WEB PHISHING DETECTION

Using Machine Learning

A Project report submitted in partial fulfilment of 7th semester in degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

Submitted by

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THE KAVERY ENGINEERING COLLEGE,

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BONAFIDE CERTIFICATE

Certified that this project report ”WEB PHISHING DETECTION” is the bonafide record work done by Mr Hari Prathap.R (612719104027),**Mr** Arivuselvam.P(612719104009),**Mr** Nandhakumar.S (612719104044),**Mr** Sanjay.S (612719104055) **for IBM-NALAIYATHIRAN in VII semester of B.E., degree course in Computer Science and Engineering branch during the academicyearof2022 - 2023.**

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We are highly grateful to thank our Project coordinator **MS G.SUDHA** and our Project Evaluator **MS G.SUDHA** Department of Computer Science and Engineering,

The Kavery Engineering College, for the coordinating us throughout this Project. We are very much indebted to thank all the faculty members of Department of Computer Science and Engineering in our Institute, for their excellent moral support and suggestions to complete our Project work successfully.

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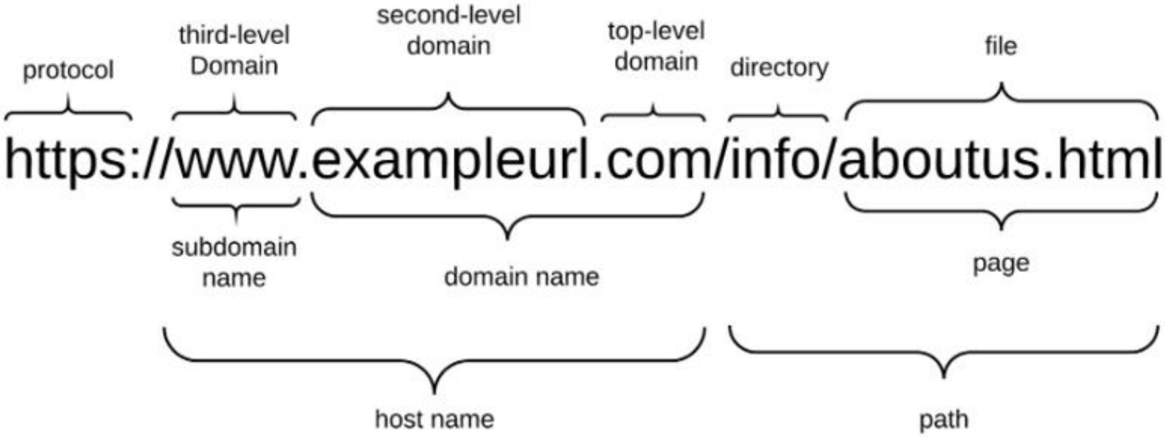
1.INTRODUCTION

Phishing is popular among attackers, since it is easier to trick someone into clicking a malicious link which seems legitimate than trying to break through a computer's defense systems. The malicious links within the body of the message are designed to make it appear that they go to the spoofed organization using that organization's logos and other legitimate contents.

In this article I explain: phishing domain (Applied data science with python) characteristics, the features that distinguish them from legitimate domains, why it is important to detect these domains, and how they can be detected using machine learning

Lets check the URL structure for the clear understanding of how attackers think when they create a phishing domain.



1.1.Project Overview

Web Phishing Detection:

There are a number of users who purchase products online and make payments through e-banking. There are e-banking websites that ask users to provide sensitive data such as username, password & credit card details, etc., often for malicious reasons. This type of e-banking website is known as a phishing website. 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.

- Large organizations may get trapped in different kinds of scams.

This Guided Project mainly focuses on applying a machine-learning algorithm to detect Phishing websites.

In order to detect and predict e-banking phishing websites, we proposed an intelligent, flexible and effective system that is based on using classification algorithms. We implemented classification algorithms and techniques to extract the phishing datasets criteria to classify their legitimacy. The e-banking phishing website can be detected based on some important characteristics like URL and domain identity, and security and encryption criteria in the final phishing detection rate. Once a user makes a transaction online when he makes payment through an e-banking website our system will use a data mining algorithm to detect whether the e-banking website is a phishing website or not.

OBJECTIVES :

The objective of phishing website URLs is to purloin the personal information like user name, passwords and online banking transactions. Phishers use the websites which are visually and semantically similar to those real websites. As technology continues to grow, phishing techniques started to progress rapidly and this needs to be prevented by using anti-phishing mechanisms to detect phishing. Machine learning is a powerful tool used to strive against phishing attacks. This paper surveys the features used for detection and detection techniques using machine learning. Phishing becomes a main area of concern for security researchers because it is not difficult to create the fake website which looks so close to 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. Phishing attacks are becoming successful because lack of user awareness. Since phishing attack exploits the weaknesses found in users, it is very difficult to mitigate them but it is very important to enhance phishing detection techniques.

Phishing may be a style of broad extortion that happens once a pernicious web site act sort of a real one memory that the last word objective to accumulate unstable info, as an example, passwords, account focal points, or MasterCard numbers. all the same, the means that there square measure some of contrary to phishing programming

ALGORITHMS USED :

Two algorithms have been implemented to check whether a URL is legitimate or fraudulent. Random forest algorithm creates the forest with number of decision trees. High number of tree gives high detection accuracy. Creation of trees is based on bootstrap method. In bootstrap method features and samples of dataset are randomly selected with replacement to construct single tree. Decision tree begins its work by choosing best splitters from the available attributes for classification which is considered as a root of the tree. Algorithm continues to build tree until it finds the leaf node. Decision tree creates training model which is used to predict target value or class in tree representation each internal node of the tree belongs to attribute and each leaf node of the tree belongs to class label.

The accuracy of the model :

Research demonstrates that current phishing detection technologies have an accuracy rate between 70% and 92.52%. The experimental results prove that the accuracy rate of our proposed model can yield up to 95%, which is higher than the current technologies for phishing website detection.

The Flask framework :

The advantage of web applications is that they're platform independent and can be run by anyone who has access to the Internet. Their code is implemented on a back-end server, where the program processes incoming requests and responds through a shared protocol that's understood by all browsers. Python powers many large web applications and is a common choice as a back-end language. Many Python-driven web applications are planned from the start as web applications and are built using Python web frameworks.

Project Flow

Find below the project flow to be followed while developing the project.

- Download the dataset.
- Preprocess or clean the data.
- Analyze the pre-processed data.
- Train the machine with preprocessed data using an appropriate machine learning algorithm.
- Save the model and its dependencies.
- Build a Web application using a flask that integrates with the model built.

Pre-Requisites

In order to develop this project we need to install the following software/packages:

Step 1:

Anaconda Navigator :

Anaconda Navigator is a free and open-source distribution of the Python and R programming languages for data science and machine learning related applications. It can be installed on Windows, Linux, and macOS. Conda is an open-source, cross-platform, package management system. Anaconda comes with great tools like JupyterLab, Jupyter Notebook, QtConsole, Spyder, Glueviz, Orange, Rstudio, Visual Studio Code.

Application Building

Building an Application to integrate the model

After the model is built, we will be integrating it to a web application so that normal users can also use it to know if any website is phishing or safe in a no-code manner.

In the application, the user provides any website URL to check and the corresponding parameter values are generated by analysing the URL using which legitimate websites are detected.

Features Used for Phishing Domain Detection

There are a lot of algorithms and a wide variety of data types for phishing detection in the academic literature and commercial products. A phishing URL and the corresponding page have several features which can be differentiated from a malicious URL.

For example; an attacker can register long and confusing domain to hide the actual domain name (Cybersquatting, Typosquatting). In some cases attackers can use direct IP addresses instead of using the domain name. This type of event is out of our scope, but it can be used for the same purpose. Attackers can also use short domain names which are irrelevant to legitimate brand names and don’t have any FreeUrl addition. But these type of web sites are also out of our scope, because they are more relevant to fraudulent domains instead of phishing domains.

Beside URL-Based Features, different kinds of features which are used in machine learning algorithms in the detection process of academic studies are used. Features collected from academic studies for the phishing domain detection with machine learning techniques are grouped as given below.

1. URL-Based Features
2. Domain-Based Features
3. Page-Based Features
4. Content-Based Features

URL-Based Features

URL is the first thing to analyse a website to decide whether it is a phishing or not. As we mentioned before, URLs of phishing domains have some distinctive points. Features which are related to these points are obtained when the URL is processed.

1.2.Purpose

Phishing is a major problem, which uses both social engineering and technical deception to get users' important information such as financial data, emails, and other private information. Phishing exploits human vulnerabilities; therefore, most protection protocols cannot prevent the whole phishing attacks

Our approach extracts and analyzes different features of suspected webpages for effective identification of large-scale phishing offenses. The main contribution of this paper is the combined uses of these feature set. For improving the detection accuracy of phishing webpages, we have proposed eight new features. Our proposed features determine the relationship between the URL of the webpage and the webpage content.

2.Literature Survey

Team ID : PNT2022TMID41066

Project Name: Web phishing Detection

College Name : The Kavery engineering college

Department : Computer Science And Engineering

Team Leader : Hari Prathap.R

Team Member : Arivuselvam.P

Team Member : Nandhakumar.S

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Phishing Websites Features

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1. Phishing Websites Features:

One of the challenges faced by our research was the unavailability of reliable training datasets. In fact, this challenge faces any researcher in the field. However, although plenty of articles about predicting phishing websites using data mining techniques have been disseminated these days, no reliable training dataset has been published publically, maybe because there is no agreement in literature on the definitive features that characterize phishing websites, hence it is difficult to shape a dataset that covers all possible features.

In this article, we shed light on the important features that have proved to be sound and effective in predicting phishing websites. In addition, we proposed some new features, experimentally assigned new rules to some well-known features and updated some other features.

2. Address Bar based Features:

Using the IP Address

If an IP address is used as an alternative of the domain name in the URL, such as "http://125.98.3.123/fake.html", users can be sure that someone is trying to steal their personal information. Sometimes, the IP address is even transformed into hexadecimal code as shown in the following link "http://0x58.0xCC.0xCA.0x62/2/paypal.ca/index.html".

Rule: IF{ Url   ip Address>>>phishing
otherwise>>>legitime

Long URL to Hide the Suspicious Part:

Phishers can use long URL to hide the doubtful part in the address bar.

For example:

http://federmacedoadv.com.br/3f/aze/ab51e2e319e51502f416dbe46b773a5e/?cmd=_home&amp;dispatch =11004d58f5b74f8dc1e7c2e8dd4105e811004d58f5b74f8dc1e7c2e8dd4105e8@phishing.website.html

To ensure accuracy of our study, we calculated the length of URLs in the dataset and produced an average URL length. The results showed that if the length of the URL is greater than or equal 54 characters then the URL classified as phishing. By reviewing our dataset we were able to find 1220 URLs lengths equals to 54 or more which constitute 48.8% of the total dataset size.

Redirecting using "//"

The existence of "//" within the URL path means that the user will be redirected to another website. An example of such URL's is: "http://www.legitimate.com//http://www.phishing.com". We examine the location where the "//" appears. We find that if the URL starts with "HTTP", that means the "//" should appear in the sixth position. However, if the URL employs "HTTPS" then the "//" should appear in seventh position.

Rule: IF

Adding Prefix or Suffix Separated by (-) to the Domain

The dash symbol is rarely used in legitimate URLs. Phishers tend to add prefixes or suffixes separated by (-) to the domain name so that users feel that they are dealing witha legitimate webpage. For example http://www.Confirme-paypal.com

Sub Domain and Multi Sub Domains

Let us assume we have the following link: http://www.hud.ac.uk/students/. A domain name might include the country-code top-level domains (ccTLD), which in our example is "uk". The "ac" part is shorthand for "academic", the combined "ac.uk" is called a second-level domain (SLD) and "had" is the actual name of the domain. To produce a rule for extracting this feature, we firstly have to omit the (www.) from the URL which is in fact a sub domain in itself. Then, we have to remove the (ccTLD) if it exists. Finally, we count the remaining dots. If the number of dots is greater than one, then the URL is classified as "Suspicious" since it has one sub domain. However, if the dots are greater than two, it is classified as "Phishing" since it will have multiple sub domains. Otherwise, if the URL has no sub domains, we will assign "Legitimate" to the feature.

