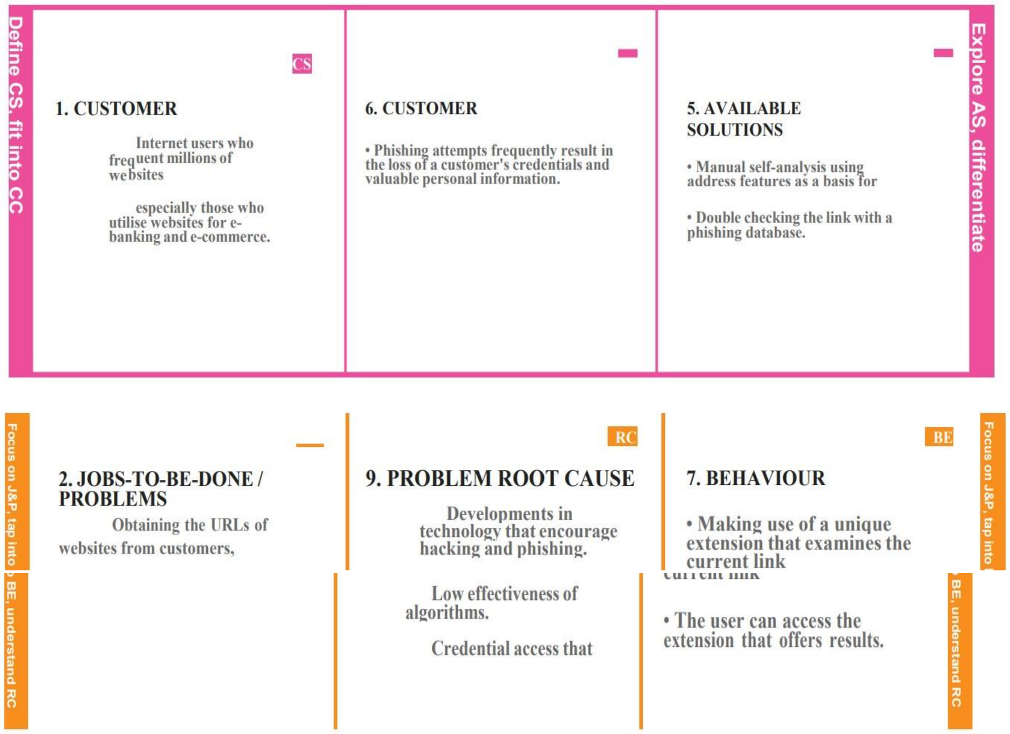
Proposed Solution Template:

SI.no	Parameter	Description
1.	Problem Statement (Problem to be solved)	It is important to fix this problem to help the people from phishing attacks. Phishing is a form of fraud in which the attacker tries to learn sensitive information such as login credentials or account information by sending a malicious URL. Phishing attack can paralyze a business. Data and assets might be stolen or damaged. Customers might be unable to access online services. We are

		developing a webpage for detecting those fake websites
2.	Idea / Solution description	Our team has proposed a solution to help the people from phishing attacks. It detects attacks faster and remediates threats as quickly as possible and detects the fraudster who creates a replica of the target website using a clone or phishing kit. It differentiates between the malicious and legitimate URL, and it also alerts the people from malicious URL.
3.	Novelty / Uniqueness	The phisher can change the URL any time to create a new URL. The reason security defenders struggle to detect phishing domains is because of the unique part of the website domain. When a domain is detected as fraudulent, it is easy to prevent this domain before a user access to it.
4.	Social Impact / Customer Satisfaction	It eliminates cyber threat risk level and increase user alertness to phishing risks. It will help to minimize fraud while using software solutions. Measure the degrees of corporate and employee vulnerability.
5.	Business Model (Revenue Model	This application can be used by many E-commerce enterprises to make the whole transaction process secure.
6.	Scalability of the Solution	People cannot find the malicious URL, this application will help them to differentiate between the malicious and legitimate URL. It protects and alerts the people from the fake websites

3.4 PROBLEM SOLUTION FIT

Project Title: **Web phishing Detection** **Project Design Phase-I - Solution Fit** **Team ID:**PNT2022TMID01032


Define CS, fit into CC
CS
Explore AS, differentiate
Focus on J&P, tap into BE, understand RC
RC
BE

1. CUSTOMER

Internet users who frequent millions of websites

especially those who utilise websites for e-banking and e-commerce.

6. CUSTOMER

• Phishing attempts frequently result in the loss of a customer's credentials and valuable personal information.

5. AVAILABLE SOLUTIONS

• Manual self-analysis using address features as a basis for

• Double checking the link with a phishing database.

2. JOBS-TO-BE-DONE / PROBLEMS

Obtaining the URLs of websites from customers,

9. PROBLEM ROOT CAUSE

Developments in technology that encourage hacking and phishing.

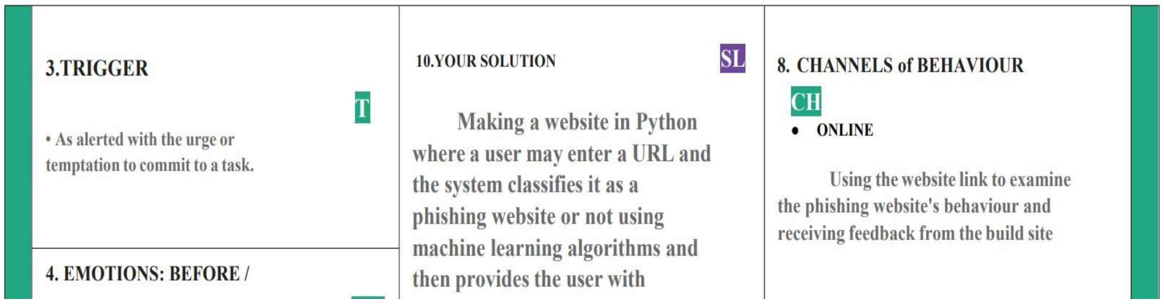
Low effectiveness of algorithms.

Credential access that

7. BEHAVIOUR

• Making use of a unique extension that examines the current link

• The user can access the extension that offers results.



3.TRIGGER

• As alerted with the urge or temptation to commit to a task.

4. EMOTIONS: BEFORE /

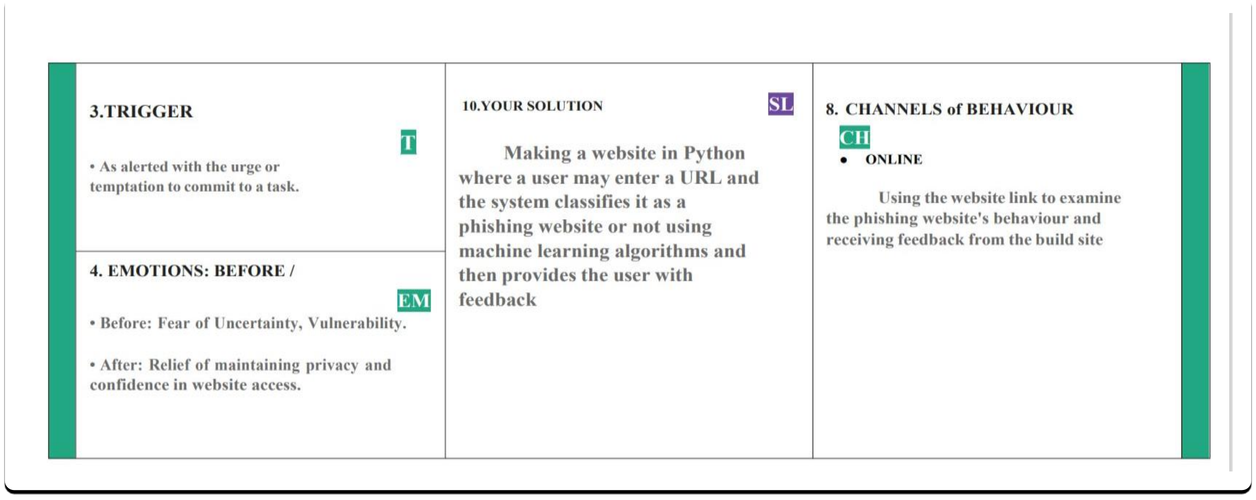
10.YOUR SOLUTION

Making a website in Python where a user may enter a URL and the system classifies it as a phishing website or not using machine learning algorithms and then provides the user with

8. CHANNELS of BEHAVIOUR

- ONLINE

Using the website link to examine the phishing website's behaviour and receiving feedback from the build site



3.TRIGGER

T

• As alerted with the urge or temptation to commit to a task.

