

Configuration Manual

MSc Research Project
M.Sc Cyber Security

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MSc Project Submission Sheet



School of Computing

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Student ID: 23251361
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Module: Practicum Part 2
Lecturer: Khadija Hafeez
Submission Due Date: 12th December
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I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature: Krithika Ramesh
Date: 12-12-2024

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Configuration Manual

Krithika Ramesh
Student ID: 23251361

This project as two parts, first one focussing on developing and training the model on Google Colab, while the other involves integrating it into the Django web application for the presentation. In the first part, I utilized one dataset in csv format, with a machine learning implementation, coding, and evaluation. The single dataset has been used on thee model Naïve Bayes. In the second part, I integrated the Email Spam detection machine learning model into a web application called Django. This step is crucial as it transforms our model into a user-friendly web app that anyone can use, even without coding knowledge. I will be covering everything from setting up the model and creating forms and views to build the user interface. This manual provides a detailed overview and a step-by-step guide of the project execution.

(Download Python, n.d.; Download Visual Studio Code - Mac, Linux, Windows, n.d.; GitHub · Build and Ship Software on a Single, Collaborative Platform, 2024; Kaggle, n.d.)

1 System Requirements

- Operating System: Windows 11
- Processor: Intel i5
- RAM: 8GB
- Disk Space: 20 GB
- Internet Connectivity: Intel(R) Wi-Fi 6E AX211 160MHz

2 Tools and Frameworks

- Google Collab: For model creation and training
- Django: For building the web interface
- Python: Version 3.8

3 Machine Learning Model Configuration Step by step guide

3.1 Part I

1. We start by importing necessary libraries, we will be using pandas to handle our dataset and sklearn for machine learning. Since the dataset file is in the form of text data, we need to first convert it into a format(numerical) that the machine learning model can process. To achieve this, we use sklearn. We will further split our data into training and testing set, as it allows us to train our model on one portion of data and test it on another portion to evaluate its performance. To build a spam detection classifier we will use naïve bayes algorithm. In order to assess the performance of the machine learning model, we need to measure its accuracy on the test data. Again use sklearn for this.

Detection of phishing emails

```

import pandas as pd # to handle our dataset

from sklearn.feature_extraction.text import CountVectorizer #for converting text data into numerical data

from sklearn.model_selection import train_test_split # to split data

from sklearn.naive_bayes import MultinomialNB

from sklearn.metrics import accuracy_score

```

- The next step is to upload the csv file and read the path of the file. We then view the csv file, for this we use the head function. Here we have two columns, one column depicts text of emails and the other column shows spam. In this case, 1 means it is spam, and 0 means it is ham which means it is not spam.

Detection of phishing emails

Files

- ..
- sample_data
- emails.csv.csv

```

dataset = pd.read_csv('/content/emails.csv.csv')

dataset.head()

```

	text	spam
0	Subject: naturally irresistible your corporate...	1
1	Subject: the stock trading gunslinger fanny i...	1
2	Subject: unbelievable new homes made easy im ...	1
3	Subject: 4 color printing special request add...	1
4	Subject: do not have money , get software cds ...	1

- Now use Countvectorizer to convert text data into numerical format that the machine learning model can process. For this use vectorizer, then use and define variables as text.

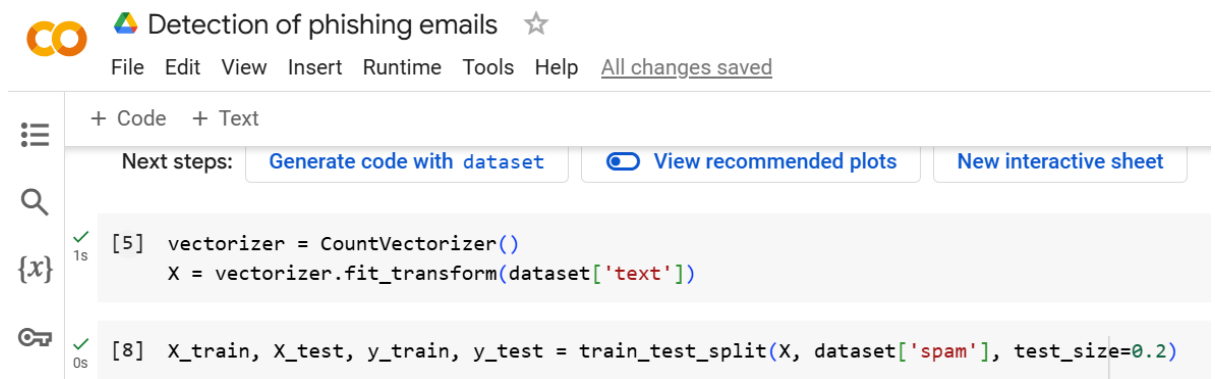
Detection of phishing emails

```

vectorizer = CountVectorizer()
X = vectorizer.fit_transform(dataset['text'])

```

- Next, use train_test_split to split the data using variables and allotting size. In this case 80% data is for training and 20% is for testing.



Detection of phishing emails ☆

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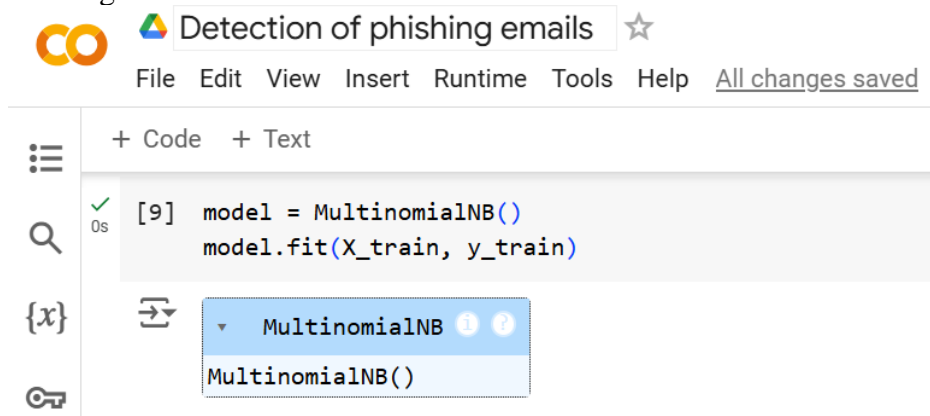
+ Code + Text

Next steps: [Generate code with dataset](#) [View recommended plots](#) [New interactive sheet](#)

```
[5] vectorizer = CountVectorizer()
     X = vectorizer.fit_transform(dataset['text'])
```

```
[8] X_train, X_test, y_train, y_test = train_test_split(X, dataset['spam'], test_size=0.2)
```

6. Next, we will train the Naïve Bayes classifier using training data. For this, we will be using multinomialNB.



Detection of phishing emails ☆

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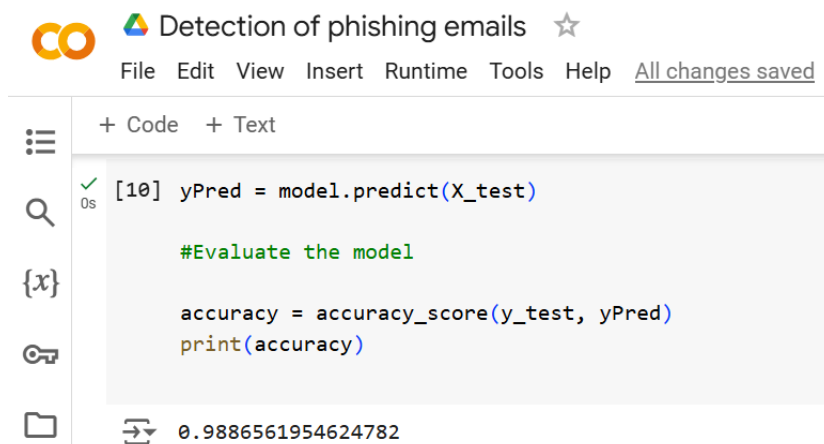
+ Code + Text

```
[9] model = MultinomialNB()
     model.fit(X_train, y_train)
```

MultinomialNB ⓘ ?

MultinomialNB()

7. After training the model, it is now necessary to make predictions on the test set and evaluate its performance. In this step, the accuracy of the model created is achieved.



Detection of phishing emails ☆

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+ Code + Text



```
[10] yPred = model.predict(X_test)

#Evaluate the model

accuracy = accuracy_score(y_test, yPred)
print(accuracy)
```

0.9886561954624782

8. Finally, let us now check a message that uses our trained model to predict if a given message is spam or not. This function is specially useful, when we integrate our model into the web application. Firstly pass the variable, and the function is created. This function takes a message as input, vectorizes it using the same count vectorizer and uses the model to predict if it is a spam or not. After passing variables and using print functions, enter the text on the text box. An example message is shown in the below screenshot.

