A

Major Project

On

FAKE PROFILE IDENTIFICATION IN SOCIAL NETWORK USING MACHINE LEARNING AND NLP

(Submitted in partial fulfillment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE AND ENGINEERING

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2020-2024

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project entitled **“FAKE PROFILE IDENTIFICATION IN SOCIAL NETWORK USING MACHINE LEARNING AND NLP ”** being submitted by **KUSUMA VINAY KUMAR REDDY (207R1A0589), CHILUKA NARESH (207R1A0572)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide work carried out by them under our guidance and supervision during the year 2023-24.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

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Submitted for viva voice Examination held on ____________________

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ABSTRACT

In the contemporary landscape, social network sites have seamlessly integrated into the daily lives of a substantial portion of the global population. The ubiquitous creation of user profiles and continuous interactions, transcending geographical and temporal constraints, underscores the pervasive nature of these platforms. However, this widespread connectivity also introduces security challenges, necessitating a nuanced approach to discern genuine users from potential threats. This study addresses the imperative need to classify social network profiles, differentiating between authentic and fake accounts. While existing classification methods have laid a foundation, there exists a pressing requirement to elevate the accuracy of fake profile detection. This paper proposes the integration of advanced machine learning and Natural Language Processing (NLP) techniques to augment the precision of this critical task. The utilization of Support Vector Machine (SVM) and Naïve Bayes algorithms stands out as a cornerstone of this approach. Leveraging the power of machine learning, SVM offers robust pattern recognition, while Naïve Bayes, rooted in probabilistic reasoning, adds a layer of sophistication to the classification process. By incorporating these techniques, the aim is to create a more discerning system that can adeptly identify and segregate genuine user profiles from potentially malicious ones. The focus on NLP brings linguistic patterns into the forefront of analysis. Going beyond traditional methods, this approach scrutinizes the intricacies of language usage within profiles, posts, and comments. This linguistic analysis, coupled with machine learning algorithms, contributes to a holistic evaluation that extends beyond behavioral patterns, enriching the classification process. The overarching goal is to elevate the accuracy rate of fake profile detection in social networks, addressing the evolving nature of deceptive practices. The proposed methodology aligns with the dynamic and multifaceted nature of online interactions, aiming to fortify the security of users in an ever-expanding digital social sphere. This research not only contributes to the academic discourse on online security but also holds practical implications for social network administrators and users alike, fostering a safer and more reliable digital ecosystem.

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1. INTRODUCTION

1. INTRODUCTION

1.1 PROJECT SCOPE

This project ambitiously aims to develop a sophisticated system for the automatic identification of fake profiles within the realm of social networks. Leveraging advanced machine learning and natural language processing techniques, the scope extends to an exhaustive examination of user behavior, linguistic patterns, and multi-modal data integration. The project seeks to provide a comprehensive solution applicable to various social media platforms, enhancing overall security and trustworthiness.

1.2 PROJECT PURPOSE

The primary purpose of this initiative is to proactively address the escalating challenges posed by fake profiles on social networks. By deploying cutting-edge technologies, the project endeavors to fortify the integrity of online communities, mitigating issues such as identity theft, misinformation, and online scams. Ultimately, the purpose is to create a safer and more reliable online environment, fostering trust among users and administrators alike.

1.3 PROJECT FEATURES

Embedded within the project's architecture are features that collectively contribute to its efficacy. The system incorporates sophisticated behavioral analysis, utilizing ML algorithms to scrutinize user behavior for irregular patterns indicative of fake profiles. This includes a nuanced examination of posting frequency, engagement levels, and other online activities.Additionally, the project integrates advanced linguistic pattern recognition through NLP techniques. This involves a deep dive into the linguistic nuances within user-generated content, uncovering anomalies or suspicious language patterns that may signify the presence of a fake profile. The analysis encompasses aspects such as writing style, grammar, and context.

2.SYSTEM ANALYSIS

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SYSTEM ANALYSIS

System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

2.1 PROBLEM DEFINITION

The escalating prevalence of fake profiles on social networks has emerged as a severe threat, compromising the integrity and security of online communities. Identity theft, misinformation, and online scams have become rampant, eroding user trust in these platforms. Current detection methods are manual, time-intensive, and often ineffective against evolving deceptive strategies. The absence of a sophisticated, automated system exacerbates the challenges. This project addresses the pressing need for an advanced solution, utilizing machine learning and natural language processing to comprehensively analyze user behavior, linguistic patterns, and diverse data modalities. By developing an intelligent system capable of proactively identifying and neutralizing fake profiles across various social media platforms, this initiative aims to restore and enhance the security and credibility of online social spaces.

2.2 EXISTING SYSTEM

Chai et al awarded on this paper is a proof-of inspiration gain knowledge of. Even though the prototype approach has employed most effective normal systems in normal language processing and human-pc interplay, the results realized from the user trying out are significant. By using comparing this simple prototype approach with a wholly deployed menu procedure, they've discovered that users, principally beginner users, strongly pick the common language dialog-based approach. They have additionally learned that in an ecommerce environment sophistication in dialog administration is most important than the potential to manage complex typical language sentences.