4. EMOTIONS: BEFORE /

EM

• Before: Fear of Uncertainty, Vulnerability.

• After: Relief of maintaining privacy and confidence in website access.

10.YOUR SOLUTION

SL

Making a website in Python where a user may enter a URL and the system classifies it as a phishing website or not using machine learning algorithms and then provides the user with feedback

8. CHANNELS of BEHAVIOUR

CH

• ONLINE

Using the website link to examine the phishing website's behaviour and receiving feedback from the build site

SOLUTION ARCHITECTURE:

TEAM ID	PNT2022TMID01032
PROJECT NAME	WEB PHISING DETECTION

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technological solutions. Its goals are to:

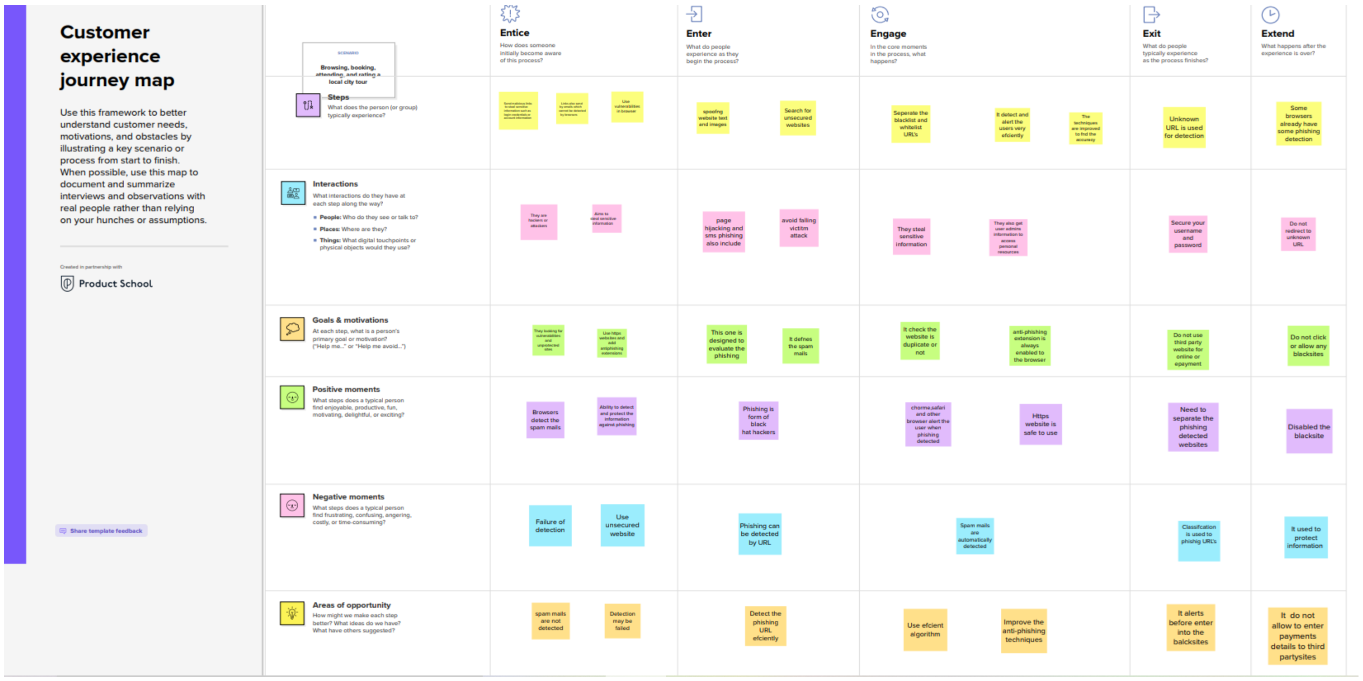
Find the best tech solution to solve existing business problems.

Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.

Define features, development phases, and solution requirements.

Provide specifications according to which the solution is defined, managed, and delivered.

Customer journey map:



Customer experience journey map

Use this framework to better understand customer needs, motivations, and obstacles by illustrating a key scenario or process from start to finish. When possible, use this map to document and summarize interviews and observations with real people rather than relying on your hunches or assumptions.