HTTPS (Hyper Text Transfer Protocol with SecureSockets Layer)

The existence of HTTPS is very important in giving the impression of website legitimacy, but this is clearly not enough. The authors in (Mohammad, Thabtah and McCluskey 2012)(Mohammad, Thabtah and McCluskey 2013) suggest checking the certificate assigned with HTTPS including the extent of the trust certificate issuer, and the certificate age. Certificate Authorities that are consistently listed among the top trustworthy names include: “GeoTrust, GoDaddy, Network Solutions, Thawte, Como- do, Doster and VeriSign”. Furthermore, by testing out our datasets, we find that the minimum age of a reputable certificate is two years.

Domain Registration Length

Based on the fact that a phishing website lives for a short period of time, we believe that trustworthy domains are regularly paid for several years in advance. In our dataset, we find that the longest fraudulent domains have been used for one year only.

Table 1 Common ports to be checked

PORT	Service	Meaning	Preferred Status
21	FTP	Transfer files from one host to another	Close
22	SSH	Secure File Transfer Protocol	Close
23	Telnet	provide bidirectional interactive text-oriented communication	Close
80	HTTP	Hyper test transfer protocol	Open
443	HTTPS	Hypertext transfer protocol secured	Open
445	SMB	Providing shared access to files, printers, serial ports	Close
1433	MSSQL	Store and retrieve data as requested by other software applications	Close
1521	ORACLE	Access oracle database from web.	Close
3306	MySQL	Access MySQL database from web.	Close
3389	Remote Desktop	allow remote access and remote collaboration	Close

Abstract

The detection of phishing attacks. Phishing attacks target vulnerabilities that exist in systems due to the human factor. Many cyber attacks are spread via mechanisms that exploit weaknesses found in end-users, which makes users the weakest element in the security chain. The phishing problem is broad and no single silver-bullet solution exists to mitigate all the vulnerabilities effectively, thus multiple techniques are often implemented to mitigate specific attacks.

This paper surveys the features used for detection and detection techniques using machine learning. Phishing becomes a main area of concern for security researchers because it is not difficult to create the fake website which looks so close to 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.

The Main aim of the attacker is to steal banks account credentials. Phishing attacks are becoming successful because of lack of user awareness. Since phishing attack exploits the weaknesses found in users, it is very difficult to mitigate them but it is very important to enhance phishing detection techniques.

Phishing maybe a style of broad extortion that happens once a pernicious web site acts sort of a real one memory that the last word objective to accumulate unstable info, as an example, passwords, account focal points, or MasterCard numbers. all the same, the means that there square measure some of contrary to phishing programming

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Decision tree begins its work by choosing the best splitters from the available attributes for classification which is considered as a root of the tree. The algorithm continues to build tree until it finds the leaf node. Decision tree creates training model which is used to predict target value or class in tree representation each internal node of the tree belongs to attribute and each leaf node of the tree belongs to class label.

The accuracy of the model :

Research demonstrates that current phishing detection technologies have an accuracy rate **between 70% and 92.52%**. The experimental results prove that the accuracy rate of our proposed model can yield up to 95%, which is higher than the current technologies for phishing website detection.

Phishing Website Detection Using Machine LearningAlgorithms:

PROPOSED WORK:

URLs extracting and analyze Various links by checking with Back listing with the help of Machine Learning to increase accuracy.

TOOLS USED/ ALGORITHM:

- Decision Tree Algorithm
- Random Forest Algorithm
- Support Vector Machine Algorithm

TECHNOLOGY:

- Machine Learning

ADVANTAGES/ DISADVANTAGES:

The disadvantage is that the Characteristics are not guaranteed to always exist in such attacks and the false positive rate in detection is very high.

Advantage is 97.14% detection accuracy using random forest algorithm with lowest false positive rate

Detecting phishing websites using machine learning technique:

PROPOSED WORK:

URL-based anti-phishing machine learning and method URL Net, a CNN-based deep-neural URL detection network.

TOOLS USED/ALGORITHM:

- Support Vector Machine
- K-NN
- Random forest classification
- Artificial Neural Network

TECHNOLOGY:

- Machine Learning

ADVANTAGES/ DISADVANTAGES:

Advantages-Reduces over fitting in decision trees and helps to improve the accuracy.

Disadvantages-Requires a computational power as well as resources as it builds numerous trees to combine their outputs.

Phishing Website detection using machine learning and deeplearning techniques

PROPOSED WORK:

It discusses the machine learning and deep learning algorithms and apply all these algorithms on our dataset and the best algorithm having the best precision and accuracy is selected for the phishing website detection.

TOOLS USED/ALGORITHM:

- Regression Techniques
- K nearest neighbor
- Decision Tree
- Random Forest
- XG Boost
- AdaBoost.

TECHNOLOGY:

- Machine Learning
- Deep Learning

ADVANTAGES/ DISADVANTAGES:

Advantage is to eliminate the cyber threat risk level. Increase user alertness to phishing risks.

Disadvantage is Negative effects on a business, including of money, loss of intellectual property

Phishing Website Detection Based on URL:PROPOSED WORK:

To preserve the confidentiality. develop a user-friendly environment and to prevent or mitigate harm or destruction of computer networks,applications, devices, and data.

TOOLS USED/ALGORITHM:

- Learning Model Algorithm
- Naive BayesAlgorithm
- Decision tree,
- Support Vector Machine
- Artificial Neural Network
- Sequential Minimal Optimization

TECHNOLOGY:

- Machine Learning

ADVANTAGES/ DISADVANTAGES:

Advantages–Provide clear idea about the effective level of each classifier on phishingemail detection.
Disadvantages-Non standard classifier

Phishing Website Detection Based on Deep ConvolutionNeural Network and Random Forest Ensemble Learning

PROPOSED WORK:

It proposes an integrated phishing website detection method based on convolution neural networks (CNN) and random forest (RF)

TOOLS USED/ALGORITHM:

- Linear Regression
- K nearest neighbor
- Support Vector Machine
- Random Forest
- XG Boost
- Naïve Bayes
- RNN Model
- CNN Model

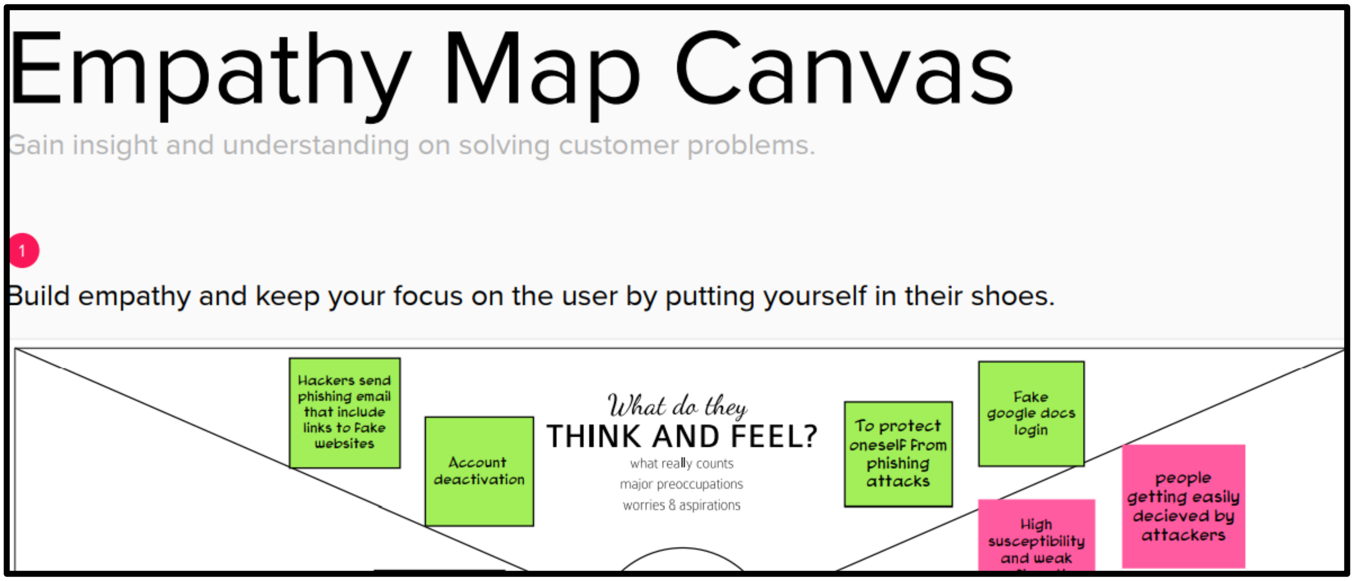
TECHNOLOGY:

- Machine Learning
- Deep Learning

ADVANTAGES/ DISADVANTAGES:

The disadvantage is that the model cannot determine whether the URL is active or not, so it is necessary to test whether the URL is active or not before detection. Advantage is that the third-party service is independent.

3.IDEATION & PROPOSED SOLUTION



Empathy Map Canvas

Gain insight and understanding on solving customer problems.

1

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

Hackers send phishing email that include links to fake websites

Account deactivation

What do they THINK AND FEEL?

what really counts

major preoccupations

worries & aspirations

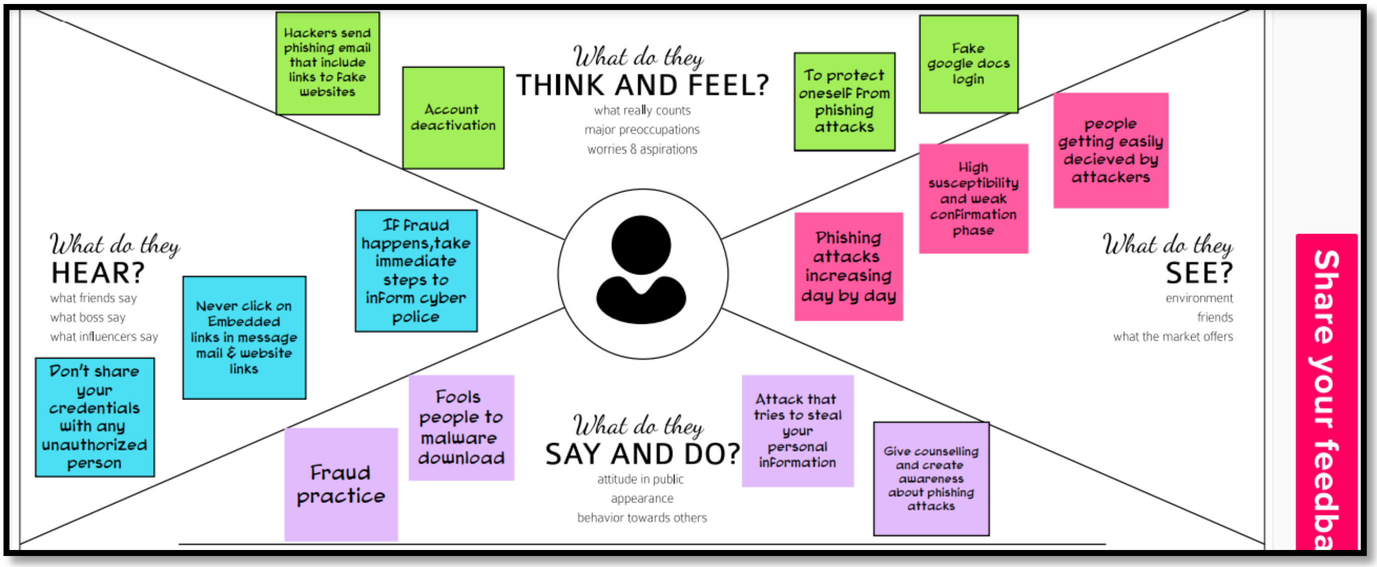
To protect oneself from phishing attacks

Fake google docs login

people getting easily decieved by attackers

High susceptibility and weak

3.1 Empathy Map Canvas:



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To protect oneself from phishing attacks

Fake google docs login

people getting easily decieved by attackers

High susceptibility and weak confirmation phase

What do they HEAR?

what friends say

what boss say

what influencers say

If fraud happens,take immediate steps to inform cyber police

Never click on Embedded links in message mail & website links

Don't share your credentials with any unauthorized person

Phishing attacks increasing day by day

What do they SEE?

environment

friends

what the market offers

Share your feedba

Fraud practice

Fools people to malware download

What do they SAY AND DO?