  Detection of phishing emails ☆



File Edit View Insert Runtime Tools Help

+ Code + Text

```
def predictMessage(message):
    messageVector = vectorizer.transform([message])
    prediction = model.predict(messageVector)
    return 'Spam' if prediction[0] == 1 else 'Ham'

userMessage = input('Enter text to predict: ')
prediction = predictMessage(userMessage)
print(f'The message is: {prediction}')
```

... Enter text to predict:

  Detection of phishing emails ☆



File Edit View Insert Runtime Tools Help [All changes saved](#)

+ Code + Text

```
def predictMessage(message):
    messageVector = vectorizer.transform([message])
    prediction = model.predict(messageVector)
    return 'Spam' if prediction[0] == 1 else 'Ham'

userMessage = input('Enter text to predict: ')
prediction = predictMessage(userMessage)
print(f'The message is: {prediction}')
```

Enter text to predict: Hey, You have won an Iphone! Click here to claim.
The message is: Spam

  Detection of phishing emails ☆

File Edit View Insert Runtime Tools Help

+ Code + Text

```
def predictMessage(message):
    messageVector = vectorizer.transform([message])
    prediction = model.predict(messageVector)
    return 'Spam' if prediction[0] == 1 else 'Ham'

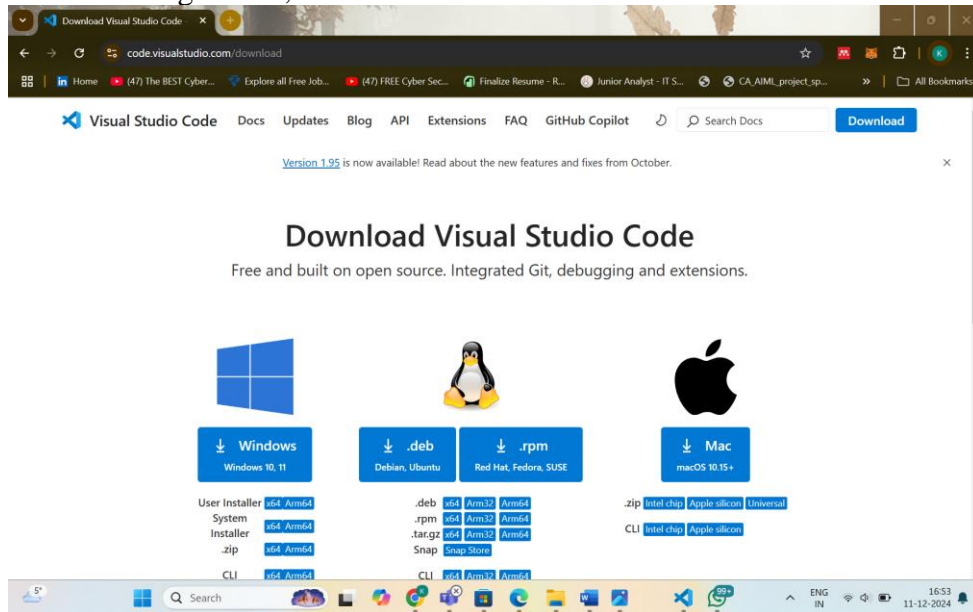
userMessage = input('Enter text to predict: ')
prediction = predictMessage(userMessage)
print(f'The message is: {prediction}')
```

Enter text to predict: Hey, are we meeting for dinner?
The message is: Ham

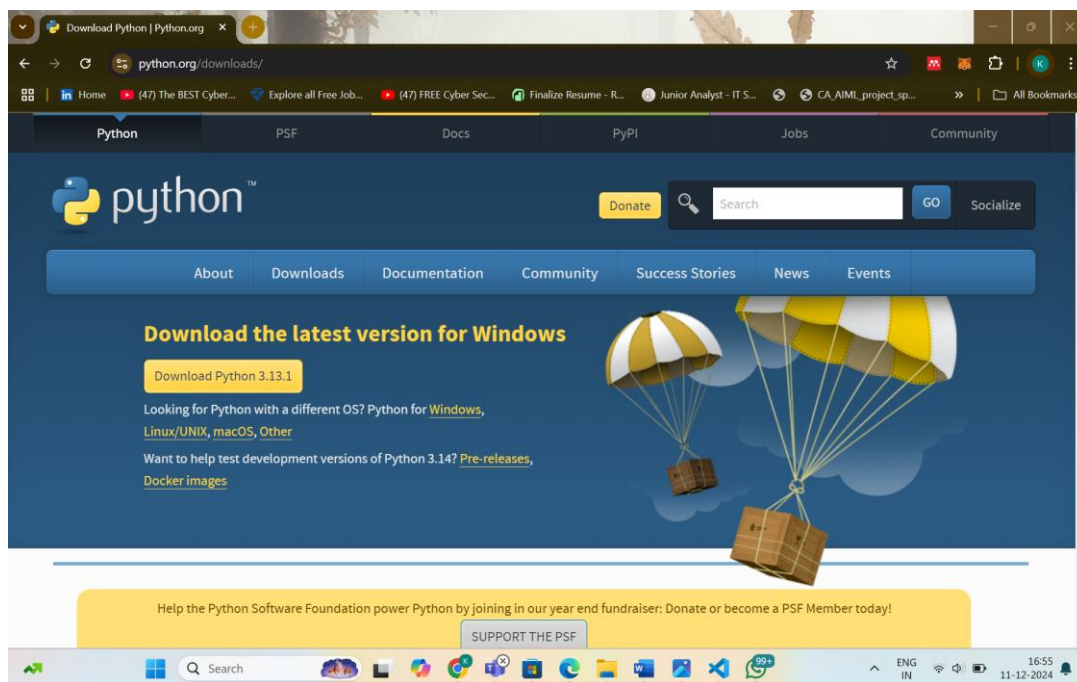
So, we have successfully built a spam detection classifier using a machine learning model, and in the next part, this model is integrated into a web application Django.

3.2 Part II

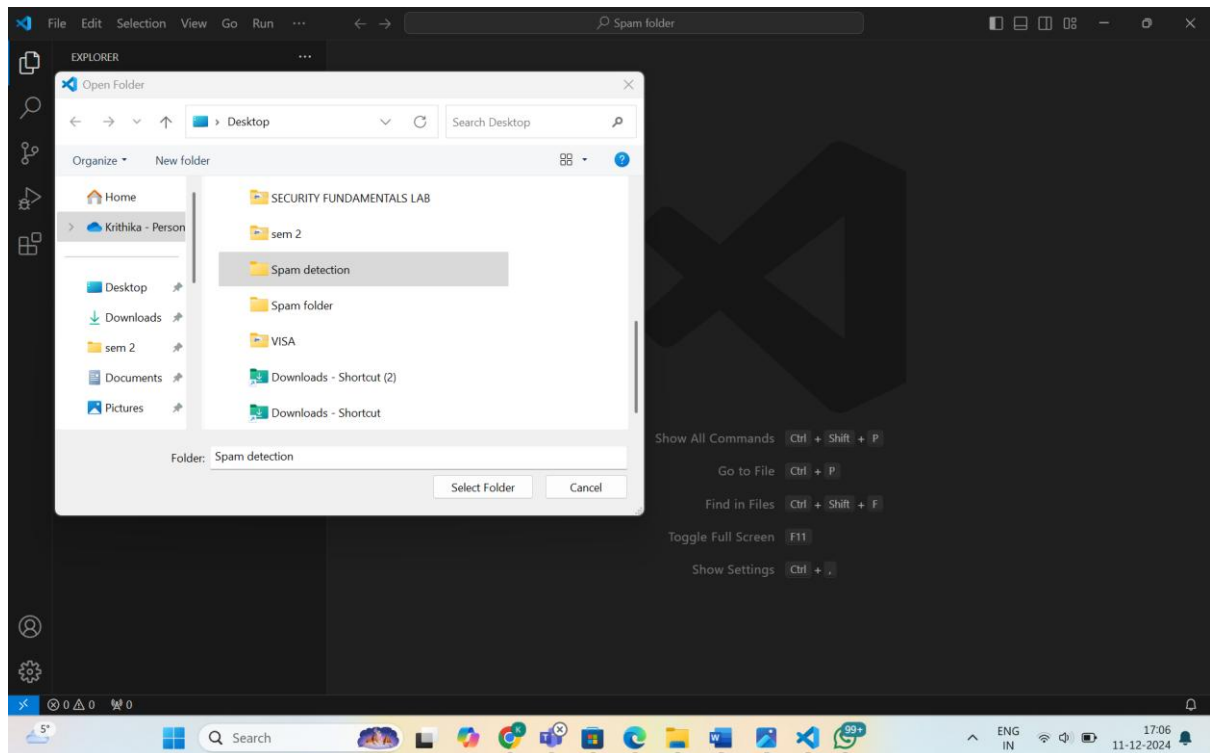
1. To begin with, download the Visual studio code from chrome.



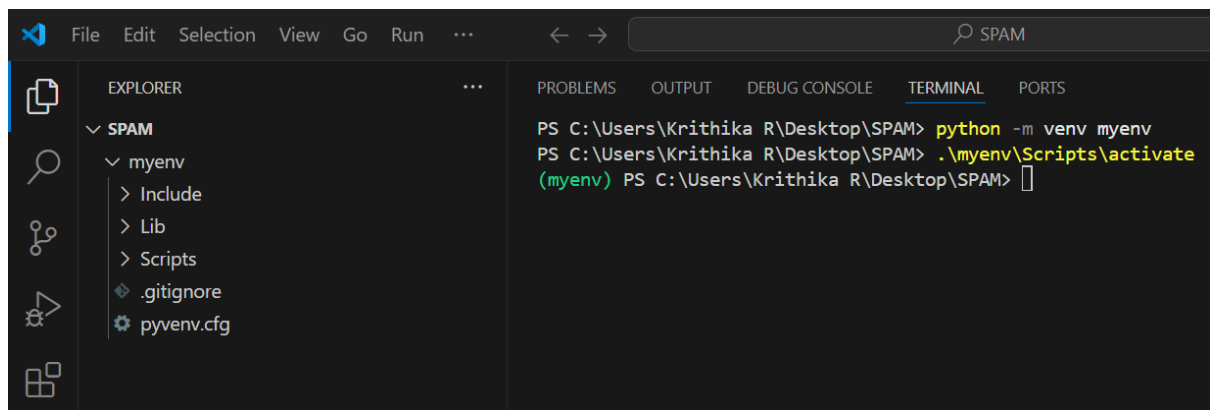
2. For Python, install the latest version of Python from chrome



3. Now, let us get started with VS Code, first click on file and create an empty folder and select it.



4. Open a new terminal, and the first step is to create a virtual environment as it helps many dependencies for the project to be isolated. For this use `python -m venv myenv` and activate it.



5. Now, we can setup the Django project, with the virtual environment activated, but first we need to install Django and other dependencies. Django is a python framework, so we use pip.