Created in partnership with

Product School

Share template feedback

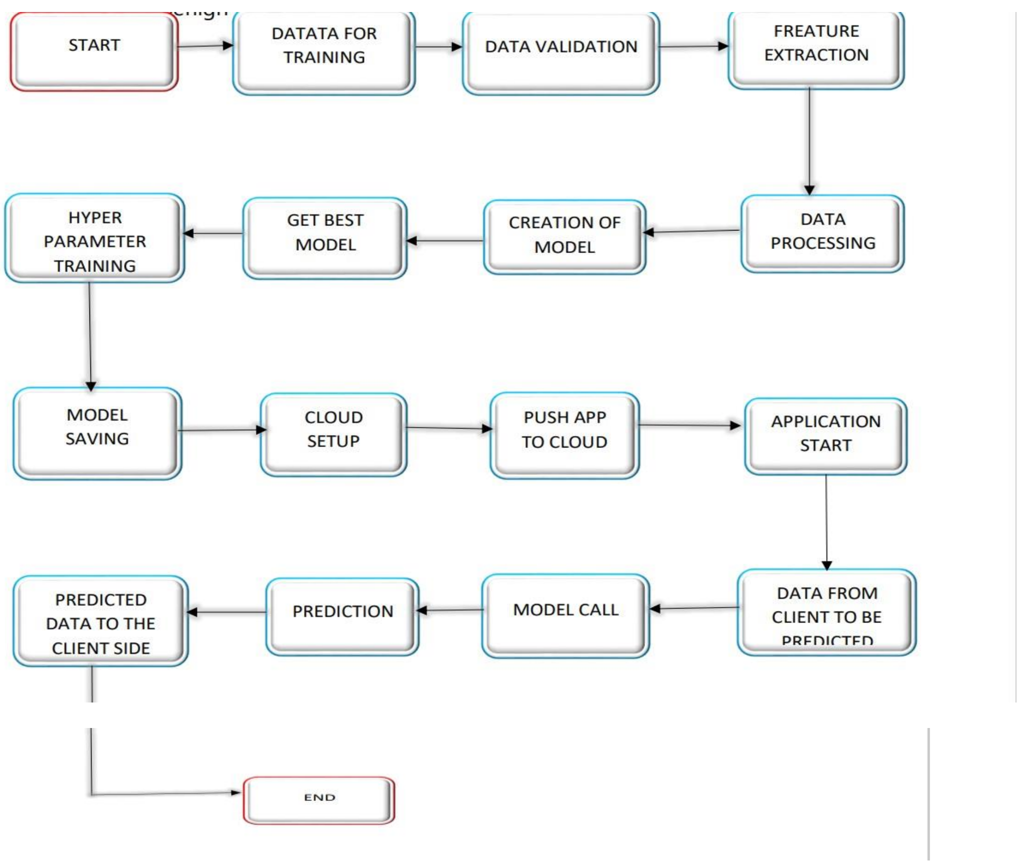
SCENARIO

Browsing, booking, attending, and rating a local city tour

	Entice How does someone initially become aware of this process?	**Enter** What do people experience as they begin the process?	**Engage** In the core moments in the process, what happens?	**Exit** What do people typically experience as the process finishes?	**Extend** What happens after the experience is over?
Steps What does the person (or group) typically experience?	Send malicious links to steal sensitive information such as login credentials or account information; Links also send by emails which cannot be detected by browsers; Use vulnerabilities in browser	spoofng website text and images; Search for unsecured websites	Seperate the blacklist and whitelist URL's; It detect and alert the users very efciently; The techniques are improved to fnd the accuracy	Unknown URL is used for detection	Some browsers already have some phishing detection
Interactions What interactions do they have at each step along the way? ▪ **People:** Who do they see or talk to? ▪ **Places:** Where are they? ▪ **Things:** What digital touchpoints or physical objects would they use?	They are hackers or attackers; Aims to steal sensitive information	page hijacking and sms phishing also include; avoid falling victitm attack	They steal sensitive information; They also get user admins information to access personal resources	Secure your username and password	Do not redirect to unknown URL
Goals & motivations At each step, what is a person's primary goal or motivation? ("Help me..." or "Help me avoid...")	They looking for vulnerabilities and unprotected sites; Use https websites and add antiphishing extensions	This one is designed to evaluate the phishing; It defnes the spam mails	It check the website is duplicate or not; anti-phishing extension is always enabled to the browser	Do not use third party website for online or epayment	Do not click or allow any blacksites
Positive moments What steps does a typical person find enjoyable, productive, fun, motivating, delightful, or exciting?	Browsers detect the spam mails; Ability to detect and protect the information against phishing	Phishing is form of black hat hackers	chorme,safari and other browser alert the user when phishing detected; Https website is safe to use	Need to separate the phishing detected websites	Disabled the blacksite
Negative moments What steps does a typical person find frustrating, confusing, angering, costly, or time-consuming?	Failure of detection; Use unsecured website	Phishing can be detected by URL	Spam mails are automatically detected	Classifcation is used to phishig URL's	It used to protect information
Areas of opportunity How might we make each step better? What ideas do we have? What have others suggested?	spam mails are not detected; Detection may be failed	Detect the phishing URL efciently	Use efcient algorithm; Improve the anti-phishing techniques	It alerts before enter into the balcksites	It do not allow to enter payments details to third partysites

DATA FLOW DIAGRAM:

The technique comprises of host based, page based and lexical feature extraction of collected websites. The primary step is the collection of phishing and begin websites.


START
DATATA FOR TRAINING
DATA VALIDATION
FREATURE EXTRACTION
DATA PROCESSING
CREATION OF MODEL
GET BEST MODEL
HYPER PARAMETER TRAINING
MODEL SAVING
CLOUD SETUP
PUSH APP TO CLOUD
APPLICATION START
DATA FROM CLIENT TO BE PREDICTED
MODEL CALL
PREDICTION
PREDICTED DATA TO THE CLIENT SIDE
END

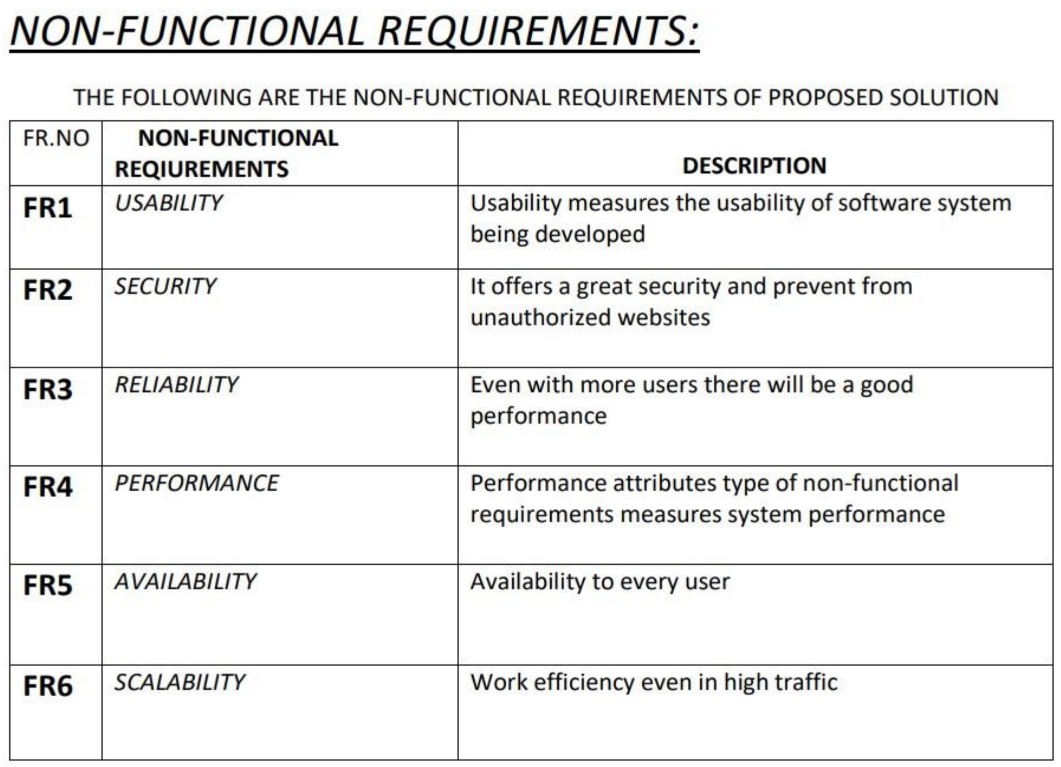
PROJECT DESIGN PHASE-2

SOLUTION REQUIREMENTS(FUNCTIONAL AND NON-FUNCTIONAL)

FUNCTIONAL REQUIREMENTS:

THE FOLLOWING ARE THE NON-FUNCTIONAL REQUIREMENTS OF PROPOSED SOLUTION

FR.NO	**FUNCTIONAL USER (EPIC)**	SUB REQUIREMENTS (SUB/STORY TASK)
FR1	*USER REGISTRATION*	Registration through form Registration through email Registration through linkedIN
FR2	*USER CONFIRMATION*	Confirmation via Gmail Confirmation via OTP
FR3	*AUTHENTICATION*	Very users identity
FR4	*REPORT*	Reports are used to communicate the result of the projects
FR5	*EXTERNAL INTERFACE*	It includes user interface



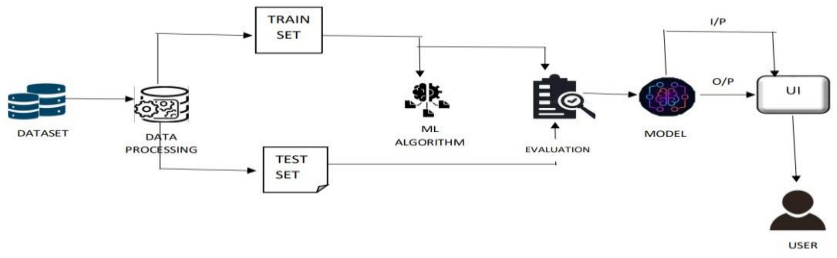
NON-FUNCTIONAL REQUIREMENTS:

THE FOLLOWING ARE THE NON-FUNCTIONAL REQUIREMENTS OF PROPOSED SOLUTION

FR.NO	**NON-FUNCTIONAL REQUIREMENTS**	**DESCRIPTION**
FR1	*USABILITY*	Usability measures the usability of software system being developed
FR2	*SECURITY*	It offers a great security and prevent from unauthorized websites
FR3	*RELIABILITY*	Even with more users there will be a good performance
FR4	*PERFORMANCE*	Performance attributes type of non-functional requirements measures system performance
FR5	*AVAILABILITY*	Availability to every user
FR6	*SCALABILITY*	Work efficiency even in high traffic

TECHNOLOGY ARTITECTURE:

DATE	OCTOBER 29,2022
TEAM ID	PNT2022TMID01032
PROJECT NAME	WEB PHISING DETECTION
MARK	4 MARKS



6.PROJECT PLANNING & SCHEDULING

In Scrum Projects, Estimation is done by the entire team during Sprint Planning Meeting. The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint. During sprint planning, we break the stories down into tasks, estimate those tasks, and compare the task estimates against our capacity. It's that, not points, that keep us from overcommitting in this sprint. No need to change the estimate.