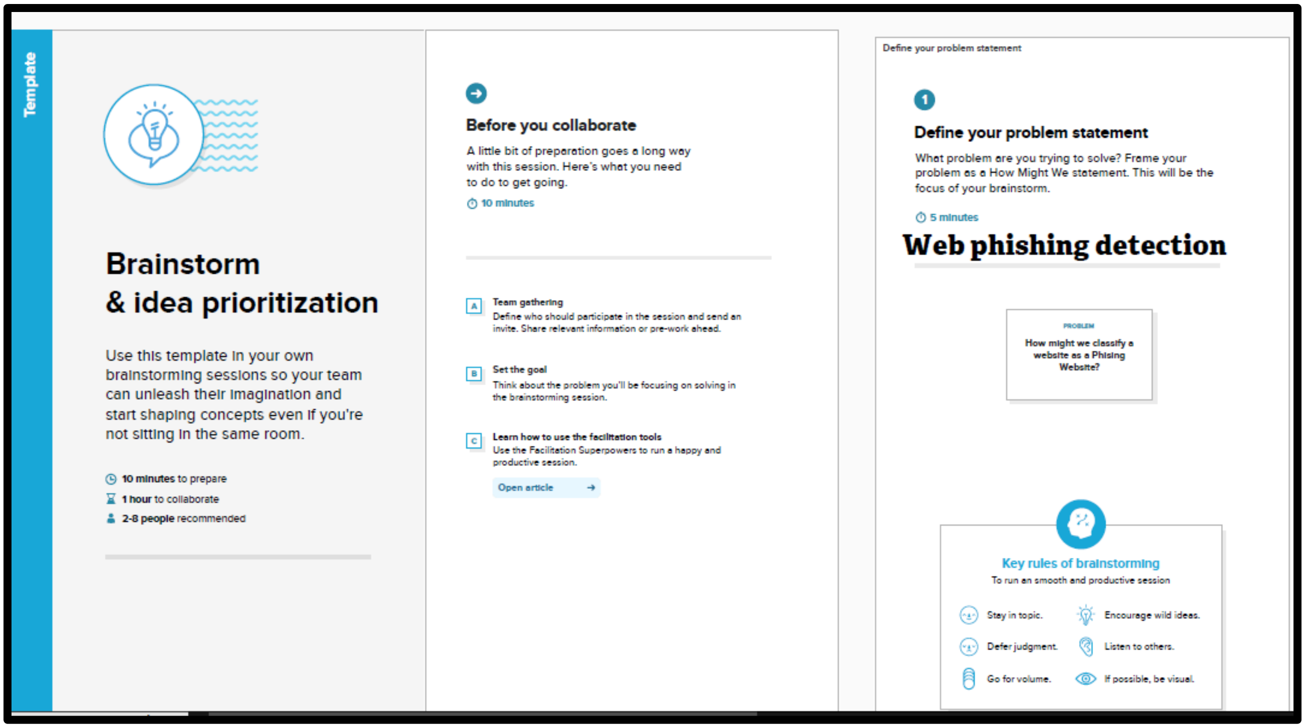
attitude in public

appearance

behavior towards others

Attack that tries to steal your personal information

Give counselling and create awareness about phishing attacks



Template

Brainstorm
& idea prioritization

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.

- **10 minutes** to prepare
- **1 hour** to collaborate
- **2-8 people** recommended

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

A **Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B **Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.

C **Learn how to use the facilitation tools**
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

Define your problem statement

1 **Define your problem statement**

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

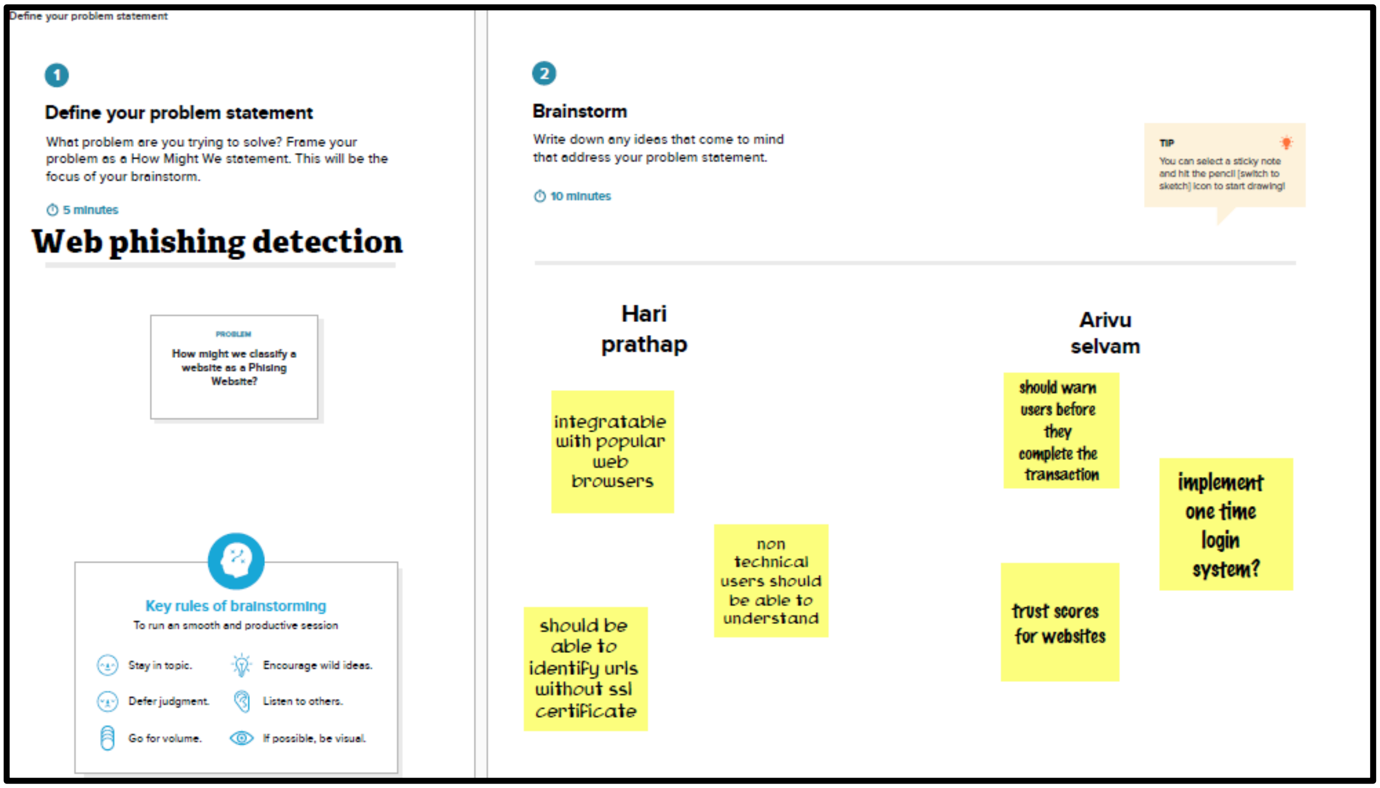
Web phishing detection

PROBLEM
How might we classify a website as a Phising Website?

Key rules of brainstorming
To run an smooth and productive session

Stay in topic.	Encourage wild ideas.
Defer judgment.	Listen to others.
Go for volume.	If possible, be visual.

3.2 Ideation & Brainstorming:



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Key rules of brainstorming
To run an smooth and productive session

Stay in topic.	Encourage wild ideas.
Defer judgment.	Listen to others.
Go for volume.	If possible, be visual.

2 **Brainstorm**

Write down any ideas that come to mind that address your problem statement.

10 minutes

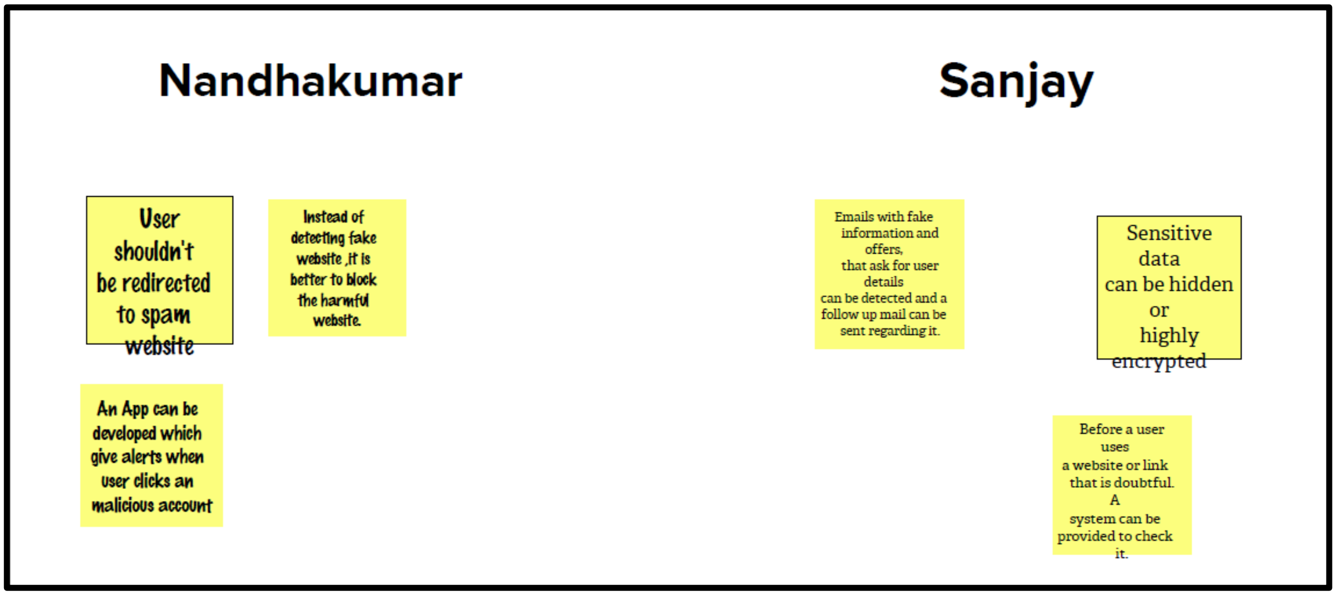
TIP
You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Hari prathap

- integratable with popular web browsers
- non technical users should be able to understand
- should be able to identify urls without ssl certificate

Arivu selvam

- should warn users before they complete the transaction
- implement one time login system?
- trust scores for websites



Nandhakumar

User shouldn't be redirected to spam website

Instead of detecting fake website ,it is better to block the harmful website.