The screenshot shows a VS Code interface with a terminal window open. The Explorer pane on the left shows a project named 'SPAM' with a subdirectory 'myenv' containing files like 'Include', 'Lib', 'Scripts', '.gitignore', and 'pyvenv.cfg'. The terminal window shows the following commands and output:

```
PS C:\Users\Krithika R\Desktop\SPAM> python -m venv myenv
PS C:\Users\Krithika R\Desktop\SPAM> .\myenv\Scripts\activate
(myenv) PS C:\Users\Krithika R\Desktop\SPAM> pip install django
Collecting django
  Downloading Django-5.1.4-py3-none-any.whl.metadata (4.2 kB)
Collecting asgiref<4,>=3.8.1 (from django)
  Downloading asgiref-3.8.1-py3-none-any.whl.metadata (9.3 kB)
Collecting sqlparse>=0.3.1 (from django)
  Downloading sqlparse-0.5.3-py3-none-any.whl.metadata (3.9 kB)
Collecting tzdata (from django)
  Downloading tzdata-2024.2-py2.py3-none-any.whl.metadata (1.4 kB)
  Downloading Django-5.1.4-py3-none-any.whl (8.3 MB)
    8.3/8.3 MB 9.5 MB/s eta 0:00:00
  Downloading asgiref-3.8.1-py3-none-any.whl (23 kB)
  Downloading sqlparse-0.5.3-py3-none-any.whl (44 kB)
  Downloading tzdata-2024.2-py2.py3-none-any.whl (346 kB)
Installing collected packages: tzdata, sqlparse, asgiref, django
Successfully installed asgiref-3.8.1 django-5.1.4 sqlparse-0.5.3 tzdata-2024.2

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip
(myenv) PS C:\Users\Krithika R\Desktop\SPAM>
```

6. And in google Collab, we used pandas and sklearn, so we also need to download these two libraries.

The screenshot shows a VS Code interface with a terminal window open. The Explorer pane on the left shows the same 'SPAM' project structure. The terminal window shows the following commands and output:

```
(myenv) PS C:\Users\Krithika R\Desktop\SPAM> pip install pandas scikit-learn
Collecting pandas
  Downloading pandas-2.2.3-cp313-cp313-win_amd64.whl (11.5 MB)
    11.5/11.5 MB 8.2 MB/s eta 0:00:00
Collecting scikit-learn
  Downloading scikit-learn-1.6.0-cp313-cp313-win_amd64.whl (11.1 MB)
    11.1/11.1 MB 9.7 MB/s eta 0:00:00
Collecting joblib
  Downloading joblib-1.4.2-py3-none-any.whl (301 kB)
Collecting numpy
  Downloading numpy-2.2.0-cp313-cp313-win_amd64.whl (12.6 MB)
    12.6/12.6 MB 10.4 MB/s eta 0:00:00
Collecting python-dateutil
  Downloading python-dateutil-2.9.0.post0-py2.py3-none-any.whl (229 kB)
Collecting pytz
  Downloading pytz-2024.2-py2.py3-none-any.whl (508 kB)
Collecting scipy
  Downloading scipy-1.14.1-cp313-cp313-win_amd64.whl (44.5 MB)
    44.5/44.5 MB 10.4 MB/s eta 0:00:00
Collecting six
  Downloading six-1.17.0-py2.py3-none-any.whl (11 kB)
Collecting threadpoolctl
  Downloading threadpoolctl-3.5.0-py3-none-any.whl (18 kB)
Installing collected packages: pytz, threadpoolctl, six, numpy, joblib, scipy, python-dateutil, scikit-learn, pandas
Successfully installed joblib-1.4.2 numpy-2.2.0 pandas-2.2.3 python-dateutil-2.9.0.post0 pytz-2024.2 scikit-learn-1.6.0 sci
py-1.14.1 six-1.17.0 threadpoolctl-3.5.0

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip
(myenv) PS C:\Users\Krithika R\Desktop\SPAM>
```

7. We can now set-up the django project, write django-admin startproject SpamDetection and further navigate to that directory, use cd command for navigation.

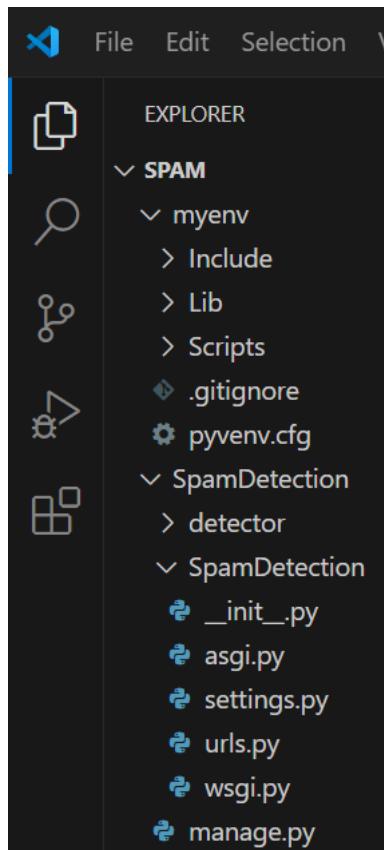
```
File Edit Selection View Go Run ... SPAM
EXPLORER
  SPAM
    myenv
      Include
      Lib
      Scripts
      .gitignore
      pyvenv.cfg
      SpamDetection
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
powershell - SpamDetection
Downloading numpy-2.2.0-cp313-cp313-win_amd64.whl (12.6 MB)
  12.6/1_ 10.4 eta 0:00:00
  MB MB/s
Downloading python_dateutil-2.9.0.post0-py2.py3-none-any.whl (229 kB)
Downloading pytz-2024.2-py2.py3-none-any.whl (508 kB)
Downloading scipy-1.14.1-cp313-cp313-win_amd64.whl (44.5 MB)
  44.5/4_ 10.4 eta 0:00:00
  MB MB/s
Downloading threadpoolctl-3.5.0-py3-none-any.whl (18 kB)
Downloading six-1.17.0-py2.py3-none-any.whl (11 kB)
Installing collected packages: pytz, threadpoolctl, six, numpy, joblib, scipy, python-dateutil, scikit-learn, pandas
Successfully installed joblib-1.4.2 numpy-2.2.0 pandas-2.2.3 python-dateutil-2.9.0.post0 pytz-2024.2 scikit-learn-1.6.0 sci
py-1.14.1 six-1.17.0 threadpoolctl-3.5.0

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip
(myenv) PS C:\Users\Krithika R\Desktop\SPAM> django-admin startproject SpamDetection
(myenv) P^C
(myenv) PS C:\Users\Krithika R\Desktop\SPAM> cd .\SpamDetection
(myenv) PS C:\Users\Krithika R\Desktop\SPAM\SpamDetection>
```

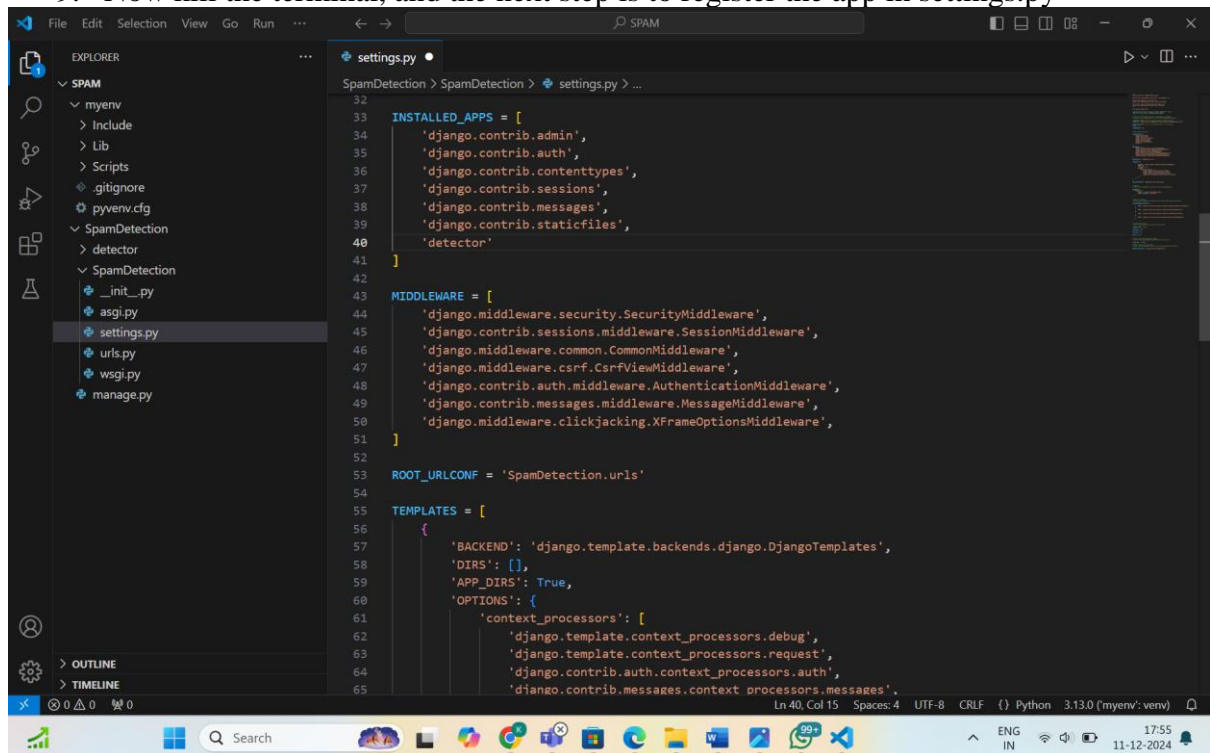
```
File Edit Selection View Go Run ... SPAM
EXPLORER
  SPAM
    myenv
      Include
      Lib
      Scripts
      .gitignore
      pyvenv.cfg
    SpamDetection
      SpamDetection
        __init__.py
        asgi.py
        settings.py
        urls.py
        wsgi.py
        manage.py
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
(myenv) PS C:\Users\Krithika R\Desktop\SPAM\SpamDetection>
```

8. The next step is to create an application inside the spam detection directory

```
File Edit Selection View Go Run ... SPAM
EXPLORER
  SPAM
  OUTLINE
  TIMELINE
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
powershell - Sp
(myenv) PS C:\Users\Krithika R\Desktop\SPAM\SpamDetection> django-admin startapp detector
(myenv) PS C:\Users\Krithika R\Desktop\SPAM\SpamDetection>
```