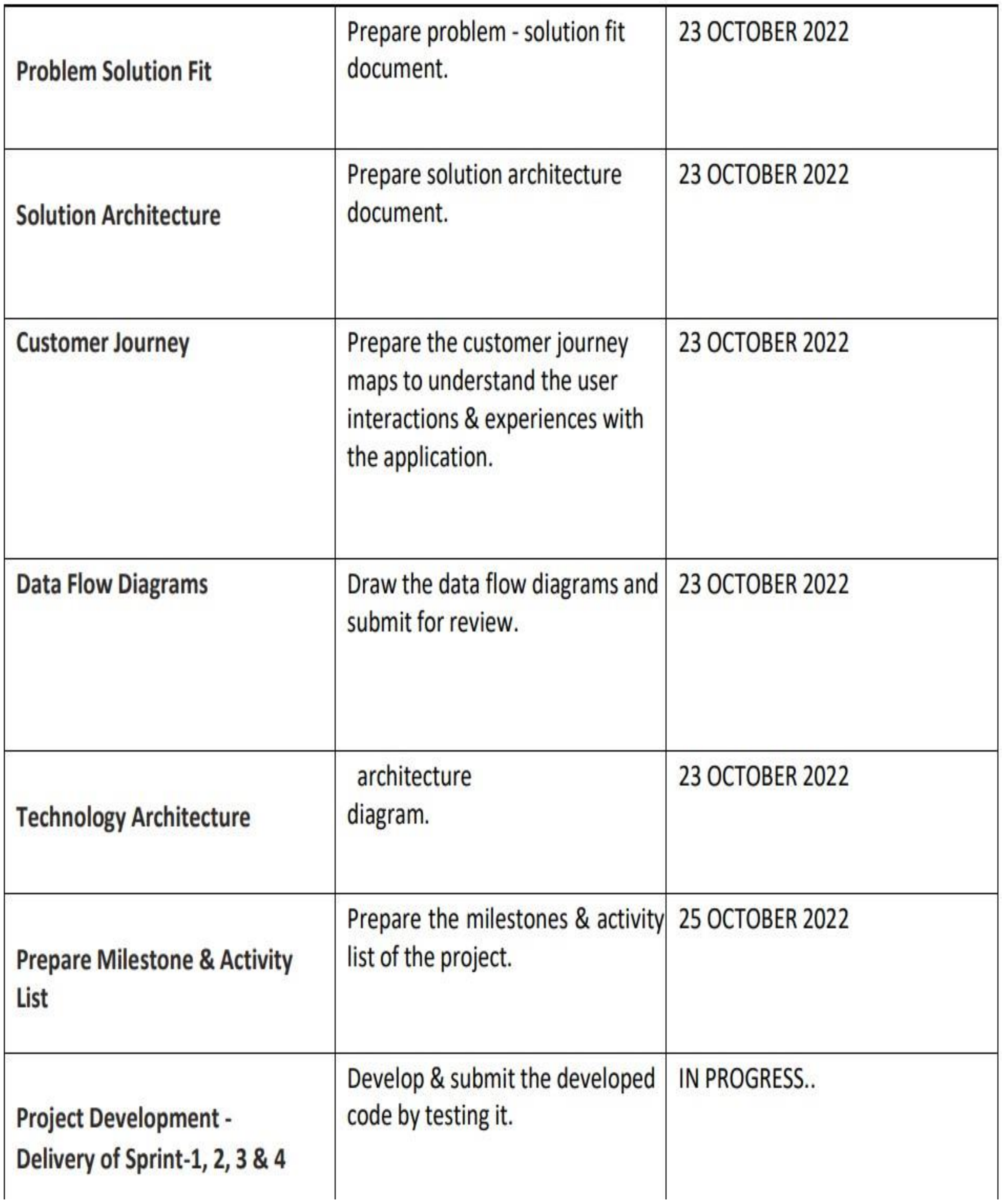
How to run a sprint planning

- Examine team availability.
- Establish velocity for your team.
- Plan your sprint planning meeting.
- Start with the big picture.
- Present new updates, feedback, and issue.
- Confirm team velocity and capacity.
- Go over backlog items.
- Determine task ownership.

Milestone and Activity List:

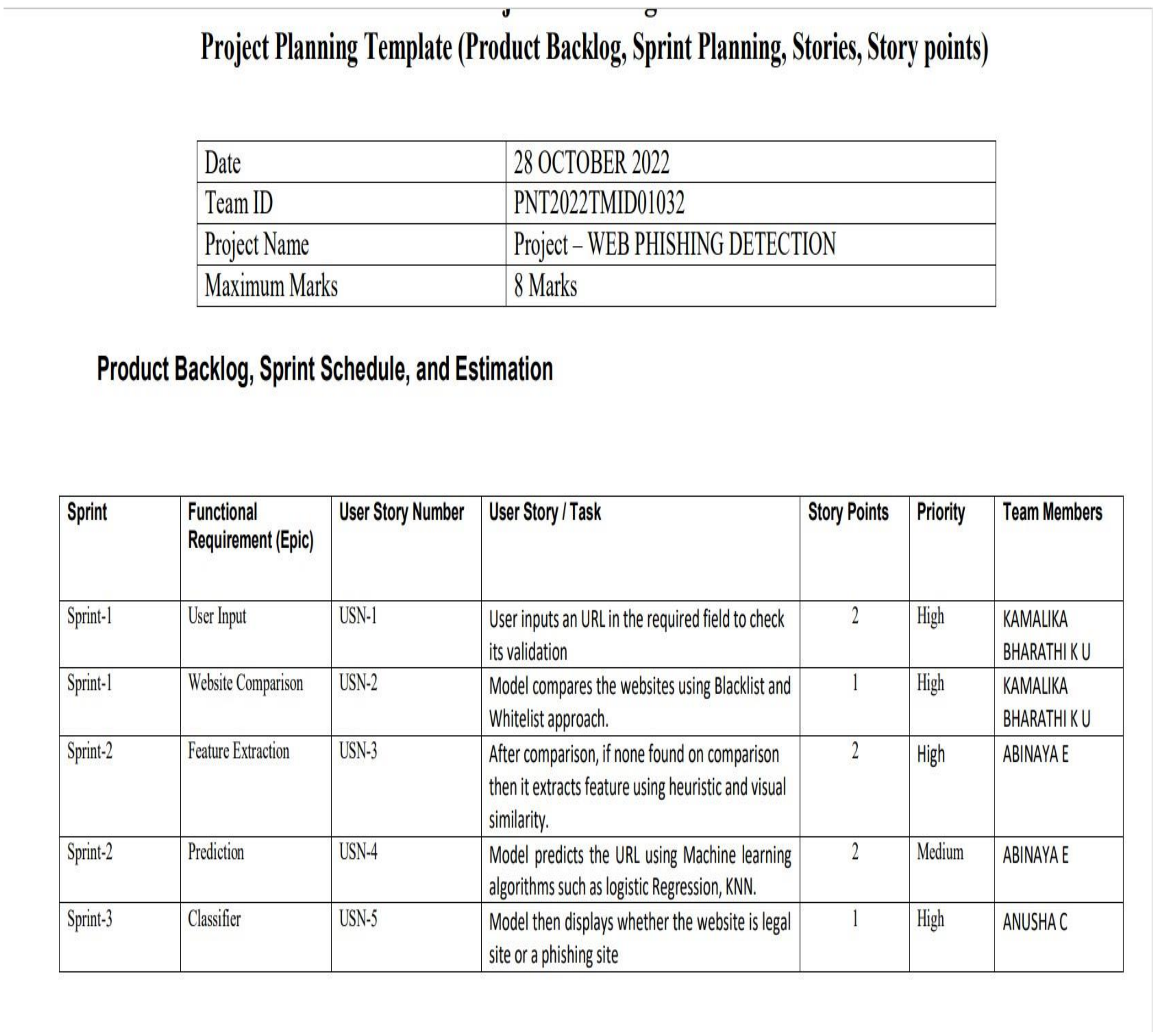
Date	28 October 2022
Team ID	PNT2022TMID01032
Project Name	Web Phishing Detection