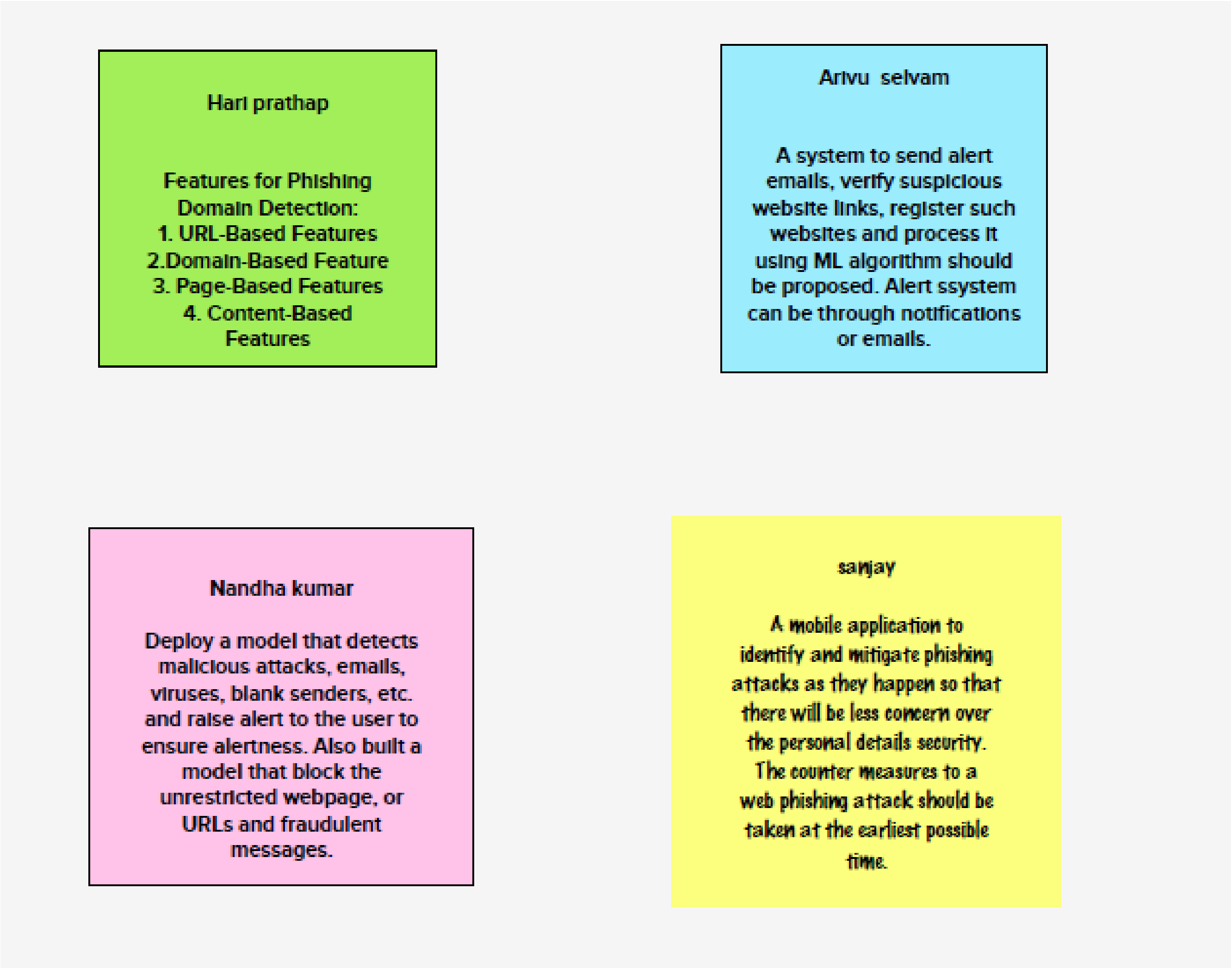
An App can be developed which give alerts when user clicks an malicious account

Sanjay

Emails with fake information and offers, that ask for user details can be detected and a follow up mail can be sent regarding it.

Sensitive data can be hidden or highly encrypted

Before a user uses a website or link that is doubtful. A system can be provided to check it.



Hari prathap

Features for Phishing Domain Detection:
1. URL-Based Features
2.Domain-Based Feature
3. Page-Based Features
4. Content-Based Features

Arivu selvam

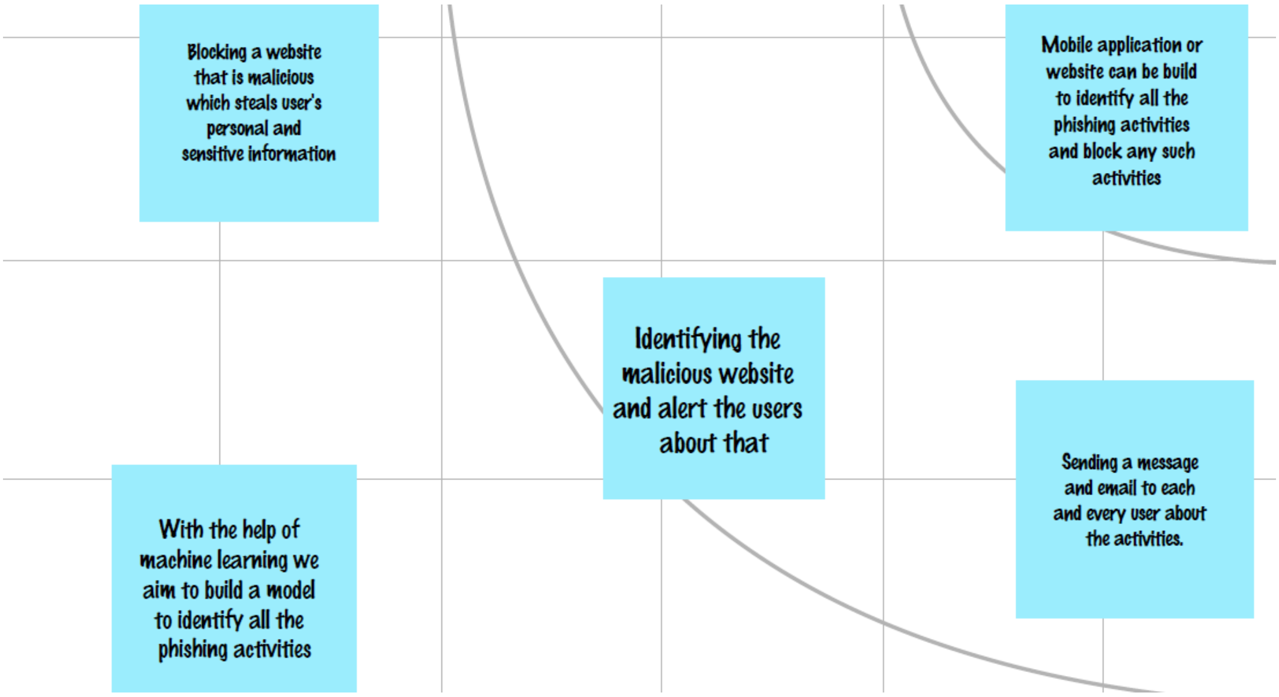
A system to send alert emails, verify suspicious website links, register such websites and process it using ML algorithm should be proposed. Alert ssystem can be through notifications or emails.

Nandha kumar

Deploy a model that detects malicious attacks, emails, viruses, blank senders, etc. and raise alert to the user to ensure alertness. Also built a model that block the unrestricted webpage, or URLs and fraudulent messages.

sanjay

A mobile application to identify and mitigate phishing attacks as they happen so that there will be less concern over the personal details security. The counter measures to a web phishing attack should be taken at the earliest possible time.


Blocking a website that is malicious which steals user's personal and sensitive information
Mobile application or website can be build to identify all the phishing activities and block any such activities
Identifying the malicious website and alert the users about that
Sending a message and email to each and every user about the activities.
With the help of machine learning we aim to build a model to identify all the phishing activities

3.3 Proposed Solution

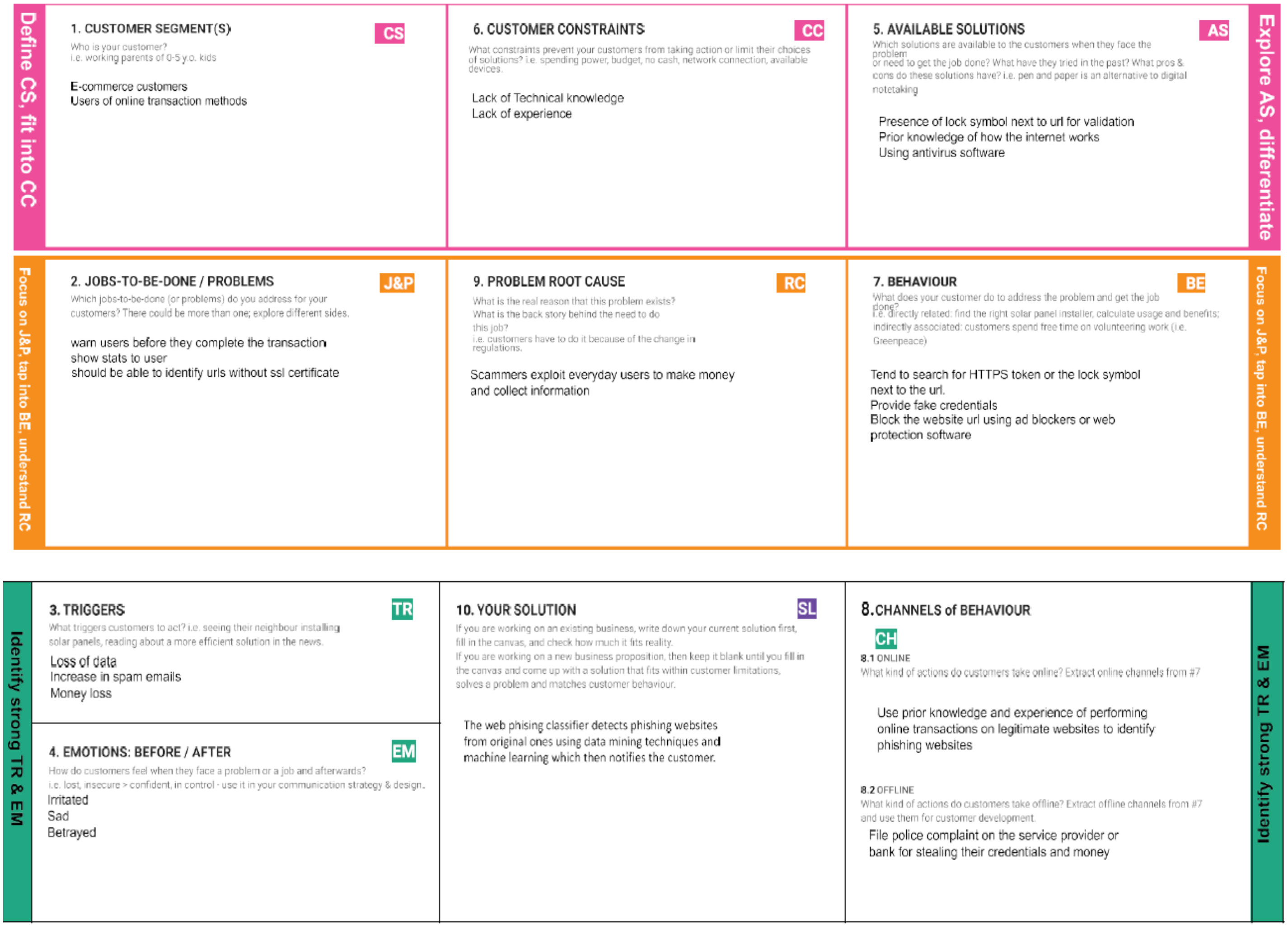
Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	**Problem Statement (Problemto besolved)**	Web phishing tends to steal a lots of information from the user during online transaction like username, password, important documents that has been attached to that websites. One of the many security risks to web services on the Internet is web phishing. There are Multiple Types of Attacks happens here every day, but there is no auto detection Process through Machine Learning is achieved
2.	**Idea / Solution description**	Through ML and data mining techniques like classification algorithm user can ableto attain a warning signal to notify these phishing websites which helps the user to safeguard their identities and their login credentials etc. python is the language that helps to enable these techniques for the online users Using the results obtained safe websites for online transactions are acquired which would then be made accessible to the users through an online application.

3.	**Novelty / Uniqueness**	This project not only able to identify the malicious websites it also has the ability to automatically block these kind of websites completely in the future when it has been identified and also blocks some various mails /ads from these malicious websites
4.	**Social Impact / Customer Satisfaction**	This web phishing detection project attains the customer satisfaction by discarding various kinds of malicious websites to protect their privacy. This project is not onlycapable of using by an single individual ,a large social community and a organization can use this web phishing detection to protect their privacy. This project helps toblock various malicious websites simultaneously.
5.	**Business Model (Revenue Model)**	This developed model can be used as an enterprise applications by organizations which handles sensitive information and also can be sold to government agencies to prevent the loss of potential important data.Based on membership levels, different levels of security strictness and multiple volumes of secure e-commerce websites would be offered.
6.	**Scalability of the Solution**	This project's performance rate will be high and it also provide many capabilities tothe user without reducing its efficiency to detect the malicious websites. thus scalability of this project will be high .It could be further extended for other security concerns such as audio recording, video recording, location tracking, virusattacks and more.with safer and more effective solutions.