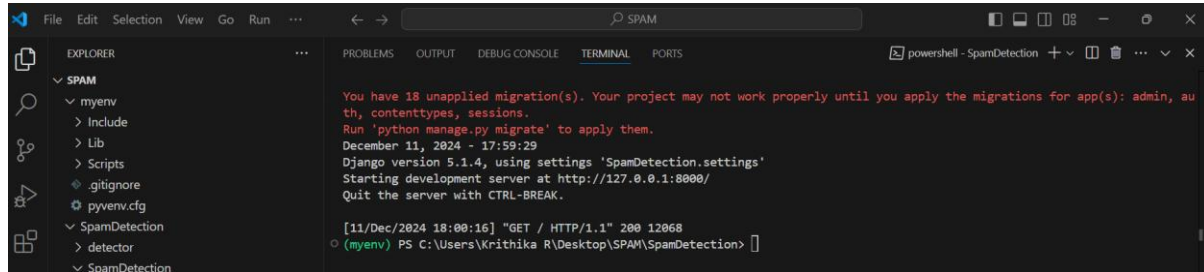


9. Now kill the terminal, and the next step is to register the app in settings.py



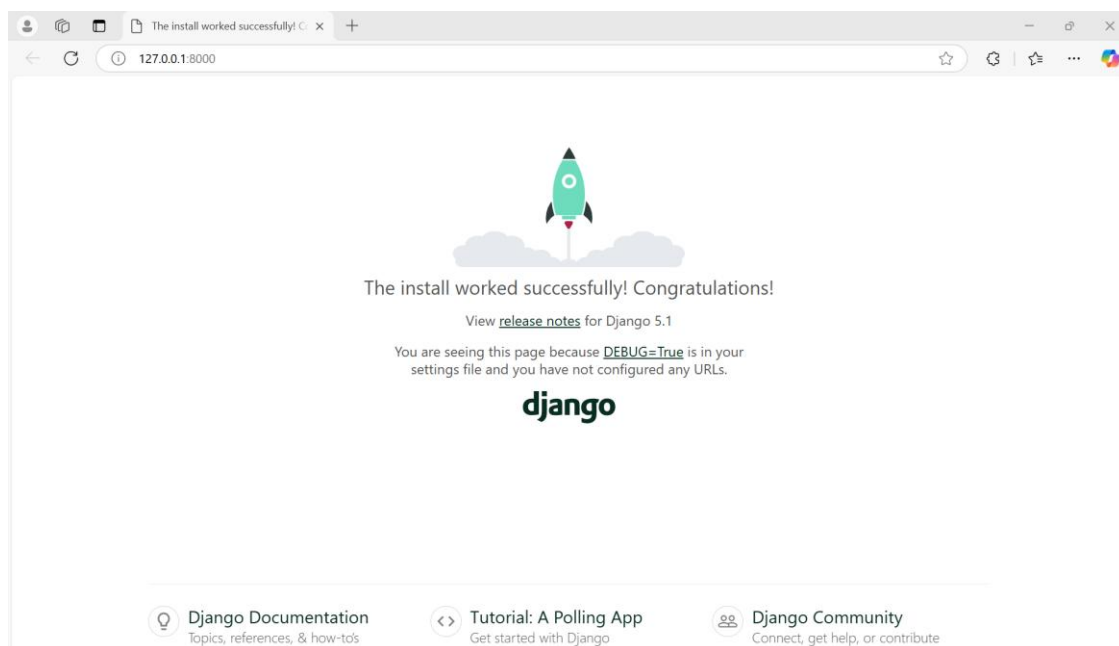
10. Save and close the file and test if the project is working fine or not by using
.\myenv\Scripts\activate

11. Now, I am going to start the server, using python manage.py runserver

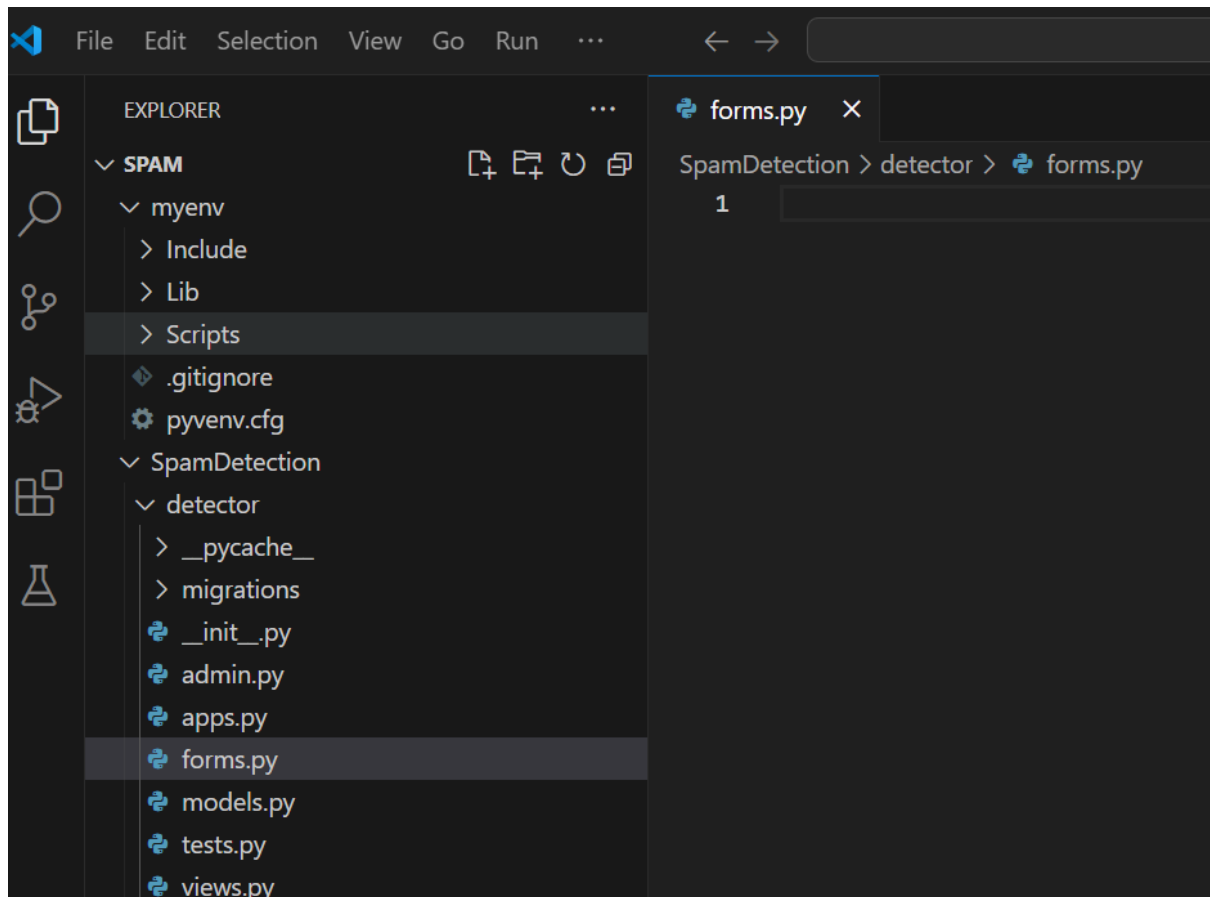


The screenshot shows the VS Code interface with the terminal pane active. The terminal output indicates that Django version 5.1.4 is running on http://127.0.0.1:8000/. It also shows a message about 18 unapplied migrations for the 'admin' app. The prompt shows the user is in the 'myenv' PowerShell environment.

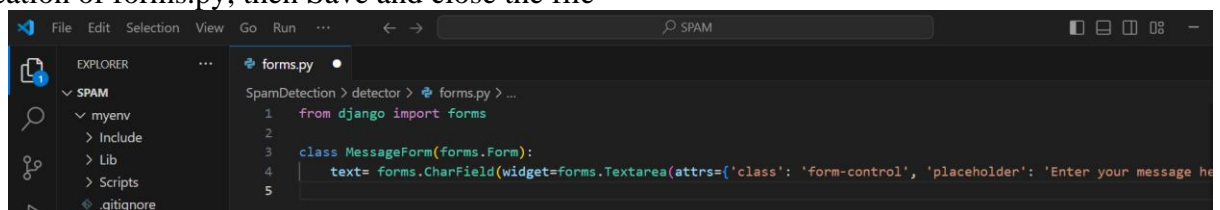
```
You have 18 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): admin, au  
th, contenttypes, sessions.  
Run 'python manage.py migrate' to apply them.  
December 11, 2024 - 17:59:29  
Django version 5.1.4, using settings 'SpamDetection.settings'  
Starting development server at http://127.0.0.1:8000/  
Quit the server with CTRL-BREAK.  
[11/Dec/2024 18:00:16] "GET / HTTP/1.1" 200 12068  
(myenv) PS C:\Users\Krithika R\Desktop\SPAM\SpamDetection>
```



12. The next step is to create a form and input a message to check if it is a spam or not. To do this, create a new file forms.py in the app directory