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on the selected project & gathering information by referring the, technical papers, research publications etc.	23 OCTOBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvas to capture the user Pains & Gains, Prepare list of problem statements	23 OCTOBER 2022
Ideation	List the by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility & importance.	23 OCTOBER 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	23 OCTOBER 2022



Problem Solution Fit	Prepare problem - solution fit document.	23 OCTOBER 2022
Solution Architecture	Prepare solution architecture document.	23 OCTOBER 2022
Customer Journey	Prepare the customer journey maps to understand the user interactions & experiences with the application.	23 OCTOBER 2022
Data Flow Diagrams	Draw the data flow diagrams and submit for review.	23 OCTOBER 2022
Technology Architecture	architecture diagram.	23 OCTOBER 2022
Prepare Milestone & Activity List	Prepare the milestones & activity list of the project.	25 OCTOBER 2022
Project Development - Delivery of Sprint-1, 2, 3 & 4	Develop & submit the developed code by testing it.	IN PROGRESS..

6.1 SPRINT PLANNING & ESTIMATION:



Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	28 OCTOBER 2022
Team ID	PNT2022TMID01032
Project Name	Project – WEB PHISHING DETECTION
Maximum Marks	8 Marks

Product Backlog, Sprint Schedule, and Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	User Input	USN-1	User inputs an URL in the required field to check its validation	2	High	KAMALIKA BHARATHI K U
Sprint-1	Website Comparison	USN-2	Model compares the websites using Blacklist and Whitelist approach.	1	High	KAMALIKA BHARATHI K U
Sprint-2	Feature Extraction	USN-3	After comparison, if none found on comparison then it extracts feature using heuristic and visual similarity.	2	High	ABINAYA E
Sprint-2	Prediction	USN-4	Model predicts the URL using Machine learning algorithms such as logistic Regression, KNN.	2	Medium	ABINAYA E
Sprint-3	Classifier	USN-5	Model then displays whether the website is legal site or a phishing site	1	High	ANUSHA C

Sprint-3	Announcement	USN-6	Model then displays whether the website is legal site or a phishing site	1	High	ANUSHA C
Sprint-4	Events	USN-7	This model needs the capability of retrieving and displaying accurate result for a website.	1	High	JANANI V

Project Tracker, Velocity & Burndown Chart:

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	30 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	13 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	29 Nov 2022

Velocity:

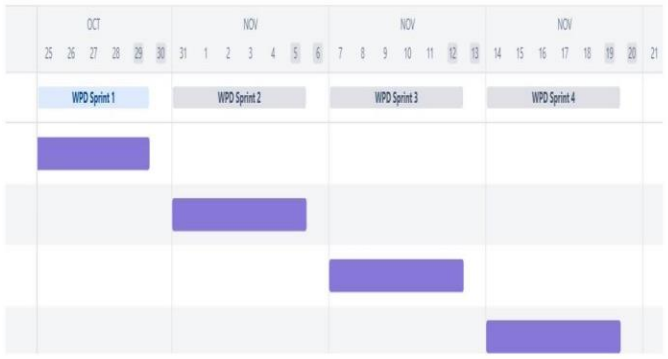
We have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). So, our team's average velocity (AV) per iteration unit (story points per day) AV = (Sprint Duration / Velocity).

AV = (Sprint Duration / Velocity)

= 20 /10

AV = 2

Burndown Chart:



7. CODING & SOLUTIONING

Coding Solutions is a highly competitive job accelerator and talent refinement program that recruits and transitions college graduates with past programming experience or technical degrees into professional careers with Alabama companies and organizations at no cost to the graduates.

7.1 FEATURE 1

```
from flask import Flask, request, render_template

import numpy as np

import rfc

import pandas as pd

from sklearn import metrics

import requests

import json
import warnings

import pickle

warnings.filterwarnings('ignore')

from feature import FeatureExtraction

API_KEY = "ITkxxANDG6N3roYajqDgCD4qZOdsELITcTYseAecmJKu"

token_response = requests.post('https://iam.cloud.ibm.com/identity/token', data={"apikey":

API_KEY, "grant_type": 'urn:ibm:params:oauth:grant-type:apikey'})

mltoken = token_response.json()["access_token"]

header = {'Content-Type': 'application/json', 'Authorization': 'Bearer ' + mltoken}

file = open("pickle/model.pkl","rb")

rfc = 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 =rfc.predict(x)[0]

    #1 is safe

    #-1 is unsafe

    y_pro_phishing = rfc.predict_proba(x)[0,0]

    y_pro_non_phishing = rfc.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)
payload_scoring = {"input_data": [{"field": ["PrefixSuffix-",
                        "SubDomains",
                        "HTTPS",
                        "AnchorURL",
                        "WebsiteTraffic"], "values": [1, -1]}]}
response_scoring = requests.post('https://us-south.ml.cloud.ibm.com/ml/v4/deployments/f44a67e9-
ebef-4ab8-abf0-91b5e1307e64/predictions?version=2022-11-13', json=payload_scoring,
headers={'Authorization': 'Bearer ' + mltoken})
print("Scoring response")
print(response_scoring.json())


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

7.2 FEATURE 2

```
import ipaddress
import re
import socket
import time
import urllib.request
from datetime import date, datetime
from urllib.parse import urlparse
import domain
import requests
import response
import whois
```

```
from bs4 import BeautifulSoup

from dateutil.parser import parse as date_parse

from googlesearch import search

class FeatureExtraction:

features = []

def __init__(self,url):

self.features = []

self.url = url

self.domain = ""

self.whois_response = ""

self.urlparse = ""

self.response = ""

self.soup = ""

url=""

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 (
urllib.request.urlopen 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=" +
urllib.request.urlopen).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]+)", prank_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', urllib.request.urlopen)