In addition, to provide effortless access to knowledge on ecommerce web sites, natural language dialog-based navigation and menu-pushed navigation should be intelligently combined to meet person’s one-of-a-kind wants. Not too long ago, they have got accomplished development of a new iteration of the approach that includes enormous enhancements in language processing, dialog administration and information management. They believed that average language informal interfaces present powerful personalized alternatives to conventional menupushed or search-based interfaces to web sites.

LinkedIn is greatly preferred through the folks who're in the authentic occupations. With the speedy development of social networks, persons are likely to misuse them for unethical and illegal conducts.However, in relation to LinkedIn such behavioral observations are tremendously restrictive in publicly to be had profile data for the customers by the privateness insurance policies. For that reason, there is to conduct distinctive study on deciding on systems for fake profile identification in LinkedIn. Shalinda Adikari and Kaushik Dutta researched and identified the minimal set of profile data that are crucial for picking out false profiles in LinkedIn and labeled the appropriate knowledge mining procedure for such project.

Z. Halim et al. Proposed spatio-temporal mining on social network to determine circle of customers concerned in malicious events with the support of latent semantic analysis. Then compare the results comprised of spatio temporal co incidence with that of original organization/ties with in social network, which could be very encouraging as the organization generated by spatio-temporal co-prevalence and actual one are very nearly each other. Once they set the worth of threshold to right level, we develop the number of nodes i.e. Actor so that they are able to get higher photo. Total, scan indicate that Latent Semantic Indexing participate in very good for picking out malicious contents, if the feature set is competently chosen. One obvious quandary of this technique is how users pick their function set and the way rich it's. If the characteristic set is very small then most of the malicious content material will not be traced. However, the bigger person function set, better the performance won.

2.2.1 LIMITATIONS OF EXISTING SYSTEM

- The system is not implemented Learning Algorithms like svm, Naive Bayes.
- The system is not implemented any the problems involving social networking like privacy, online bullying, misuse, and trolling and many others.

2.3 PROPOSED SYSTEM

On this paper we presented a machine learning & natural language processing system to observe the false profiles in online social networks. Moreover, we are adding the SVM classifier and naïve bayes algorithm to increase the detection accuracy rate of the fake profiles.

An SVM classifies information by means of finding the exceptional hyperplane that separates all information facets of 1 type from those of the other classification. The best hyperplane for an SVM method that the one with the biggest line between the two classes. An SVM classifies data through discovering the exceptional hyperplane that separates all knowledge facets of one category from those of the other class. The help vectors are the info aspects which are closest to the keeping apart hyperplane.

Naive Bayes algorithm is the algorithm that learns the chance of an object with designated features belonging to a unique crew/category. In brief, it's a probabilistic classifier. The Naive Bayes algorithm is called "naive" on account that it makes the belief that the occurrence of a distinct feature is independent of the prevalence of other aspects. For illustration, if we're looking to determine false profiles based on its time, date of publication or posts, language and geoposition. Even if these points depend upon each and every different or on the presence of the other facets, all of these properties in my view contribute to the probability that the false profile.

2.3.1 ADVANTAGES OF PROPOSED SYSTEM

- In the proposed system, Profile information in online networks will also be static or dynamic. The details which can be supplied with the aid of the person on the time of profile creation is known as static knowledge, the place as the small print that are recounted with the aid of the system within the network is called dynamic knowledge.
- In the proposed system, Social Networking offerings have facilitated identity theft and Impersonation attacks for serious as good as naïve attackers.

2.4 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

2.4.1 ECONOMIC FEASIBILITY STUDY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

2.4.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.4.3 SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

2.5 HARDWARE & SOFTWARE REQUIREMENTS

2.5.1 HARDWARE REQUIREMENTS

Processor	:	Pentium –IV
RAM	:	20 GB
Key Board	:	Standard Windows Keyboard
Mouse	:	Two or Three Button Mouse
Monitor	:	SVGA

2.5.2 SOFTWARE REQUIREMENTS

Operating system	:	Windows 7 Ultimate.
Coding Language	:	Python.
Front-End	:	Python.
Back-End	:	Django-ORM
Designing	:	Html, css, javascript.
Data Base	:	MySQL (WAMP Server)

3. ARCHIITECTURE

3. ARCHITECTURE

3.1 PROJECT ARCHITECTURE

This project architecture shows the procedure followed for classification, starting from input to final prediction.