Creation of forms.py, then Save and close the file



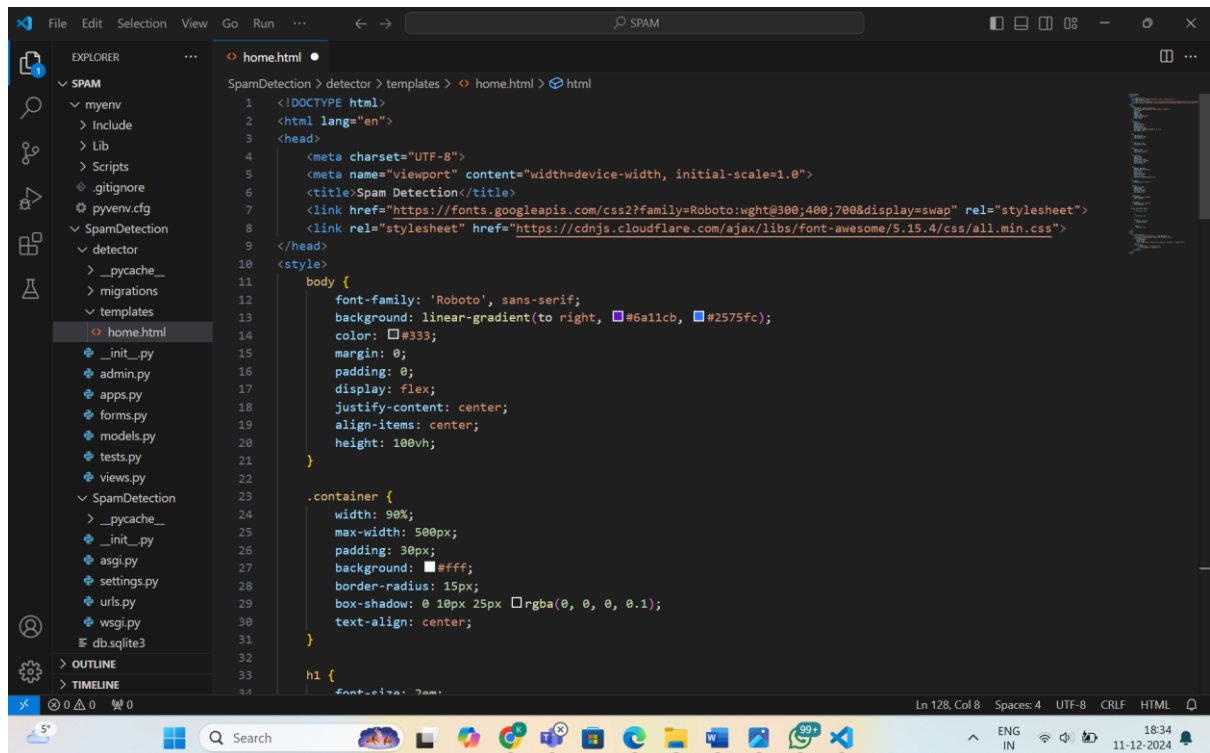
13. Now open the views.py file in the app directory. This step is very important as its where we write the code to handle the requests and responses. And we also integrate the machine learning model, so the same code has been used to make the model accessible to the web application. So, first paste the code from google colab and write the code to get message form.

```
File Edit Selection View Go Run ... SPAM
views.py x
SpamDetection > detector > views.py > Home
1 from django.shortcuts import render
2
3 # Create your views here.
4 import pandas as pd # to handle our dataset
5
6 from sklearn.feature_extraction.text import CountVectorizer #for converting text data into numerical data
7
8 from sklearn.model_selection import train_test_split # to split data
9
10 from sklearn.naive_bayes import MultinomialNB
11
12 from sklearn.metrics import accuracy_score
13
14 from .forms import MessageForm
15
16 dataset = pd.read_csv('C:\Users\Krithika R\Downloads\emails.csv.csv')
17
18 vectorizer = CountVectorizer()
19 X = vectorizer.fit_transform(dataset['text'])
20
21 X_train, X_test, y_train, y_test = train_test_split(X, dataset['spam'], test_size=0.2)
22
23 model = MultinomialNB()
24 model.fit(X_train, y_train)
25
26 def predictMessage(message):
27     messageVector = vectorizer.transform([message])
28     prediction = model.predict(messageVector)
29     return 'Spam' if prediction[0] == 1 else 'Ham'
```

```
File Edit Selection View Go Run ... SPAM
views.py x
SpamDetection > detector > views.py > Home
30
31
32 def Home(request):
33     result = None
34     if request.method == 'POST':
35         form = MessageForm(request.POST)
36         if form.is_valid():
37             message = form.cleaned_data['text']
38             result = predictMessage(message)
39
40     else:
41         form = MessageForm()
42
43     return render(request, 'home.html', {'form': form, 'result': result})
```

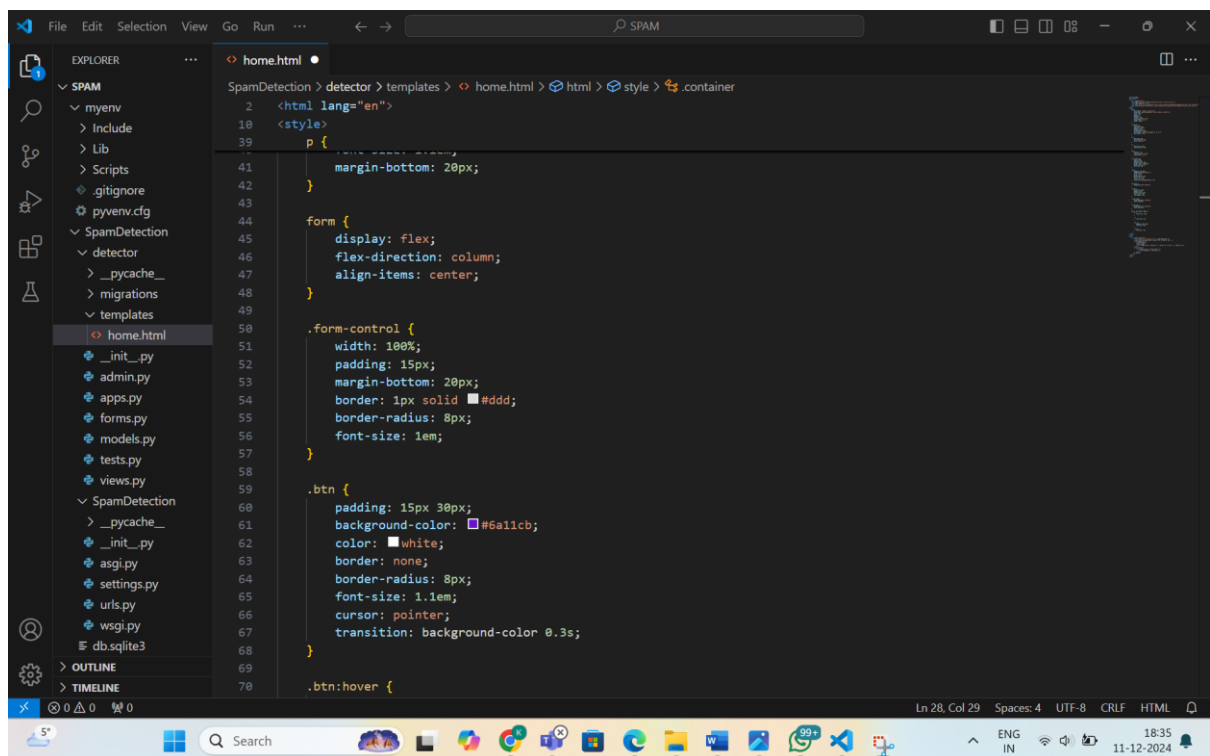
Save and close the file.

14. The next step is to create a user interface. First create a new folder named templates in the app directory and create a file inside this app directory called home.html. This is necessary because Django looks for HTML templates in the templates folder by default.



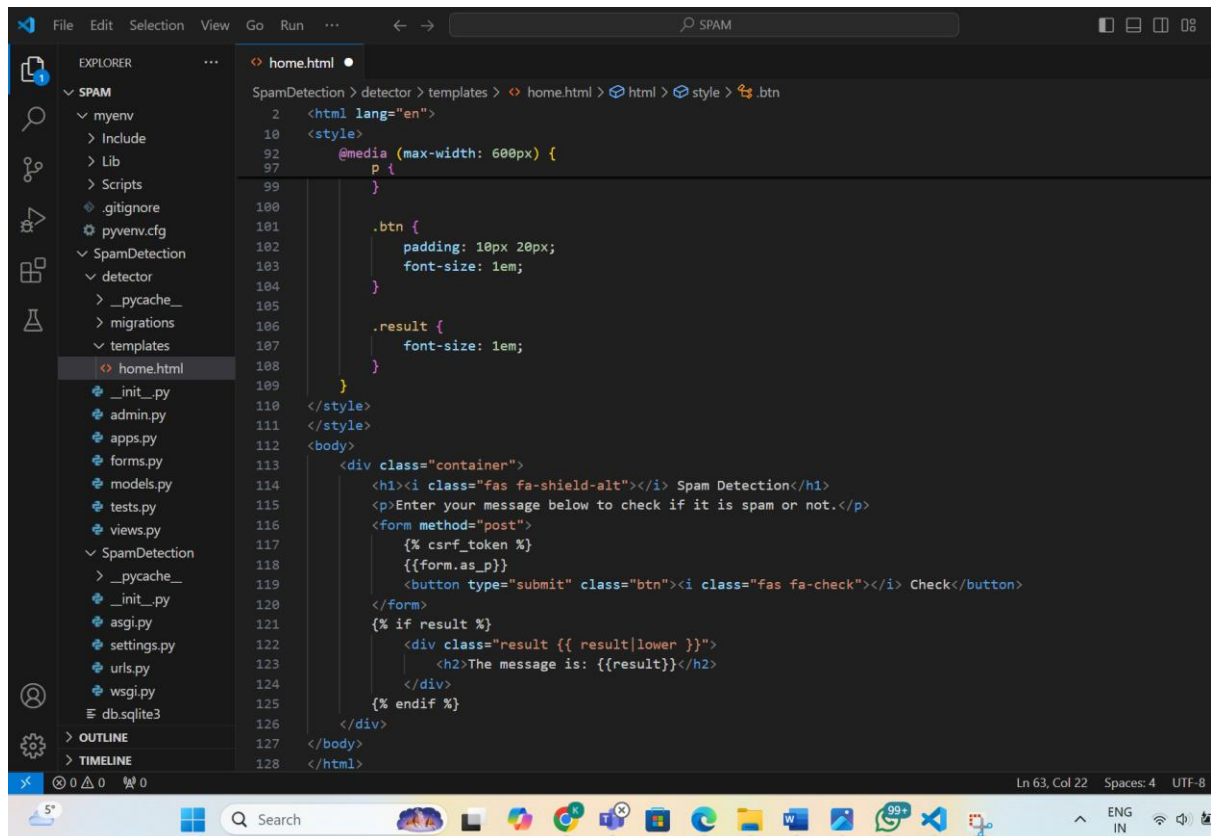
The screenshot shows the VS Code editor with the file explorer on the left. The file explorer shows a project structure with folders like SPAM, myenv, Include, Lib, Scripts, gitignore, pyvenv.cfg, SpamDetection, and detector. The file home.html is selected in the file explorer. The editor shows the following code:

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, initial-scale=1.0">
6   <title>Spam Detection</title>
7   <link href="https://fonts.googleapis.com/css2?family=Roboto:wght@300;400;700&display=swap" rel="stylesheet">
8   <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.4/css/all.min.css">
9 </head>
10 <body>
11   <div class="container">
12     <div class="row">
13       <div class="col-md-6">
14         <h1>Spam Detection</h1>
15         <h2>Welcome to Spam Detection</h2>
16         <h3>This is a demo application</h3>
17         <h4>Please enter your email address</h4>
18         <input type="text">
19         <input type="button" value="Submit" />
20       </div>
21     </div>
22   </div>
23 </body>
```



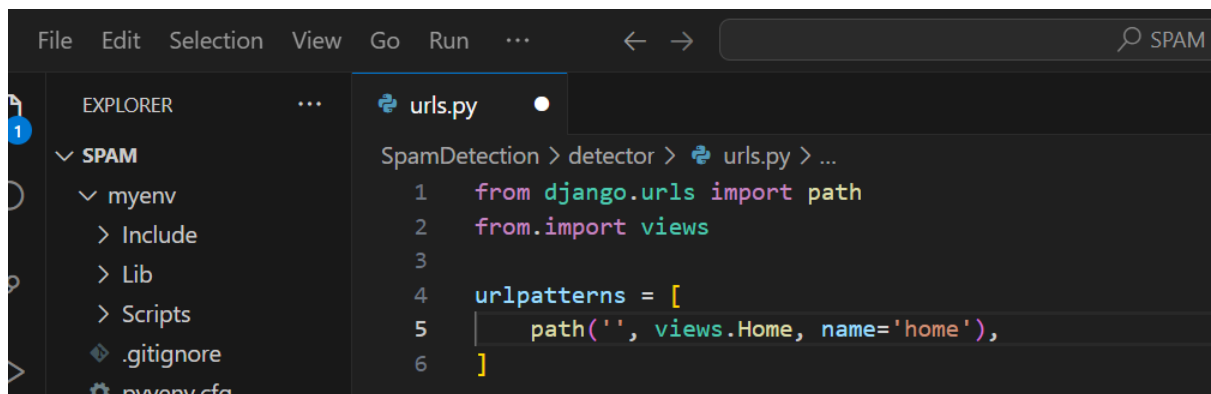
The screenshot shows the VS Code editor with the file explorer on the left. The file explorer shows a project structure with folders like SPAM, myenv, Include, Lib, Scripts, gitignore, pyvenv.cfg, SpamDetection, and detector. The file home.html is selected in the file explorer. The editor shows the following code:

```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, initial-scale=1.0">
6   <title>Spam Detection</title>
7   <link href="https://fonts.googleapis.com/css2?family=Roboto:wght@300;400;700&display=swap" rel="stylesheet">
8   <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.4/css/all.min.css">
9 </head>
10 <body>
11   <div class="container">
12     <div class="row">
13       <div class="col-md-6">
14         <h1>Spam Detection</h1>
15         <h2>Welcome to Spam Detection</h2>
16         <h3>This is a demo application</h3>
17         <h4>Please enter your email address</h4>
18         <input type="text">
19         <input type="button" value="Submit" />
20       </div>
21     </div>
22   </div>
23 </body>
```



```
2 <html lang="en">
10 <style>
92 @media (max-width: 600px) {
97   p {
99   }
100
101   .btn {
102     padding: 10px 20px;
103     font-size: 1em;
104   }
105
106   .result {
107     font-size: 1em;
108   }
109 }
110 </style>
111 </style>
112 <body>
113   <div class="container">
114     <h1><i class="fas fa-shield-alt"></i> Spam Detection</h1>
115     <p>Enter your message below to check if it is spam or not.</p>
116     <form method="post">
117       {% csrf_token %}
118       {{form.as_p}}
119       <button type="submit" class="btn"><i class="fas fa-check"></i> Check</button>
120     </form>
121     {% if result %}
122       <div class="result {{ result|lower }}">
123         <h2>The message is: {{result}}</h2>
124       </div>
125     {% endif %}
126   </div>
127 </body>
128 </html>
```

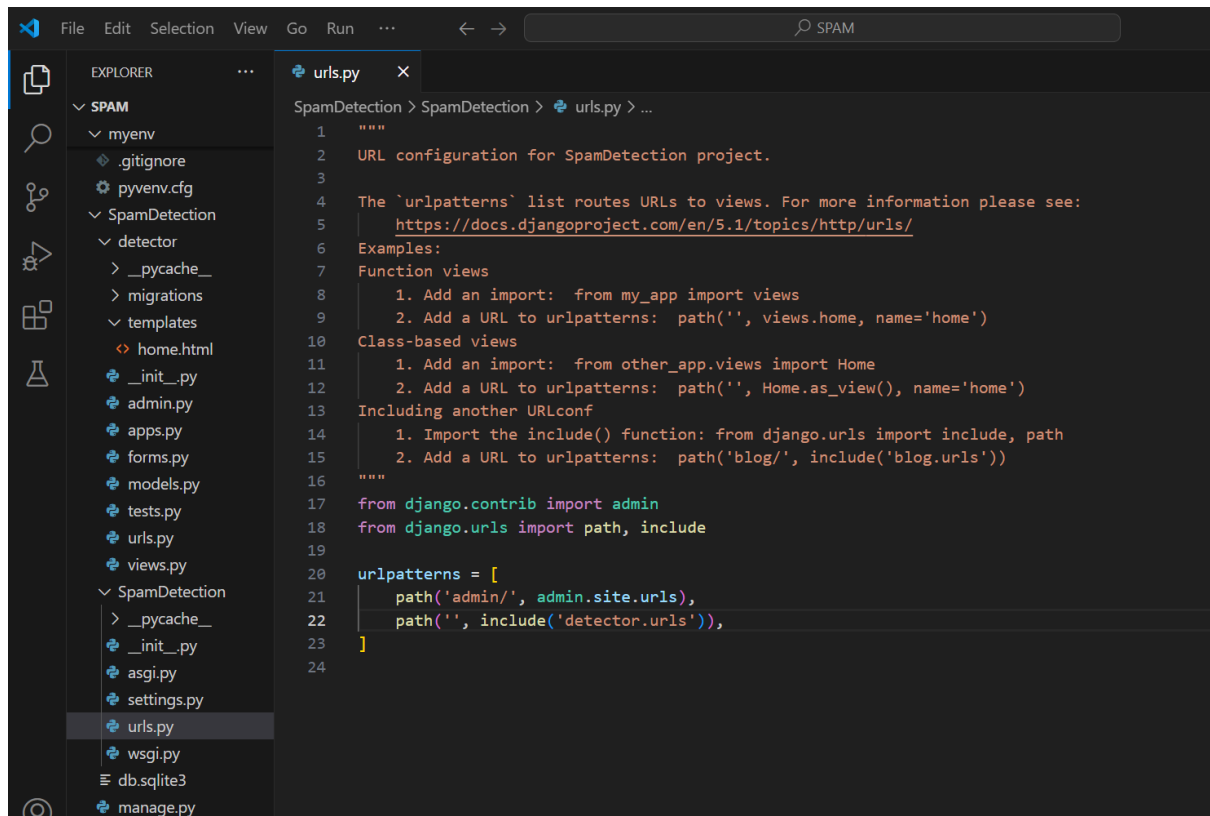
15. Now our last step is to set up a URL link for the website. For this, create urls.py file in the app directory



```
1 from django.urls import path
2 from . import views
3
4 urlpatterns = [
5     path('', views.Home, name='home'),
6 ]
```

Save and close the file

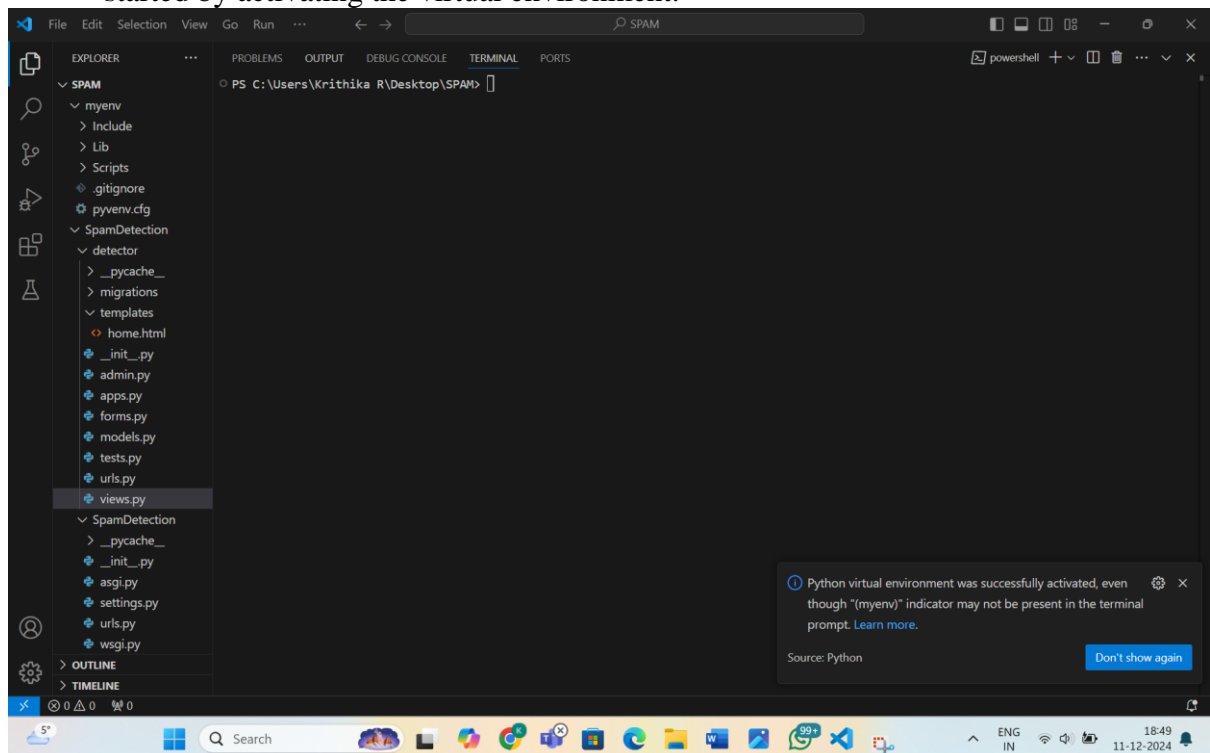
16. And next, in the project directory open the urls.py file. The app url is included here and edited in the code.



The screenshot shows the Visual Studio Code interface with the Explorer sidebar on the left displaying the project structure. The file `urls.py` is selected under the `SpamDetection` folder. The main editor displays the content of `urls.py`, which includes a docstring, a reference to Django documentation, examples of function and class-based views, and the `urlpatterns` list.