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\.1
9\.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
```

8.TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionalityof components, sub assemblies, assemblies and/or a finished product it is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

8.2 USER ACCEPTANCE TESTING

8.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application,and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputsand expected results.

8.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

8.2.3 VALIDATION TESTING

An engineering validation test (EVT) is performed on first engineering prototypes, to ensure that the basic unit performs to design goals and specifications. It is important in

Identifying design problems and solving them as early in the design cycle as possible, is the key to keeping projects on time and within budget. Too often, product design and performance problems are not detected until late in the product development cycle when the product is ready to be shipped. The old adage holds true: It costs a penny to make a change in engineering, a dime in production and a dollar after a product is in the field.Verification is a Quality control process that is used to evaluate whether or not a product,service, or system complies with regulations, specifications, or conditions imposed at the start of a development phase. Verification can be in development, scale up, or production.This is often an internal process.Validation is a Quality assurance process of establishing evidence that provides a high degree of assurance that a product, service, or system accomplishes its intended requirements.

8.2.4 SYSTEM TESTING

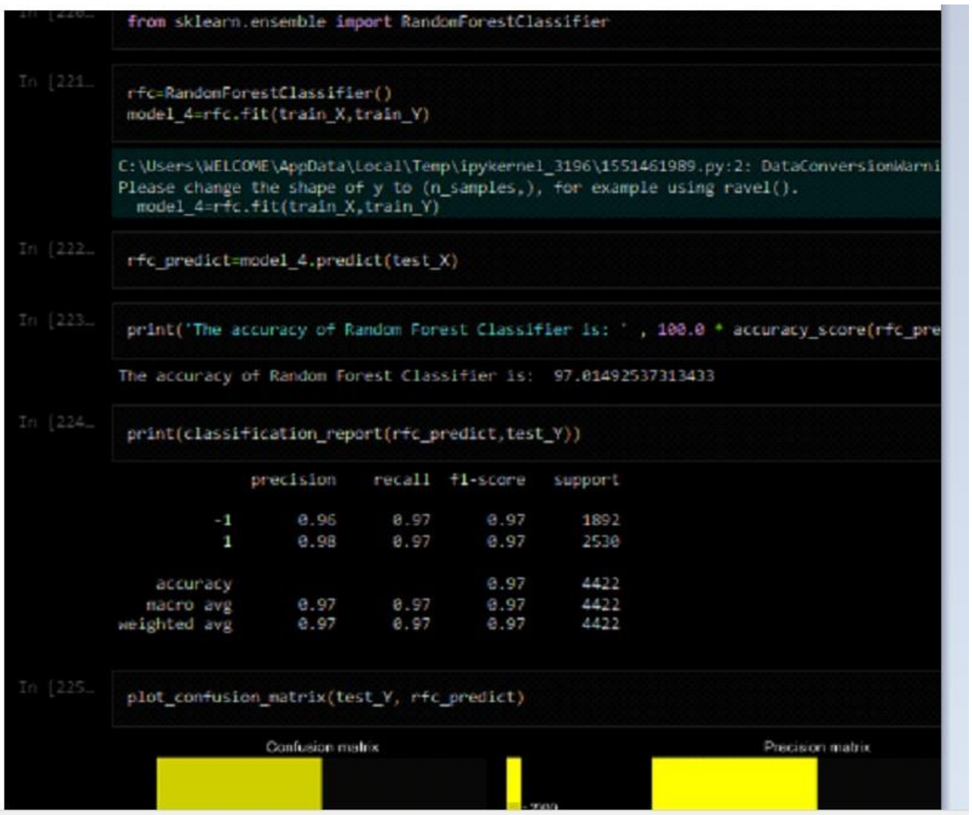
System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements. System testing falls within the scope of black box testing, and as such, should require no knowledge of the inner design of the code or logic.As a rule, system testing takes, as its input, all of the "integrated" software components that have successfully passed integration testing and also the software system itself integrated with any applicable hardware system(s).System testing is a more limited type of testing; it seeks to detect defects both within the "inter-assemblages" and also within the system as a whole.System testing is performed on the entire system in the context of a Functional Requirement Specification(s) (FRS) and/or a System Requirement Specification (SRS).System testing tests not only the design, but also the behavior and even the believed expectations of the customer. It is also intended to test up to and beyond the bounds defined in the software/hardware requirements specification(s).

9.RESULTS

9.1 PERFORMANCE METRICS

- accuracy_score
- classification_report

- plot_confusion_matrix
- plot_roc_curve



```
from sklearn.ensemble import RandomForestClassifier
```

```
In [221…   rfc=RandomForestClassifier()
           model_4=rfc.fit(train_X,train_Y)
```

```
C:\Users\WELCOME\AppData\Local\Temp\ipykernel_3196\1551461989.py:2: DataConversionWarni
Please change the shape of y to (n_samples,), for example using ravel().
  model_4=rfc.fit(train_X,train_Y)
```

```
In [222…   rfc_predict=model_4.predict(test_X)
```

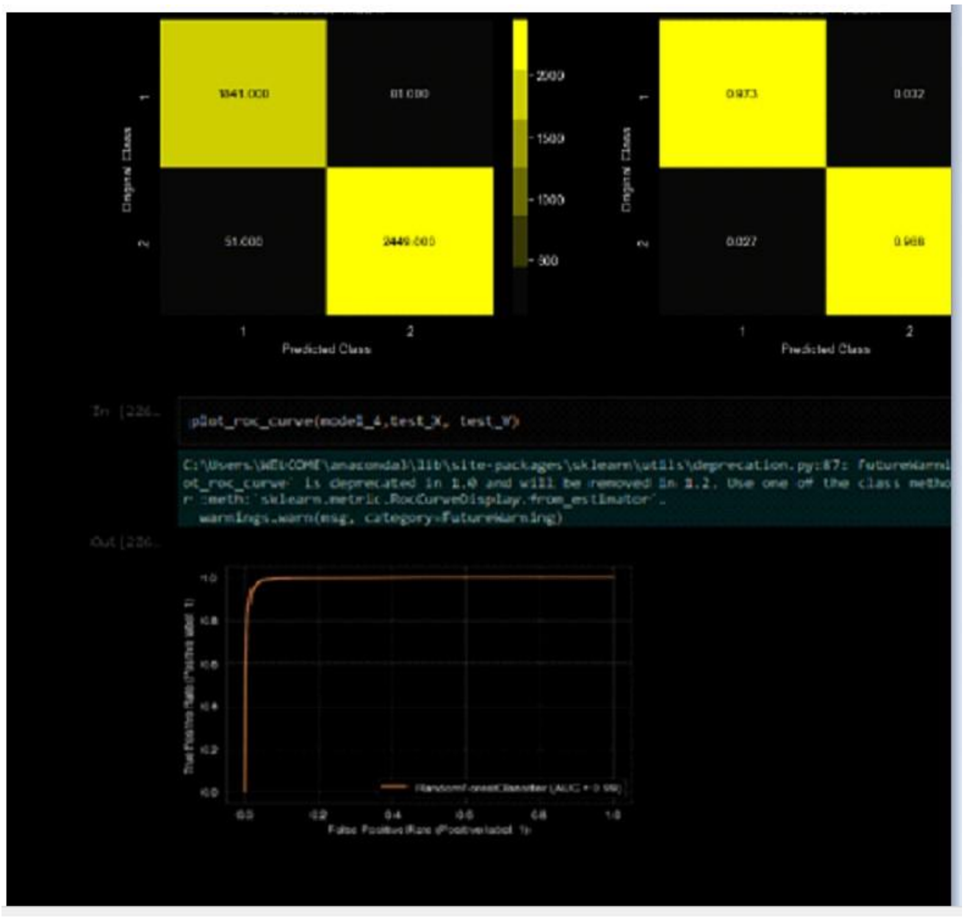
```
In [223…   print('The accuracy of Random Forest Classifier is: ' , 100.0 * accuracy_score(rfc_pre
```

```
The accuracy of Random Forest Classifier is:  97.01492537313433
```

```
In [224…   print(classification_report(rfc_predict,test_Y))
```

```
              precision    recall  f1-score   support

          -1       0.96      0.97      0.97      1892
           1       0.98      0.97      0.97      2530

    accuracy                           0.97      4422
   macro avg       0.97      0.97      0.97      4422
weighted avg       0.97      0.97      0.97      4422
```

```
In [225…   plot_confusion_matrix(test_Y, rfc_predict)
```


1841.000
81.000
51.000
2449.000
0.973
0.032
0.027
0.968
Original Class
Predicted Class
2000
1500
1000
500
True Positive Rate (Positive label: 1)
False Positive Rate (Positive label: 1)
RandomForestClassifier (AUC = 0.99)

```
In [226…  plot_roc_curve(model_4,test_X, test_Y)