3.4 Problem Solution fit:



Define CS, fit into CC

1. CUSTOMER SEGMENT(S) CS

Who is your customer?
i.e. working parents of 0-5 y.o. kids

E-commerce customers
Users of online transaction methods

6. CUSTOMER CONSTRAINTS CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

Lack of Technical knowledge
Lack of experience

5. AVAILABLE SOLUTIONS AS

Which solutions are available to the customers when they face the problem
or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking

Presence of lock symbol next to url for validation
Prior knowledge of how the internet works
Using antivirus software

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS J&P

Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.

warn users before they complete the transaction
show stats to user
should be able to identify urls without ssl certificate

9. PROBLEM ROOT CAUSE RC

What is the real reason that this problem exists?
What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

Scammers exploit everyday users to make money and collect information

7. BEHAVIOUR BE

What does your customer do to address the problem and get the job done?
i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

Tend to search for HTTPS token or the lock symbol next to the url.
Provide fake credentials
Block the website url using ad blockers or web protection software

Focus on J&P, tap into BE, understand RC

Identify strong TR & EM

3. TRIGGERS TR

What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.

Loss of data
Increase in spam emails
Money loss

4. EMOTIONS: BEFORE / AFTER EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

Irritated
Sad
Betrayed

10. YOUR SOLUTION SL

If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

The web phising classifier detects phishing websites from original ones using data mining techniques and machine learning which then notifies the customer.

8. CHANNELS of BEHAVIOUR CH

8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7

Use prior knowledge and experience of performing online transactions on legitimate websites to identify phishing websites

8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

File police complaint on the service provider or bank for stealing their credentials and money

Identify strong TR & EM

4. REQUIREMENT ANALYSIS:

Functional Requirements:

Following are the functional requirements of the proposed solution.

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
FR-3	Website identification	Model Detects the malicious website using blacklist And give alert message
FR-4	Prediction	Model predicts the URL using Machine Learning algorithms such as Regression, KNN
FR-5	Classifier	Model predicts all the output to classifier and produces the final result.
FR-6	Results	Model predict the website and give pop- up to the user before they enter any confidential details

Non-functional Requirements:

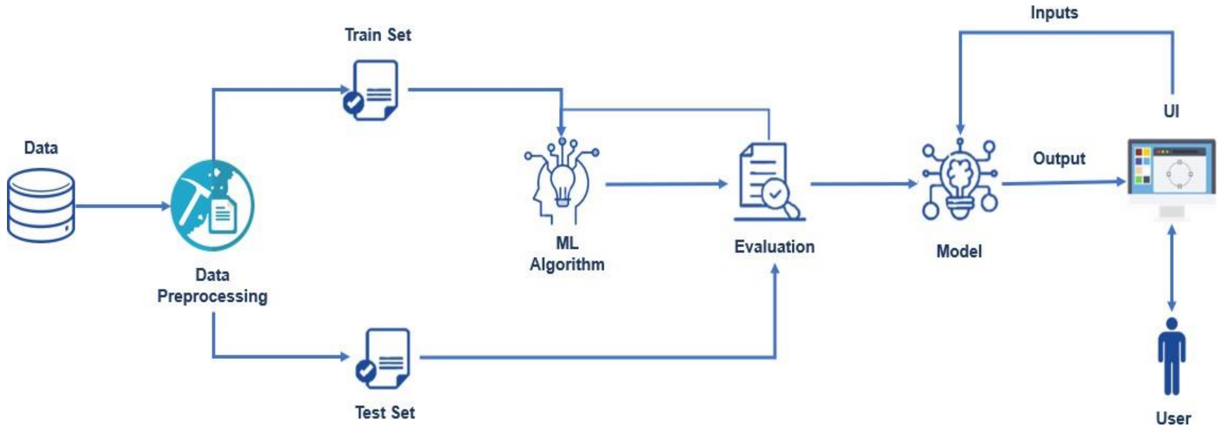
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	User can access to several website easily using web phishing detection without loosing any data
NFR-2	**Security**	User can check whether the websites are secure or not by getting pop-up message
NFR-3	**Reliability**	User should feel it reliable while using any website
NFR-4	**Performance**	The performance should be faster and user friendly for the effective performance
NFR-5	**Availability**	The users should get availability to access the resources must be valid and reliable
NFR-6	**Scalability**	The performance of the website should be efficient to handle the increasing user and loads without any disturbance

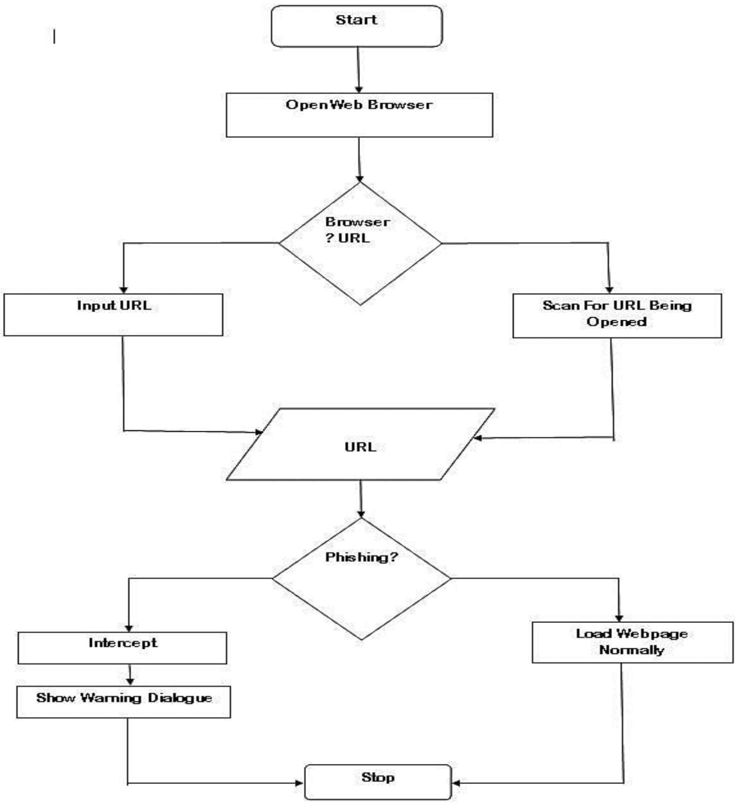
5. PROJECT DESIGN:

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.



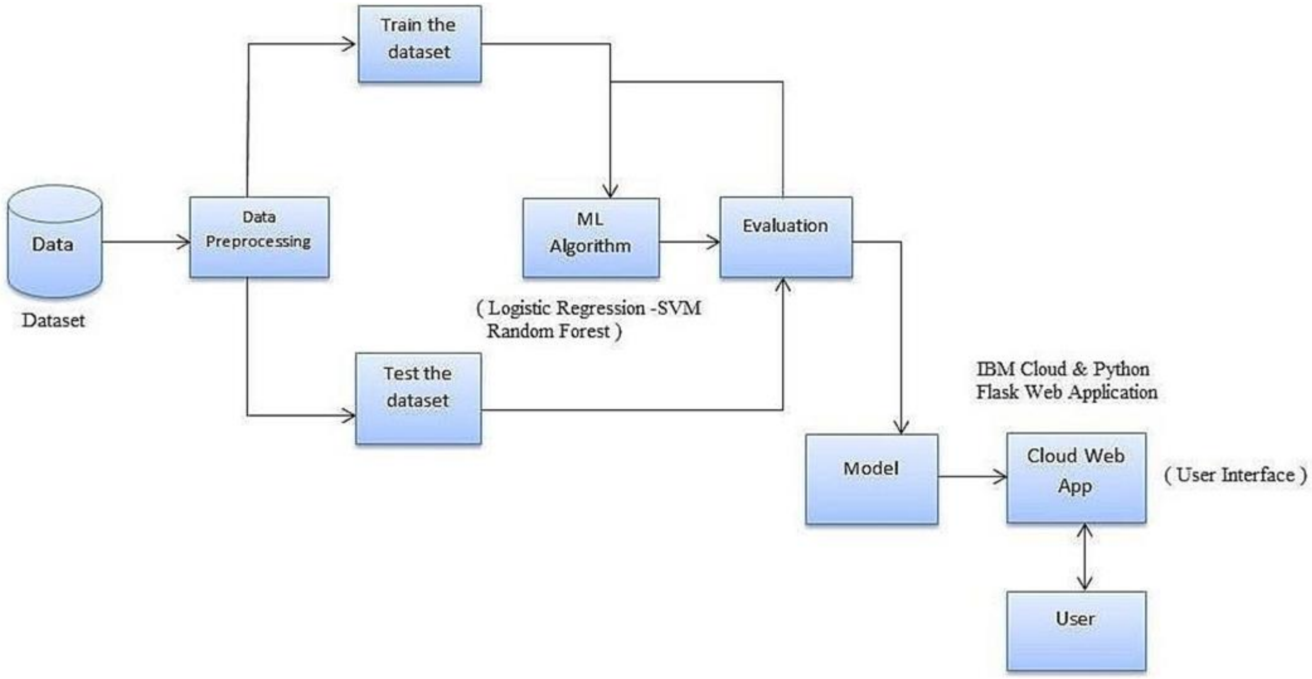
DFD Level 0:



5.2 Solution & Technical Architecture

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2



5.3 User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement(Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Contact	USN-1	As a user, I can contact to the administrationsystem to report about the performance.	I can contact directly by writing in the contactform.	High	Sprint-1
		USN-2	As a user, I will engage with admin to report about query regarding phishing website.	I can have a chat aboutthequery.	High	Sprint-1
	About	USN-3	As a user, I can read about the phishing and be aware of the harmful sides of the websites.		High	Sprint-1
	Dashboard					
Customer (Webuser)	User input	USN-1	As a user I can input the particular URL in theSearch field & get the prediction of website.	I can access the website by knowing about website security.	High	Sprint-1
Customer Care Executive	Feature extraction	USN-1	After I compare in case if none found on comparison then we can extract featureusing other various approach.	As a User I can have comparison between websitesfor 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.	I can have correct prediction on the particularalgorithms	High	Sprint-1
	Classifier	USN-2	Here I will predict the URL to give output in ordertoproduce final result by using classifier model.	In this I will find the correct classifier for predicting theresult.	Medium	Sprint-2