```
1 """
2 URL configuration for SpamDetection project.
3
4 The 'urlpatterns' list routes URLs to views. For more information please see:
5     https://docs.djangoproject.com/en/5.1/topics/http/urls/
6 Examples:
7 Function views
8     1. Add an import:  from my_app import views
9     2. Add a URL to urlpatterns:  path('', views.home, name='home')
10 Class-based views
11     1. Add an import:  from other_app.views import Home
12     2. Add a URL to urlpatterns:  path('', Home.as_view(), name='home')
13 Including another URLconf
14     1. Import the include() function: from django.urls import include, path
15     2. Add a URL to urlpatterns:  path('blog/', include('blog.urls'))
16 """
17 from django.contrib import admin
18 from django.urls import path, include
19
20 urlpatterns = [
21     path('admin/', admin.site.urls),
22     path('', include('detector.urls')),
23 ]
24
```

17. Finally, let us now run the django server and test our application. For this I again started by activating the virtual environment.



Congratulations! This is the final stage.

The screenshot shows the Visual Studio Code interface with a file explorer on the left and a terminal on the right. The file explorer shows a project structure for 'SPAM' with subfolders 'myenv', 'Include', 'Lib', 'Scripts', and 'SpamDetection'. The 'SpamDetection' folder contains files like 'home.html', 'init.py', 'admin.py', 'apps.py', 'forms.py', 'models.py', 'tests.py', 'urls.py', and 'views.py'. The terminal shows the following commands and output:

```
PS C:\Users\Krihika R\Desktop\SPAM> .\myenv\Scripts\activate
(myenv) PS C:\Users\Krihika R\Desktop\SPAM> cd .\SpamDetection
(myenv) PS C:\Users\Krihika R\Desktop\SPAM\SpamDetection> python manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).

You have 18 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): admin, auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.
December 11, 2024 - 18:58:34
Django version 5.1.4, using settings 'SpamDetection.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.

[]
```

The screenshot shows the Visual Studio Code interface with a file explorer on the left and a terminal on the right. The file explorer shows a project structure for 'SPAM FOLDER (WORKSPACE)' with subfolders 'myenv', 'Include', 'Lib', 'Scripts', and 'SpamDetection'. The 'SpamDetection' folder contains files like 'home.html', 'init.py', 'admin.py', 'apps.py', 'forms.py', 'models.py', 'tests.py', 'urls.py', 'views.py', 'spamDetection', 'db.sqlite3', and 'manage.py'. The terminal shows the following commands and output:

```
(myenv) PS C:\Users\Krihika R\Desktop\Spam folder> cd .\SpamDetection
(myenv) PS C:\Users\Krihika R\Desktop\Spam folder\SpamDetection> python manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

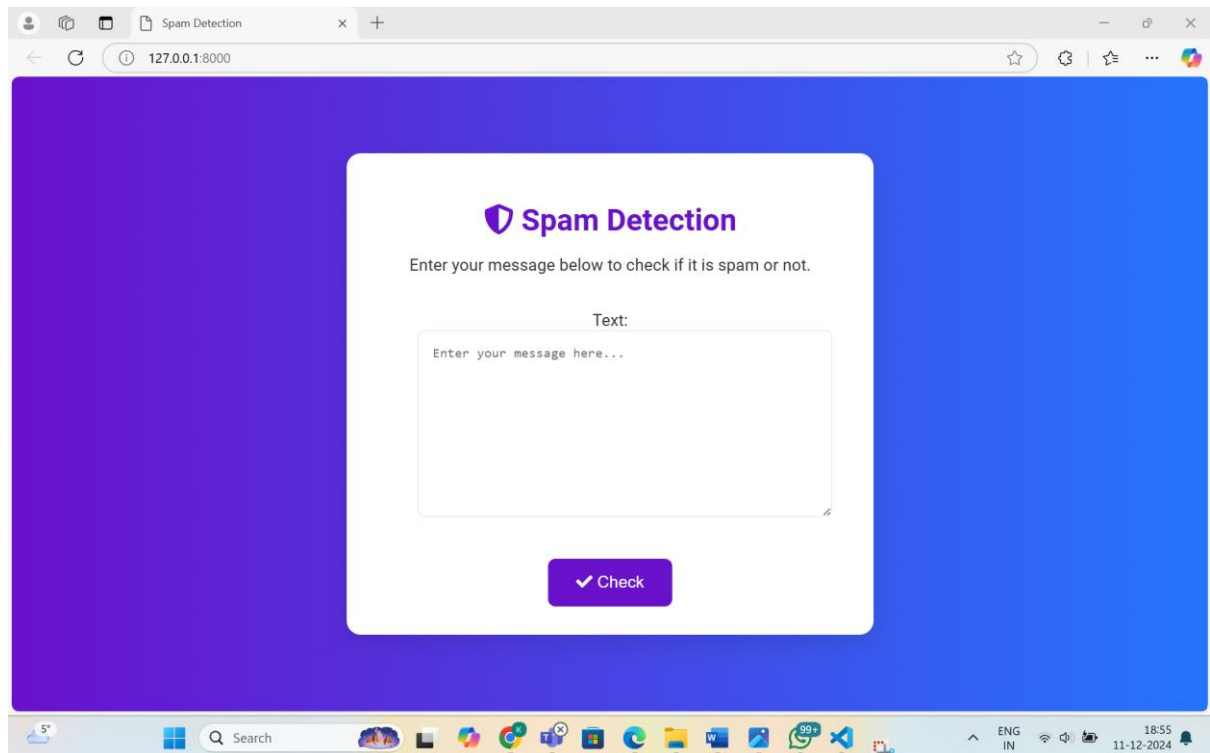
System check identified no issues (0 silenced).

You have 18 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): admin, auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.
December 11, 2024 - 18:53:48
Django version 5.1.3, using settings 'spamDetection.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.

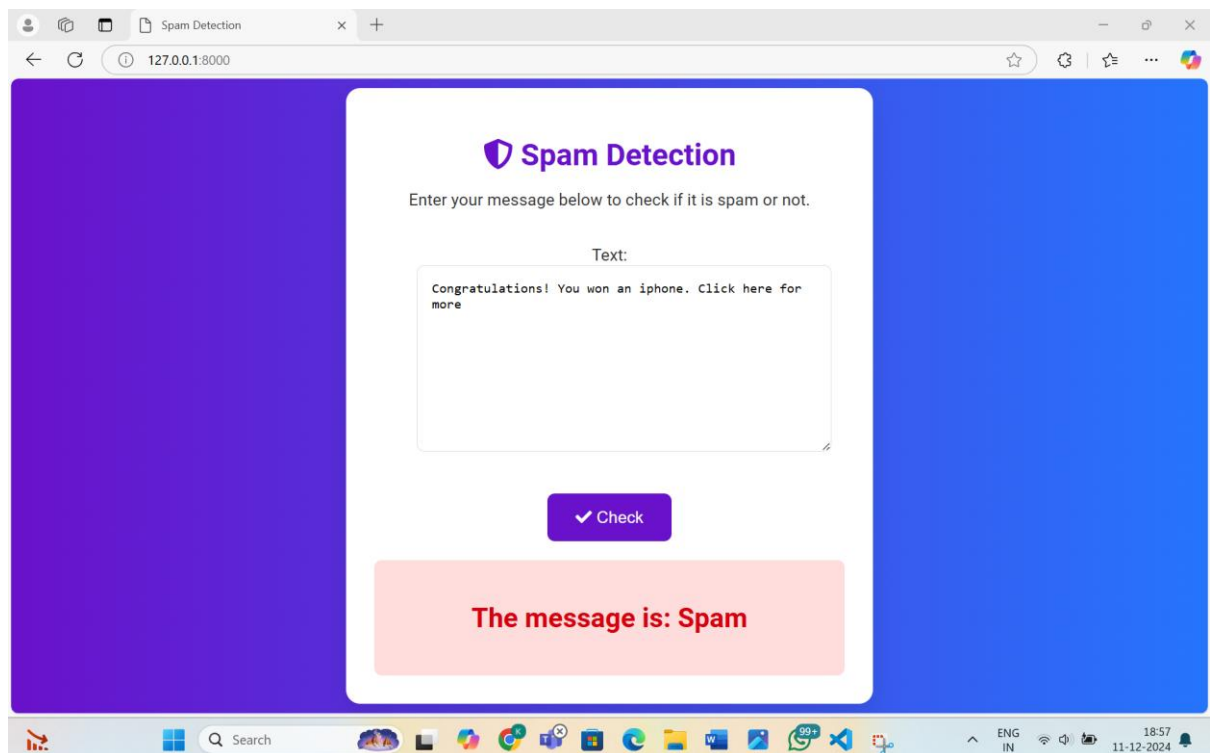
[11/Dec/2024 18:53:53] "GET / HTTP/1.1" 200 3018