C:\Users\WELCOME\anaconda3\lib\site-packages\sklearn\utils\deprecation.py:87: FutureWarni
ot_roc_curve` is deprecated in 1.0 and will be removed in 1.2. Use one of the class metho
r :meth:`sklearn.metric.RocCurveDisplay.from_estimator`.
  warnings.warn(msg, category=FutureWarning)
Out[226…
```

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES

• This system can be used by many E-commerce or other websites in order to have good customer relationship.

• User can make online payment securely.

• Data mining algorithm used in this system provides better performance as compared to other traditional classifications algorithms.

• With the help of this system user can also purchase products online without any hesitation.

- A mailbox-level anti-phishing solution offers an additional layer of protection by analyzing account information and understanding users' communication habits.
- This delivers an enhanced level of phishing protection to detect attacks faster, alert users and remediate threats as quickly as possible.
- Alert users and remediate threats as quickly as possible at detection
- private information such as usernames, passwords, and credit card details, by way of impersonating a legitimate entity.
- It will lead to information disclosure and property damage.

DISADVANTAGES

- If Internet connection fails, this system won’t work.
- All websites related data will be stored in one place.

The problem with phishing is that attack-
ers constantly look for new and creative
ways to fool users into believing their
actions involve a legitimate website or
email. Phishers have become more skilled
at forging websites to appear identical
to the expected location, even including
logos and graphics in the p

11.CONCLUSION

This paper aims to enhance detection method to detect phishing websites using machine learning technology. We achieved 97.14% detection accuracy using random forest algorithm with lowest false positive rate. Also result shows that classifiers give better performance when we used more data as training data. In future hybrid technology will be implemented to detect phishing websites more accurately, for which random forest algorithm of machine learning technology and blacklist method will be used. we get very good performance in classifiers namely, Random Forest computation duration and accuracy. The main idea behind ensemble algorithms is to combine several weak learners into a stronger one, this is perhaps the primary reason why machine learning is used in practice for most of the classification problems

12.FUTURE SCOPE

As we have already a real time implementation in our project the scope for future work for our project would be creating a GUI or web extension which would help our user if he accesses any phishing websites by any chance. The efficient of our product can be increased drastically provided your given access to the current fishing website data collection. As cyber- crime is a very prominent in our generation. The scope of future work for this project is perennial.

13.APPENDIX

13.1 Source code

Style.css

```
*,

*::after,

*::before {

  margin: 0;
  padding: 0;
  box-sizing: inherit;
  font-size: 62,5%;
}
body {
  padding: 10% 5%;
  background: rgb(25, 169, 185);
  justify-content: center;
  align-items: center;
  height: 100vh;
  color: rgb(81, 12, 12);
}
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(123, 140, 164);
  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, rgb(255, 255, 255), #e4dbf8);
  border: 0 solid #e6eaeb;
  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(20, 170, 25, 0.1),0px 2px 2px rgba(9, 187, 33,
0.2);
}

.button:active {
  background-color: #27aca9;
  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), #f51707);
  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%;
}
```

INDEX.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="Narma12">


   <!-- 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/style.css" rel="stylesheet">
   <title>Web Phishing detection</title>
</head>
<body>
<div class=" container">
   <div class="row">
      <div class="form col-md" id="form1">
         <h2>WEB PHISHING 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 here</button>
```

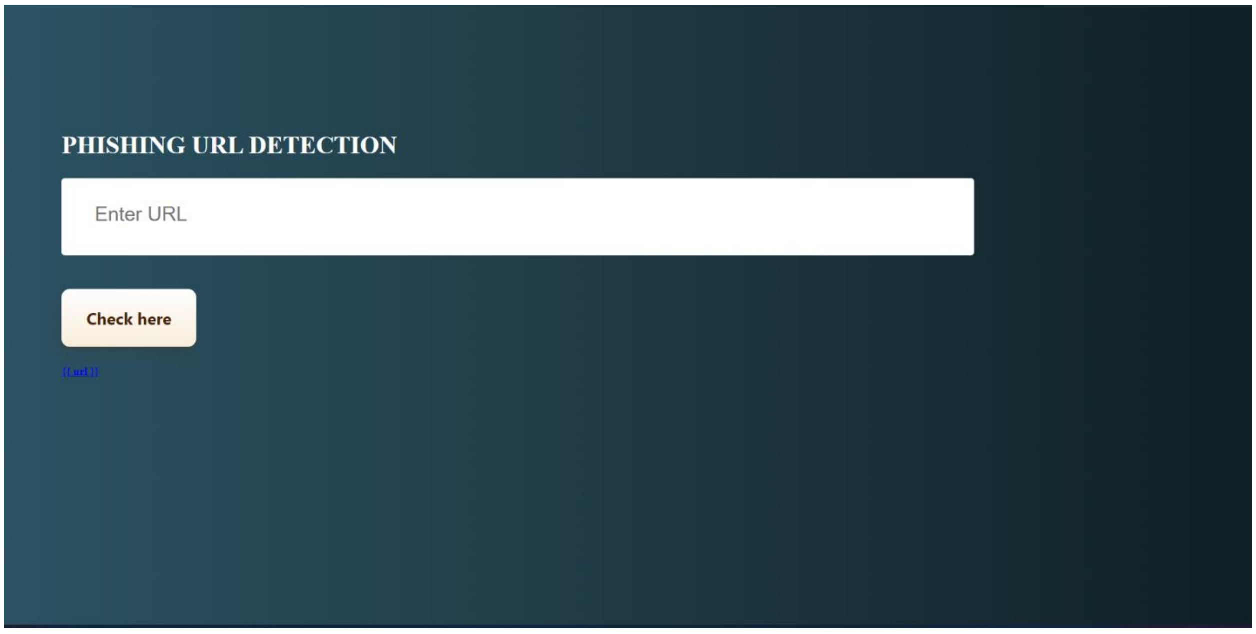
```
          </form>

    </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>
<p>Narma12</p>
</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>
```