6.1 PROJECT PLANNING & SCHEDULING

1.1 Sprint Planning & Estimation

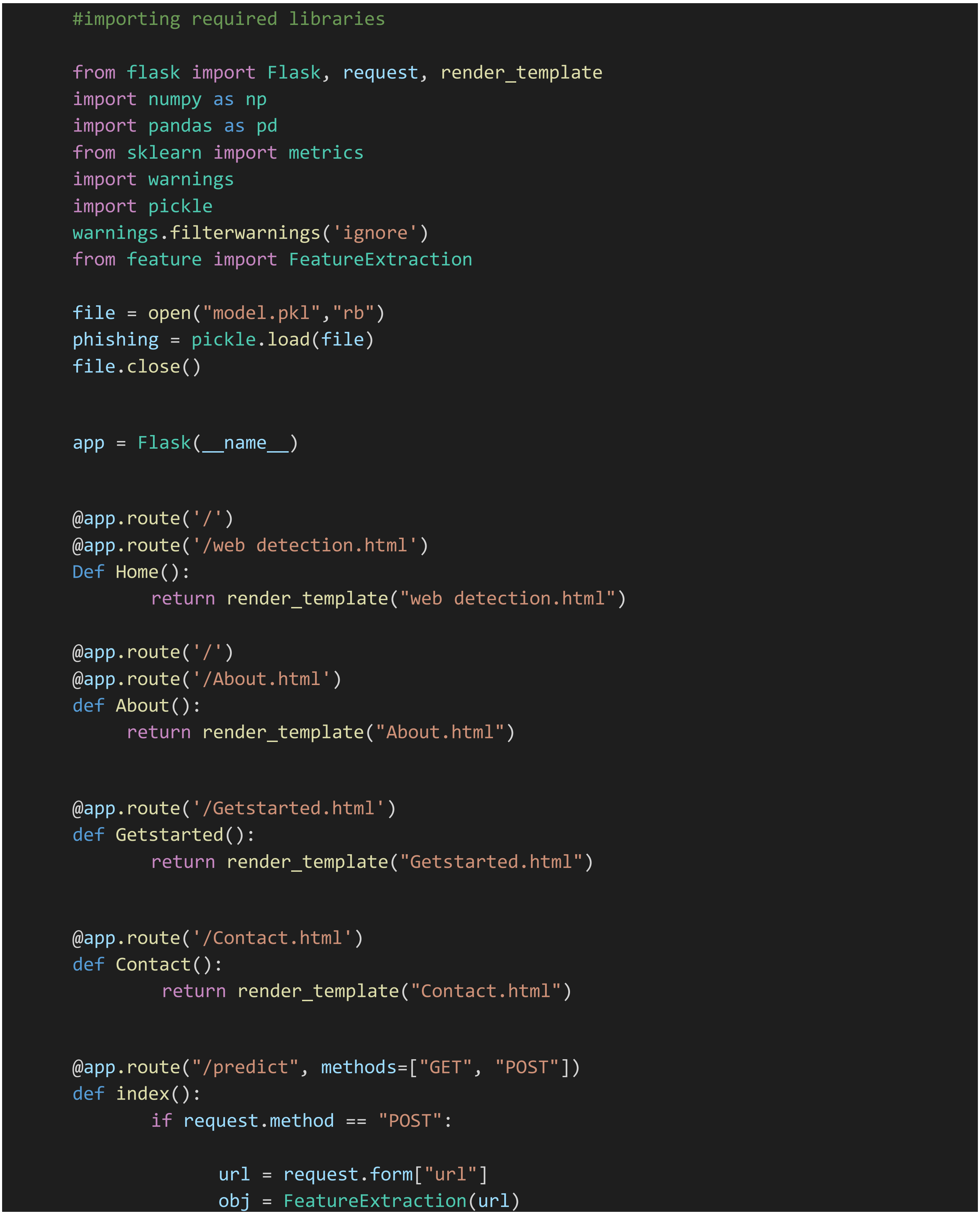
TITLE	DESCRIPTION	DATE
Prepare Empathy Map	Prepare Empathy Map Canvasto capture the user Pains & Gains, Prepare list of problemstatements	10 Sept 2022
Ideation Brain Storming	List the by organizing the brainstorming session and prioritize the top 3 ideas based on the feasibility &importance.	15 Sept 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	23 Sept 2022
Problem Solution Fit	Prepare problem solution fit document	28 Sept 2022
Solution Architecture	Prepare solution architecture document.	5 October 2022
Customer Journey	Prepare the customer journeymaps to understand the user interactions & experiences with the application (entry toexit).	7 October 2022
Solution Requirement	Prepare the functional requirement document	8 October 2022
Data Flow Diagrams	Draw the data flow diagramsand submit for review.	10 October 2022
Technology Architecture	Prepare the technology architecture diagram.	15 October 2022
Prepare Milestone&Activity List	Prepare the milestones & activity list of the project.	26 October 2022
Project Development - Delivery of Sprint-1, 2,3& 4	Develop & submit the developed code by testingit.	14 November 2022

6.2 Sprint Delivery 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 thehomepage for the functioning	10	Low	Hari prathap, Arivuselvam
Sprint-1	Url detection	USN-2	As a user, I can learn about the various sides ofthe web phishing and be aware of the scams	5	High	Nandhakumar, Sanjay
Sprint-2	Final page	USN-3	As a user, I can explore the resources of thefinal page for the functioning	15	Low	Hari prathap, Arivuselvam
Sprint-3	Prediction	USN-4	As a user, I can predict the URL easily for detecting whether the website is legitimate ornot	10	High	Hari prathap, Arivuselvam Nandhakumar, Sanjay
Sprint-4	Chat	USN-5	As a user, I can share the experience or contactt he admin for the support	10	High	Hari prathap, Arivuselvam Nandhakumar, Sanjay
Sprint-1	Homepage	USN-6	As a admin, we can design interface andm aintain the functioning of the website	5	High	Hari prathap, Arivuselvam Nandhakumar, Sanjay
Sprint-2	Final page	USN-7	As a admin, we can design the complexity oft he website for making it user-friendly	5	Medium	Hari prathap, Arivuselvam Nandhakumar, Sanjay
Sprint-3	Prediction	USN-8	As a admin, we can use various ML classifier model for the accurate result for the detection ofURL	10	High	Hari prathap, Arivuselvam Nandhakumar, Sanjay
Sprint-4	The final step	USN-9	As a admin, we can response to the usermessage for improvement of the website	10	Medium	Hari prathap, Arivuselvam Nandhakumar, Sanjay

7.CODING & SOLUTIONING:

7.1 Feature 1:

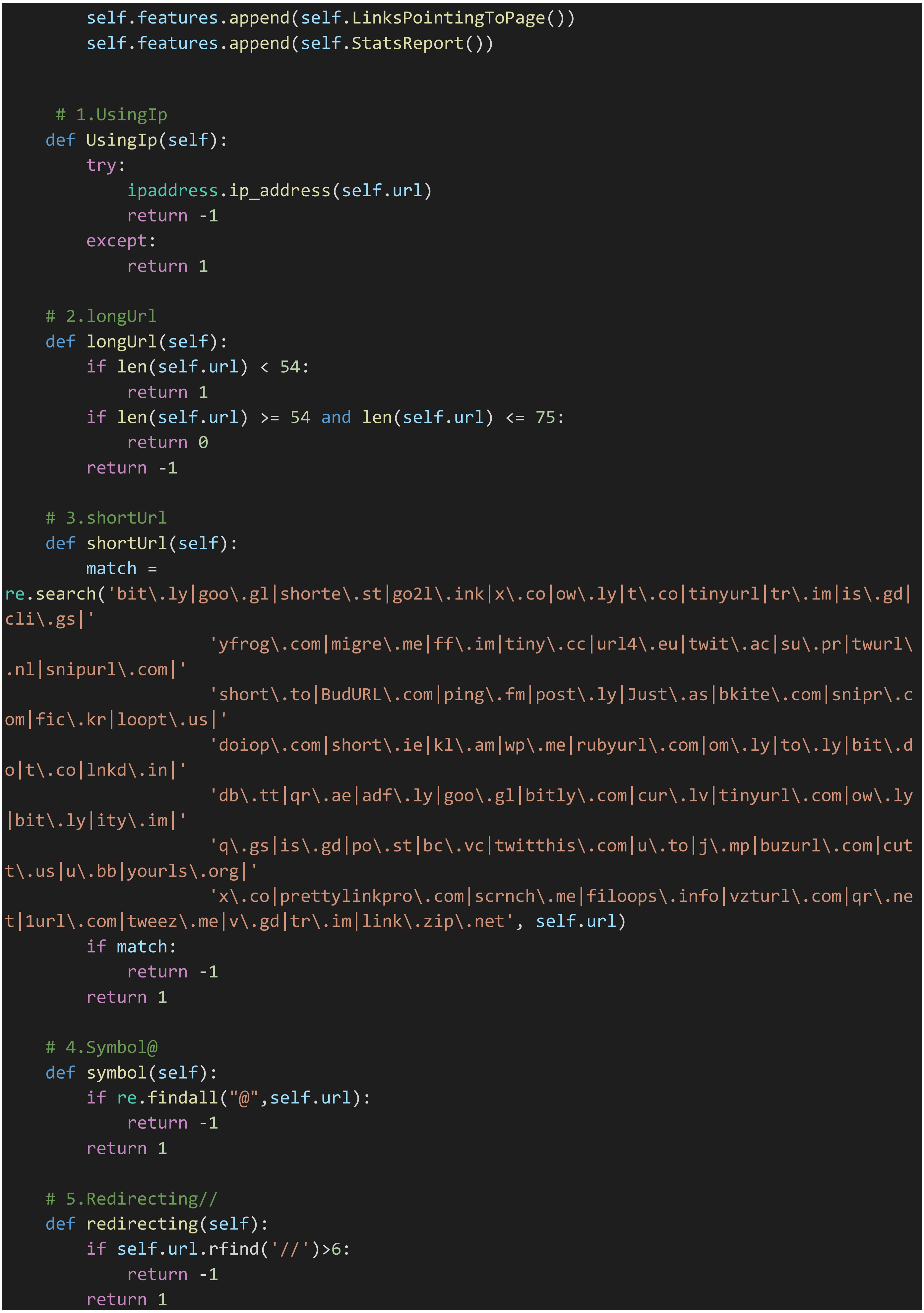


```
#importing required libraries

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("model.pkl","rb")
phishing = pickle.load(file)
file.close()


app = Flask(__name__)


@app.route('/')
@app.route('/web detection.html')
Def Home():
       return render_template("web detection.html")

@app.route('/')
@app.route('/About.html')
def About():
     return render_template("About.html")


@app.route('/Getstarted.html')
def Getstarted():
       return render_template("Getstarted.html")


@app.route('/Contact.html')
def Contact():
        return render_template("Contact.html")


@app.route("/predict", methods=["GET", "POST"])
def index():
       if request.method == "POST":

             url = request.form["url"]
             obj = FeatureExtraction(url)
```