[]
```

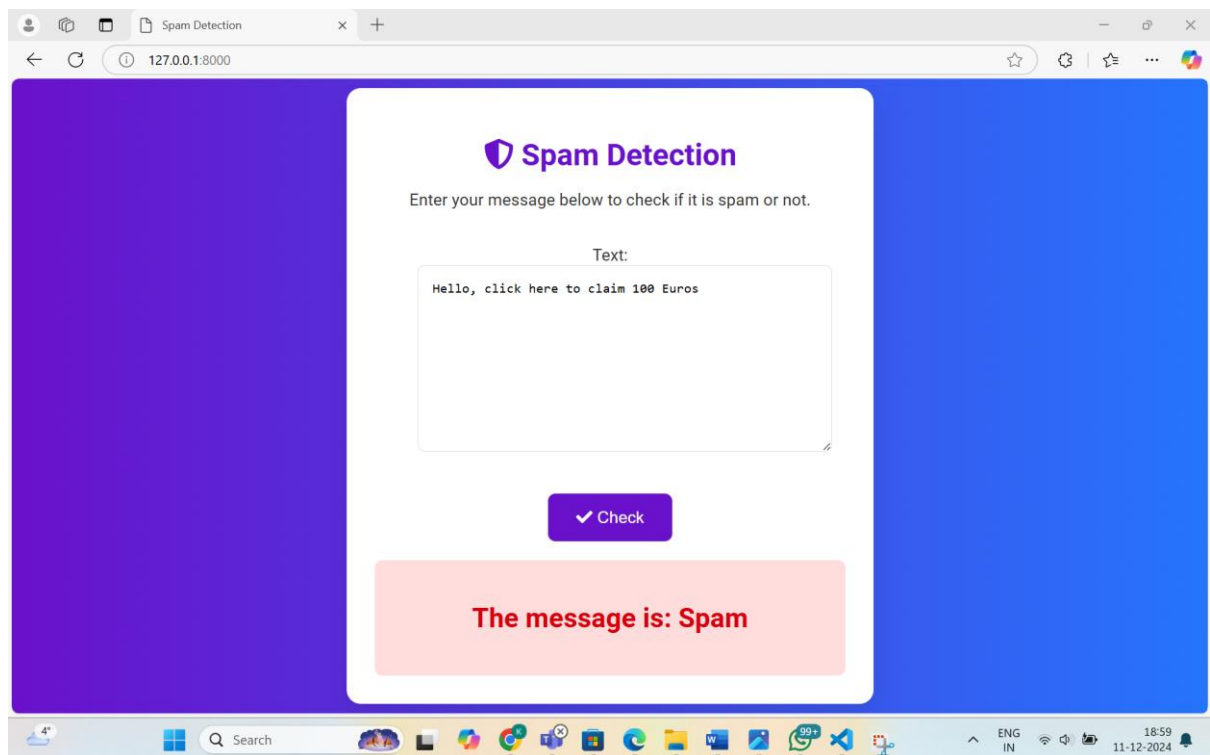
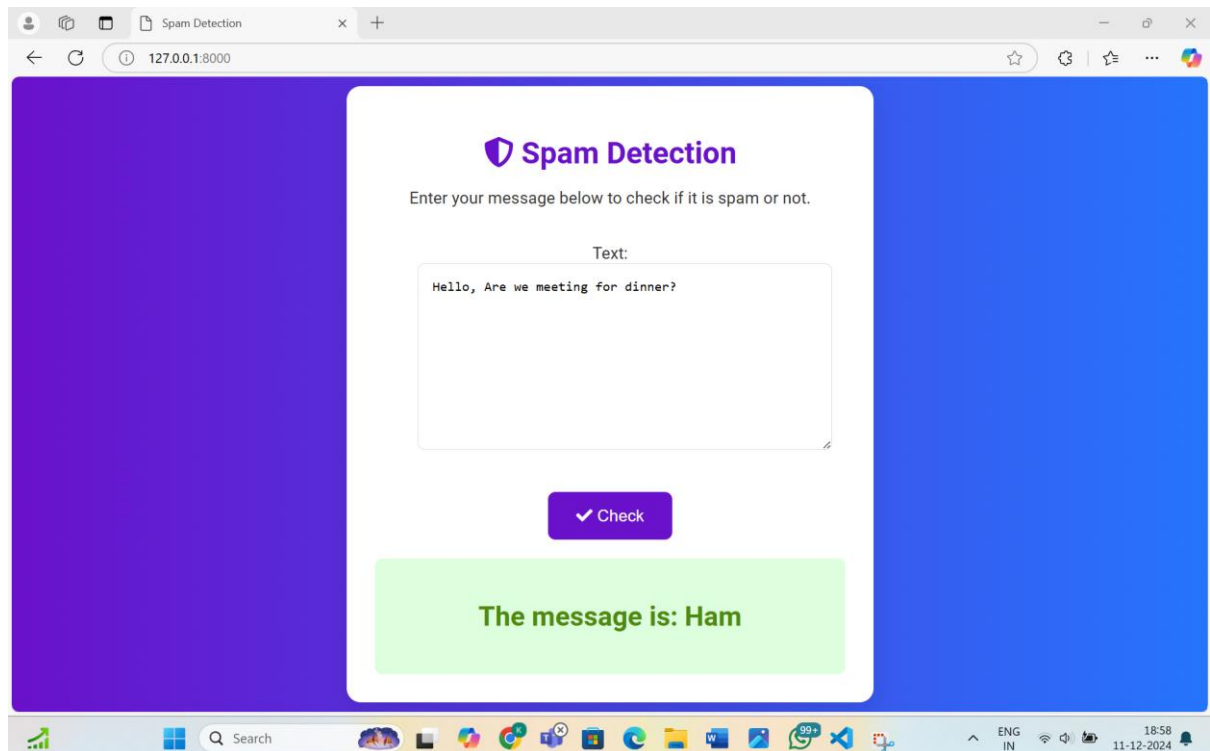
The right sidebar shows a list of open files, including 'powershell' and 'python - SpamDetection'.

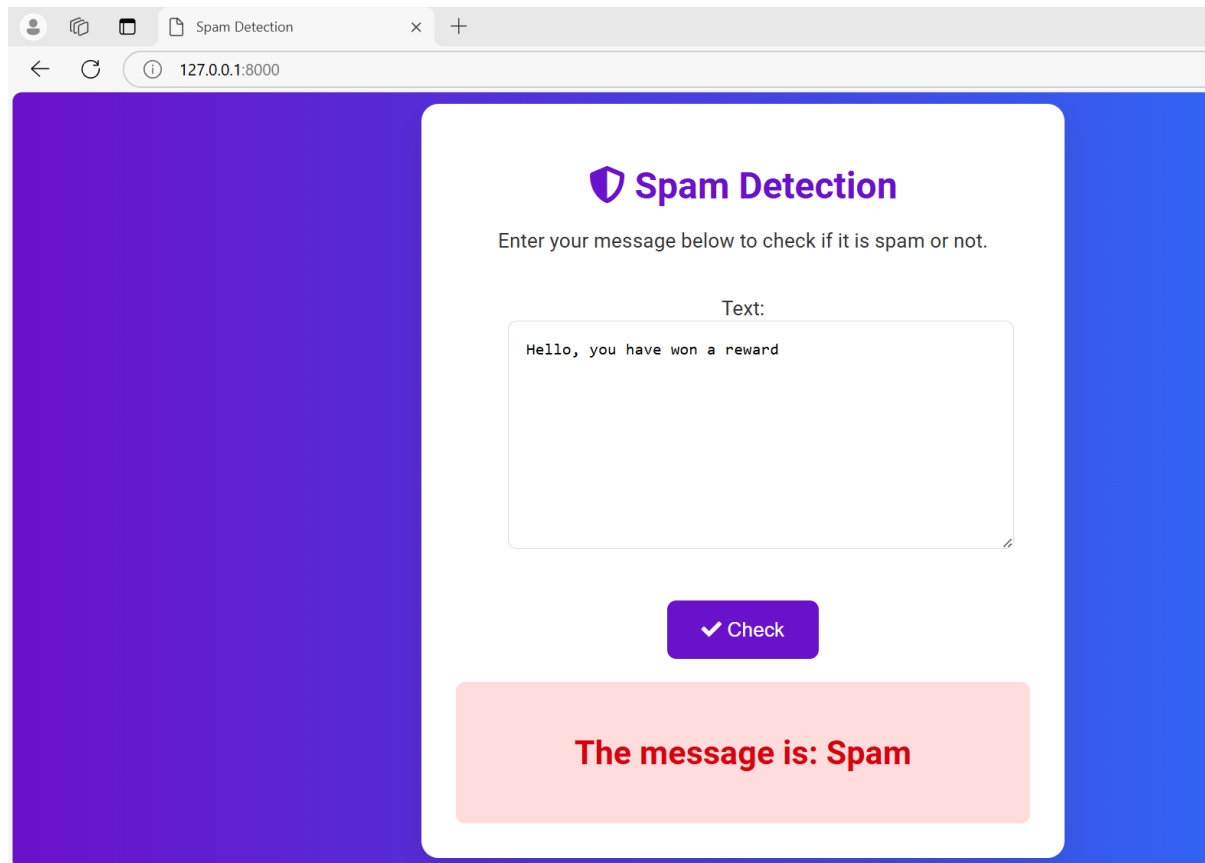


This is our web user interface, now first test it by adding any message.



As you can see this message is a spam.





Here are a few examples of messages and its screenshots are shown above.

References

Download Python. (n.d.). Python.Org. Retrieved December 12, 2024, from <https://www.python.org/downloads/>

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