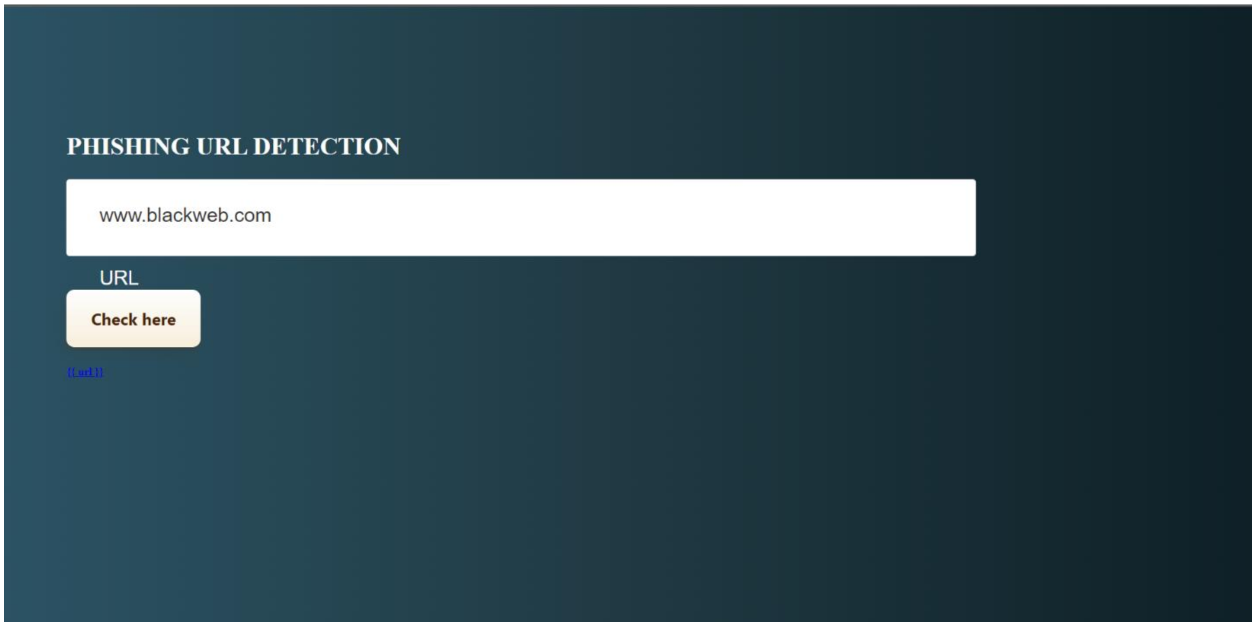
```
</body>

</html>
```

SCREEN SHOTS

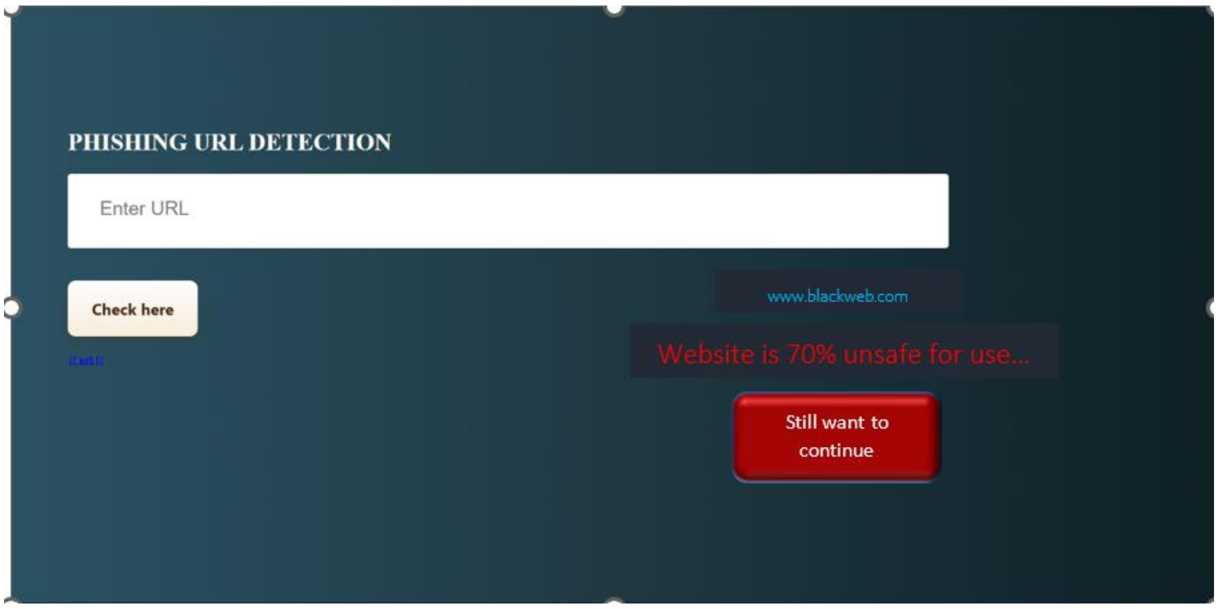
Step1: Home Page of web Phishing Detection



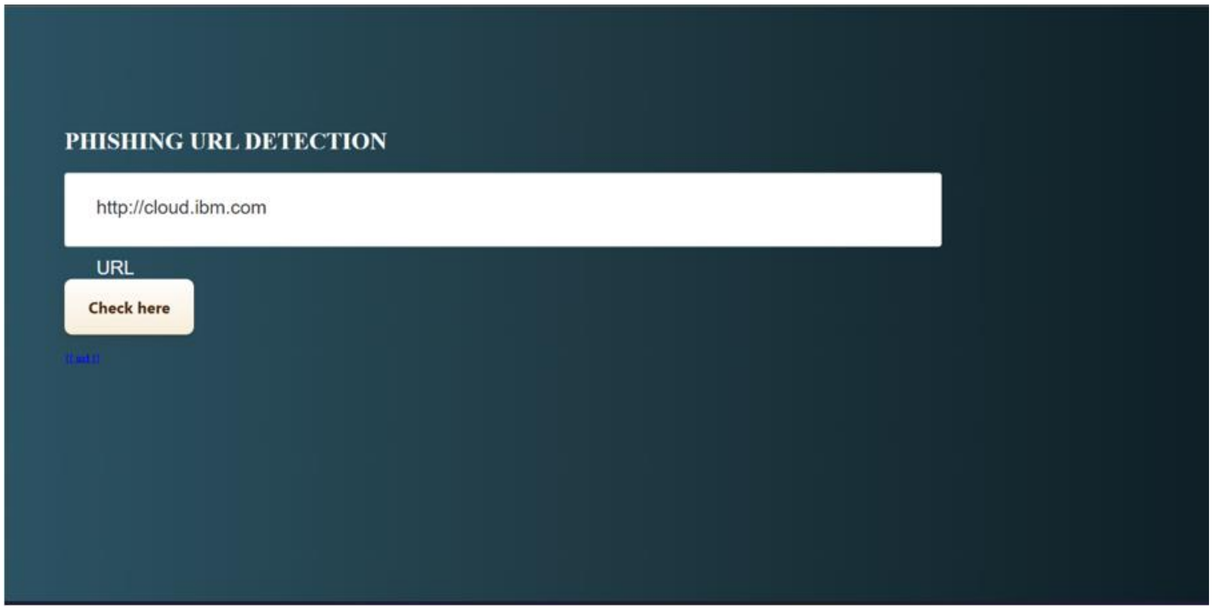
Step 2: Enter the Website URL for Detecting the Website is Phishing or not



Step 3: The Website is phishing it shows the warning Message like Website is unsafe to use



Step 4: Enter the Website URL for Detecting the Website is Phishing or not

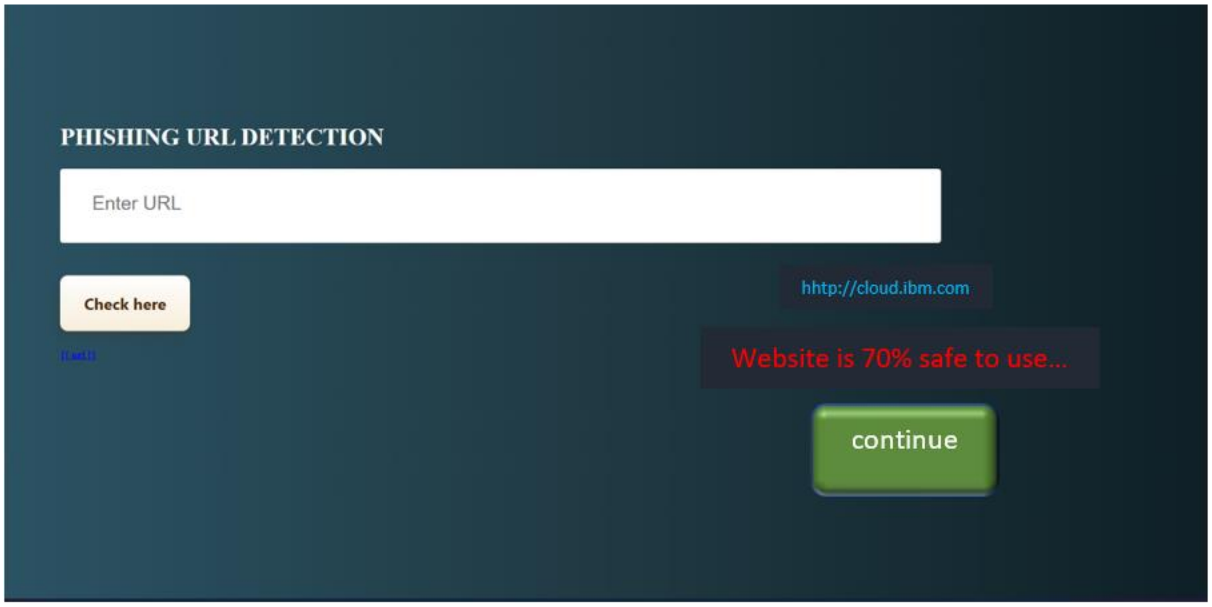


PHISHING URL DETECTION

http://cloud.ibm.com

URL

Step 5: The Website is Legitimate it shows the Message safe to use



PHISHING URL DETECTION

Enter URL

hhtp://cloud.ibm.com

Website is 70% safe to use...