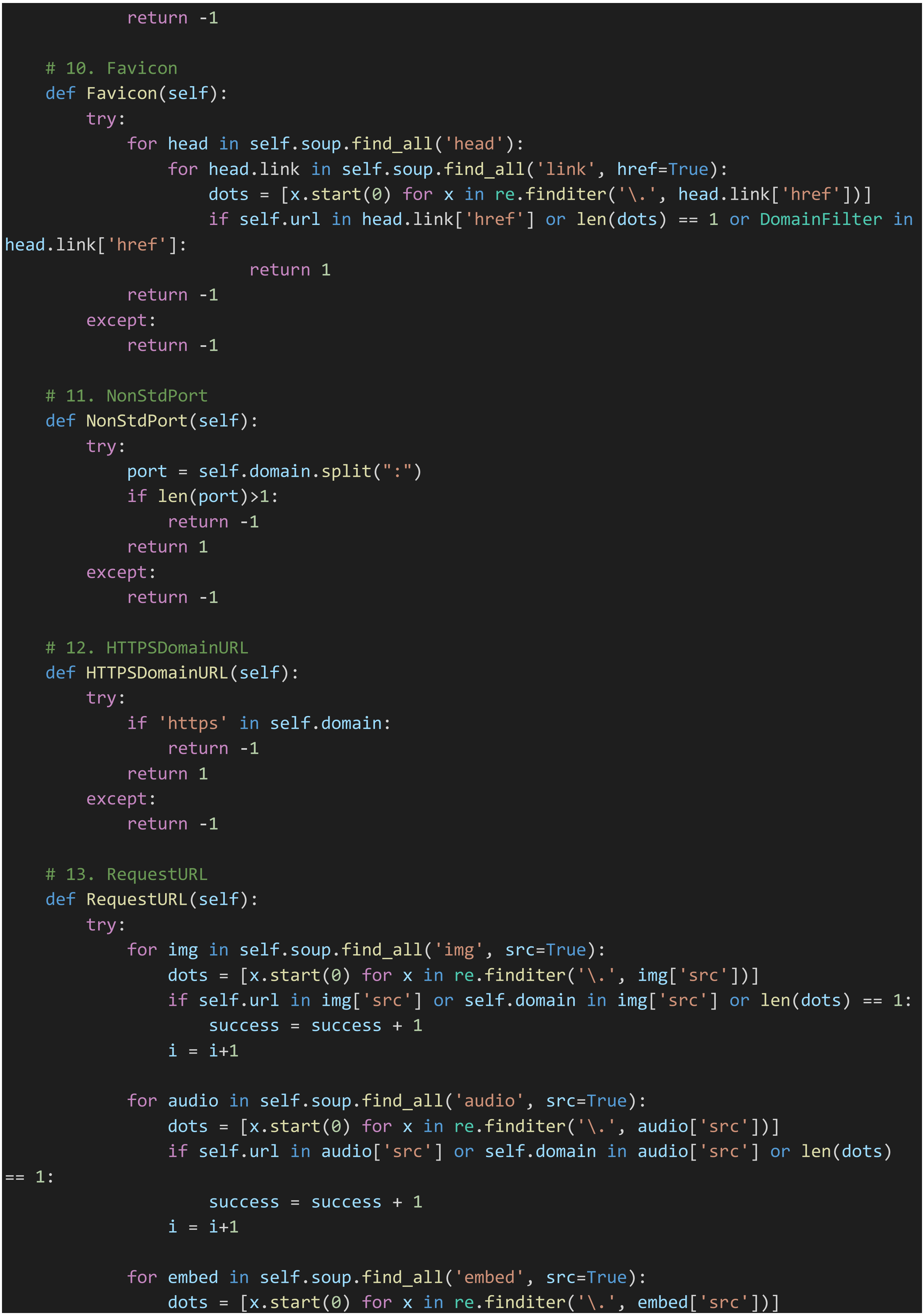
```
                   x = np.array(obj.getFeaturesList()).reshape(1,30)

                    y_pred =phishing.predict(x)[0]
        #1 is safe
        #-1 is unsafe
                    y_pro_phishing = phishing.predict_proba(x)[0,0]
                     y_pro_non_phishing = phishing.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('predict.html',xx =["It is {0:.2f} % Safe to go
".format(y_pro_non_phishing*100), "It is {0:.2f} % Unsafe to go
".format(y_pro_phishing*100)],url=url)
        # else:
        #     return render_template("predict.html", xx ="Your are on the wrong site. Be
cautious!")


      if __name__ == "__main__":
            app.run(debug=True,port=5000
```

7.2 Feature 2:

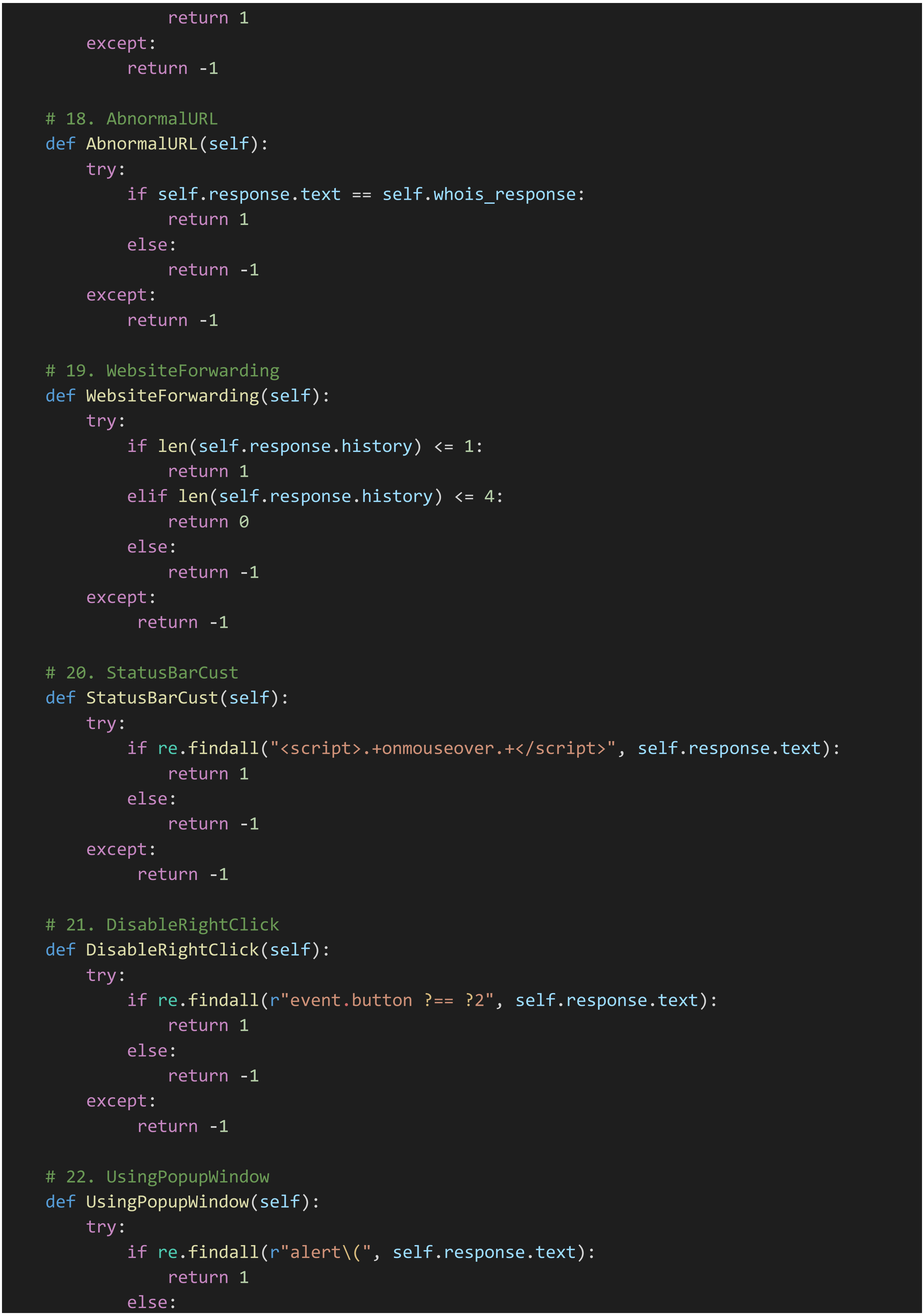
```
import ipaddress
import re
from tracemalloc import DomainFilter
from urllib import response
import urllib.request
from bs4 import BeautifulSoup
import socket
import requests
from googlesearch import search
import whois
from datetime import date, datetime
import time
from dateutil.parser import parse 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())
```



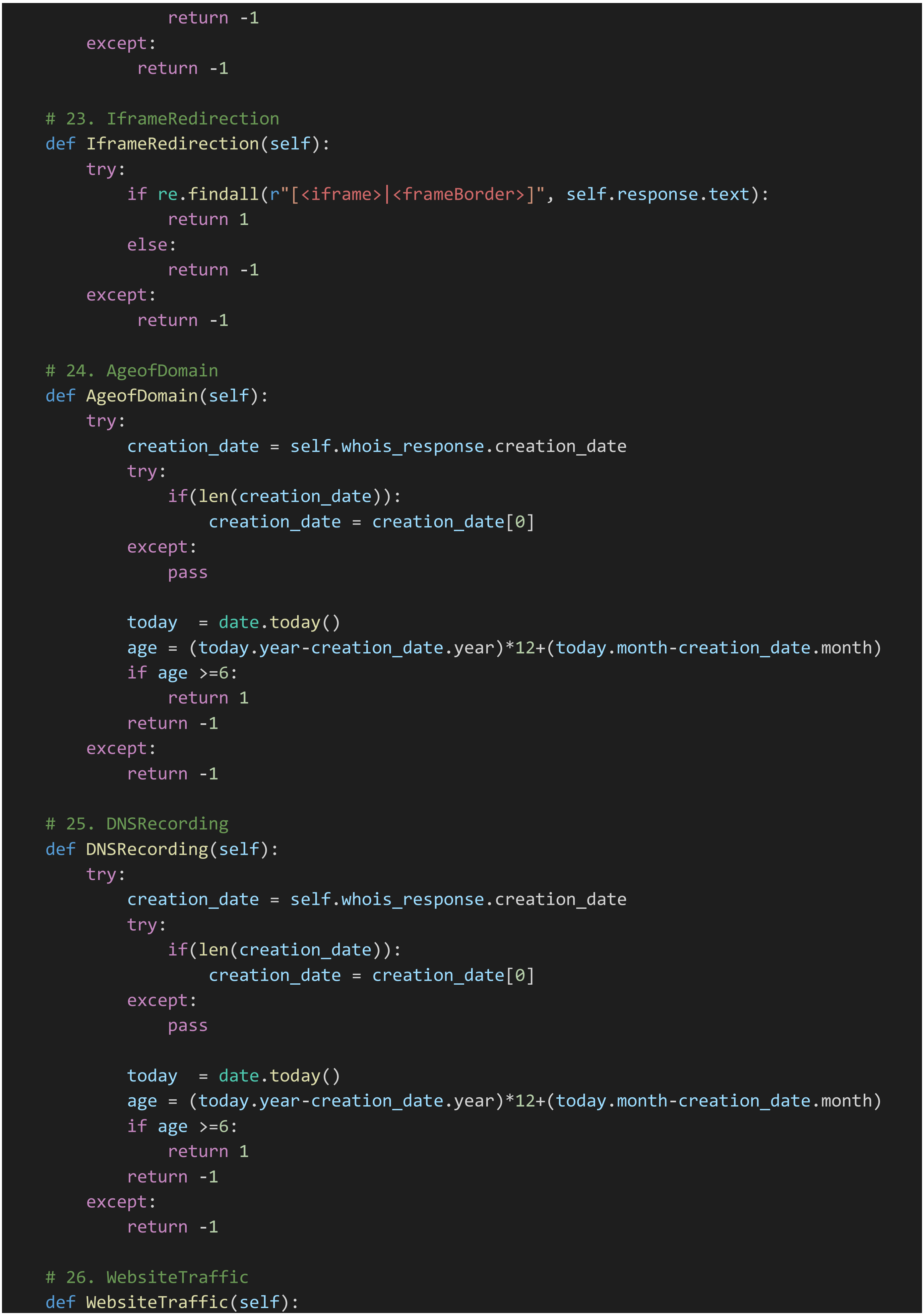
```
        self.features.append(self.LinksPointingToPage())
        self.features.append(self.StatsReport())


     # 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\.c
om|fic\.kr|loopt\.us|'
                    'doiop\.com|short\.ie|kl\.am|wp\.me|rubyurl\.com|om\.ly|to\.ly|bit\.d
o|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|cut
t\.us|u\.bb|yourls\.org|'
                    'x\.co|prettylinkpro\.com|scrnch\.me|filoops\.info|vzturl\.com|qr\.ne
t|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:
```



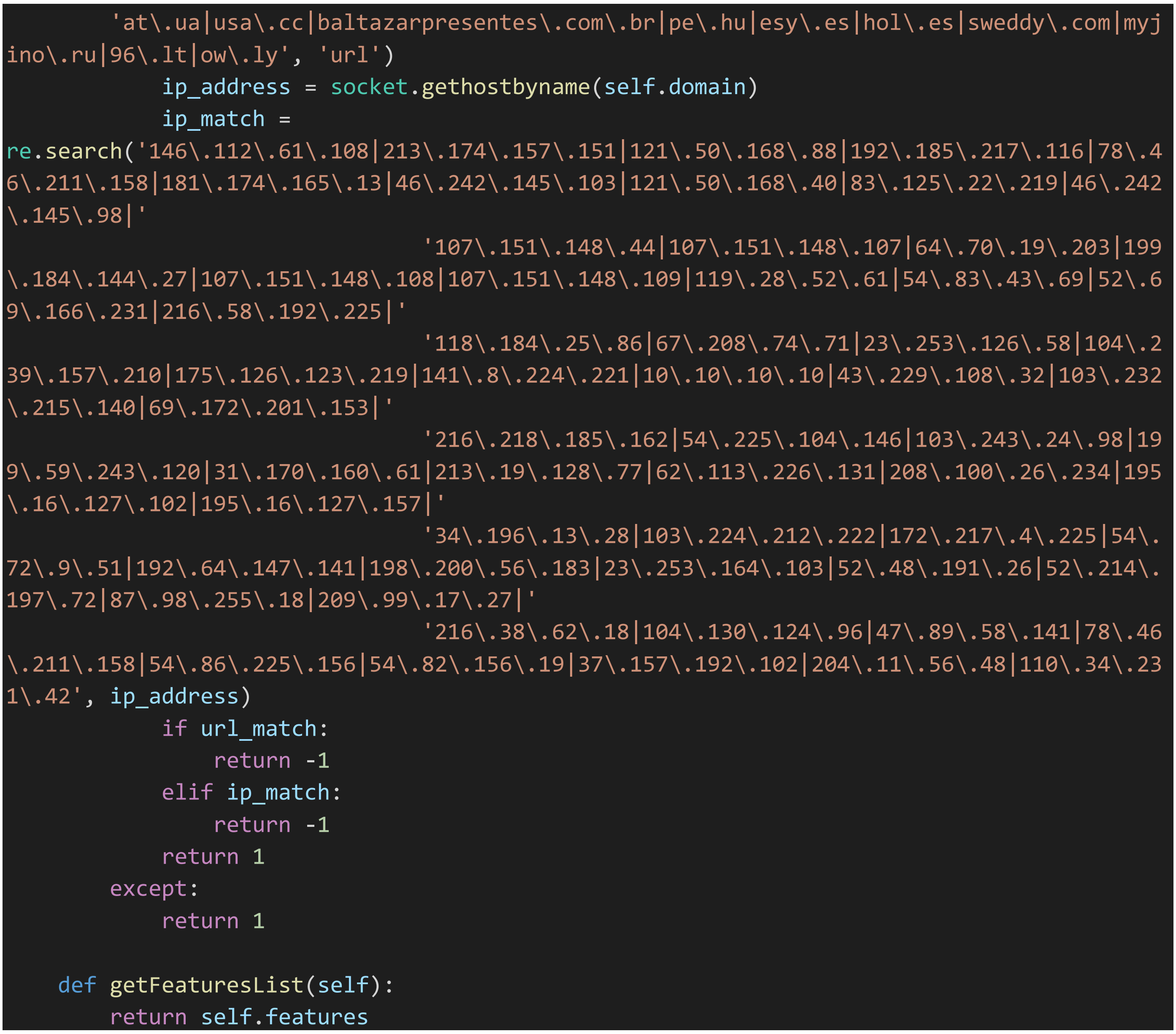
```
            return -1

    # 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 DomainFilter 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]+)", 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(
```

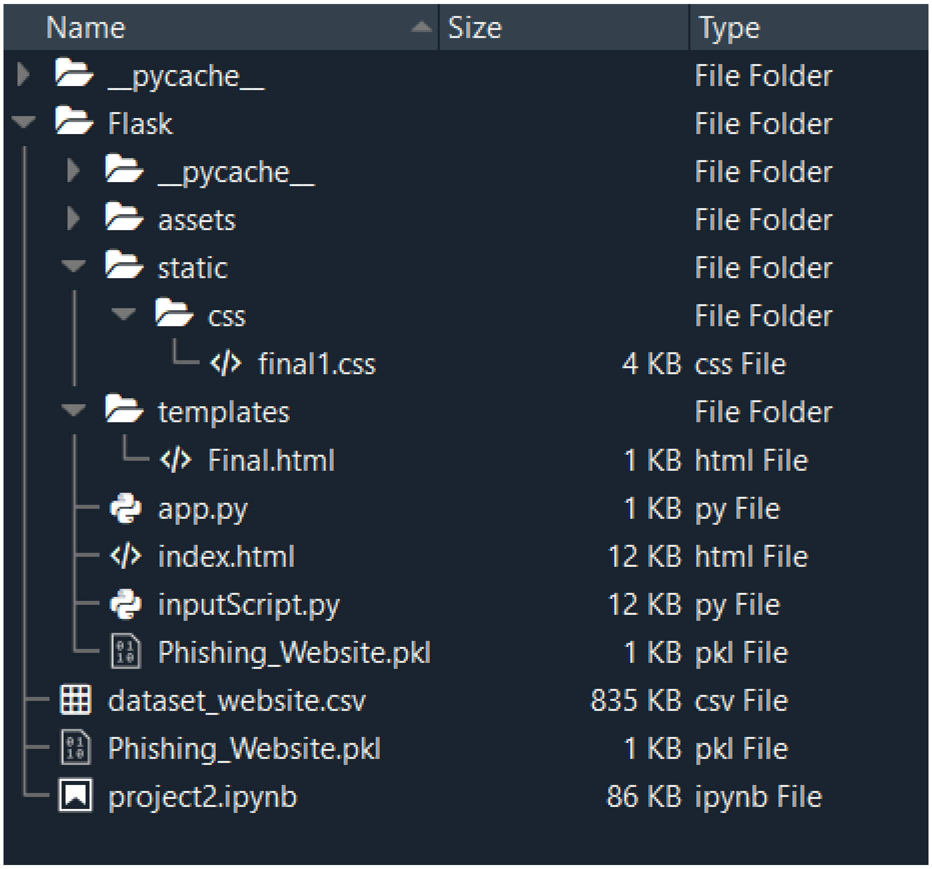


```
        'at\.ua|usa\.cc|baltazarpresentes\.com\.br|pe\.hu|esy\.es|hol\.es|sweddy\.com|myjino\.ru|96\.lt|ow\.ly', 'url')
            ip_address = socket.gethostbyname(self.domain)
            ip_match = re.search('146\.112\.61\.108|213\.174\.157\.151|121\.50\.168\.88|192\.185\.217\.116|78\.46\.211\.158|181\.174\.165\.13|46\.242\.145\.103|121\.50\.168\.40|83\.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

7.3 Database Schema (if Applicable):

- **"Flask"** folder contains two sub-folders static and templates. Static folder contains the style sheet used.
- **"Templates"** folder has the HTML pages.
- **"app.py"** is the python script for server side computing.
- **"index.html"** is the home page which should be used for initiating the application.
- **"inputScript.py"** has all the parameters of evaluation for a URL.
- **"Phishing_Website.pkl"** is the model file which you have to build.
- **"dataset_website.csv"** is the dataset
- **"project2.ipynb"** is the training notebook.

Refer below image for the same:



Name	Size	Type
__pycache__		File Folder
Flask		File Folder
__pycache__		File Folder
assets		File Folder
static		File Folder
css		File Folder
final1.css	4 KB	css File
templates		File Folder
Final.html	1 KB	html File
app.py	1 KB	py File
index.html	12 KB	html File
inputScript.py	12 KB	py File
Phishing_Website.pkl	1 KB	pkl File
dataset_website.csv	835 KB	csv File
Phishing_Website.pkl	1 KB	pkl File
project2.ipynb	86 KB	ipynb File

1. ALGORITHMS USED:

Two algorithms have been implemented to check whether a URL is legitimate or fraudulent.

Random forest algorithm creates the forest with number of decision trees. High number of tree gives high detection accuracy. Creation of trees is based on bootstrap method. In bootstrap method features and samples of dataset are randomly selected with replacement to construct single tree. Among randomly selected features, random forest algorithm will choose best splitter for classification.

Decision tree begins its work by choosing best splitter from the available attributes for classification which is considered as a root of the tree. Algorithm continues to build tree until it finds the leaf node. Decision tree creates training model which is used to predict target value or class in tree representation each internal node of the tree belongs to attribute and each leaf node of the tree belongs to class label.

Fig.1. Decision Tree Algorithm working

Fig.2. Random Forest Algorithm working

2. PROJECT REQUIREMENTS Hardware Requirements:-

- 2GB RAM (minimum)
- 100GB HDD (minimum)
- Intel 1.66 GHz Processor Pentium 4 (minimum)
- Internet Connectivity

3. Software Requirements:-

- WINDOWS 7 or higher
- Python 3.6.0 or higher
- Visual Studio Code
- FLASK framework
- HTML
- Dataset of Phishing Websites

8. TESTING:

TESTCASES REPORT

				Date	15-Nov-22								
				Team ID	PNT2022TMID41066								
				Project Name	Project - Web Phishing Detection								
				Maximum Marks	4 marks								
Test case ID	**Feature Type**	**Component**	**Test Scenario**	**Pre-Requisite**	**Steps To Execute**	**TestData**	**Expected Result**	**Actual Result**	**Status**	**Comments**	**TC for Automation(Y/N)**	**BUG ID**	**ExecutedBy**
LoginPage_TC_OO1	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 go2.Type the URL 3.Verify whether it is processing or not.	https://phishing-shield.herokuapp.com/	Should Display the Webpage	Working as expected	Pass		N		S Balaji
LoginPage_TC_OO2	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. Reloadand Test Simultaneously	https://phishing-shield.herokuapp.com/	Should Wait for Response and then gets Acknowledge	Working as expected	Pass		N		R Abisheik
LoginPage_TC_OO3	Functional	Home page	Verify whether the link is legitimate ornot		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://phishing-shield.herokuapp.com/	User should observe whether the website is legitimate ornot.	Working as expected	Pass		N		TS Aswin
LoginPage_TC_OO4	Functional	Home Page	Verify user is able to access the legitimate website ornot		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://phishing-shield.herokuapp.com/	Application should show that Safe Webpage or Unsafe.	Working as expected	Pass		N		Balajee A V
LoginPage_TC_OO5	Functional	Home Page	Testing the website with multiple URLs		1. Enter URL (https://phishing-shield.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://avbalajee.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		Balajee A V

9.RESULT

- Scikit-learn tool has been used to import Machine learning algorithms. Each classifier is trained using training set and testing set is used to evaluate performance of classifiers.

- Performance of classifiers has been evaluated by calculating classifier's accuracy score. improve the accuracy of our models with better feature extraction.

Fig.3. Accuracy with Random Forest Algorithm

Fig.4. Accuracy with Decision Tree Algorithm

10. ADVANTAGES:

- Measure the degrees of corporate and employee vulnerability.
- Eliminate the cyber threat risk level.
- Increase user alertness to phishing risks.
- Instill a cyber security culture and create cyber security heroes.

10.2 DISADVANTAGES:

Phishing has a list of negative effects on a business, including loss of money, loss of intellectual property, damage to reputation, and disruption of operational activities. These effects work together to cause loss of company value, sometimes with irreparable repercussions

11.CONCLUSION:

Thus to summarize, we have seen how phishing is a huge threat to the security and safety of the web and how phishing detection is an important problem domain. We have reviewed some of the traditional approaches to phishing detection; namely blacklist and heuristic evaluation methods, and their drawbacks. We have tested two machine learning algorithms on the Phishing Websites Dataset and reviewed their results.

We then selected the best algorithm based on its performance and built a Chrome extension for detecting phishing web pages. The extension allows easy deployment of our phishing detection model to end users. We have detected phishing websites using Random Forest algorithm with and accuracy of 97.31%. For future enhancements, we intend to build the phishing detection system as a scalable web service which will incorporate online learning so that new phishing attack patterns can easily be learned

12.FUTURE SCOPE:

Although the use of URL lexical features alone has been shown to result in high accuracy (97%), phishers have learned how to make predicting a URL destination difficult by carefully manipulating the URL to evade detection. Therefore, combining these features with others, such as host, is the most effective approach .

For future enhancements, we intend to build the phishing detection system as a scalable web service which will incorporate online learning so that new phishing attack patterns can easily be learned and improve the accuracy of our models with better feature extraction.

13.APPENDIX:

GitHub:

https://github.com/IBM-EPBL/IBM-Project-41888-1660645823

Project demo link:

- Our project runs on local host we can't share or use the site

  we attached source code through the link below

DEMO Video Link:

https://github.com/IBM-EPBL/IBM-Project-41888-1660645823/tree/main/Final%20Deliverables

Hint :

Demo Video link in Github inside Final Deliverables inside DemoVideo Download The Video And The Demo video