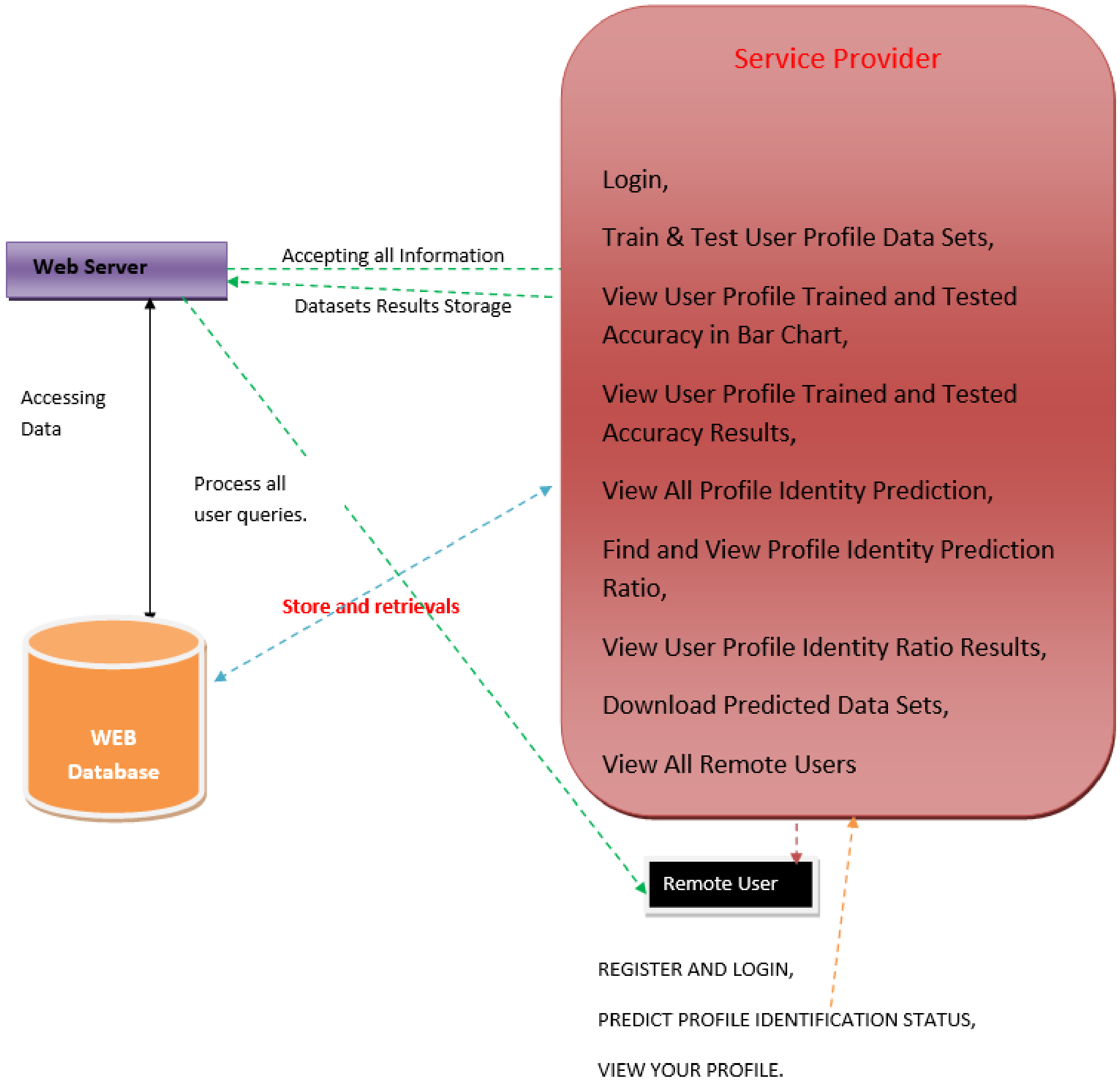

Service Provider
Login,
Train & Test User Profile Data Sets,
View User Profile Trained and Tested Accuracy in Bar Chart,
View User Profile Trained and Tested Accuracy Results,
View All Profile Identity Prediction,
Find and View Profile Identity Prediction Ratio,
View User Profile Identity Ratio Results,
Download Predicted Data Sets,
View All Remote Users
Web Server
Accepting all Information
Datasets Results Storage
Accessing Data
Process all user queries.
Store and retrievals
WEB Database
Remote User
REGISTER AND LOGIN,
PREDICT PROFILE IDENTIFICATION STATUS,
VIEW YOUR PROFILE.

Figure 3.1: Architecture diagram for Fake Profie Identification in Social Network using Machine Learning and NLP.

3.2 DESCRIPTION

3.2.1 WEB SERVER:

The web server acts as the gateway between the user interface and the backend services. It receives user requests through the web browser, processes these requests, and delivers the corresponding responses. It is responsible for handling static content, managing user sessions, and facilitating communication between the user interface and the underlying services.

3.2.2 WEB DATABASE:

The web database serves as the central repository for storing and retrieving data critical to the application's functionality. It houses user information, application data, and any other relevant datasets. This relational or non-relational database is integral for maintaining data consistency, integrity, and providing efficient data access to support various features and functionalities of the web application.

3.2.3 SERVICE PROVIDER

The service provider plays a crucial role in delivering dynamic functionalities and services to the web application. This may include third-party services, APIs, or in-house services that augment the core functionality of the application. These services could range from authentication and authorization services to external integrations, enhancing the overall user experience and expanding the capabilities of the web application.

3.2.4 REMOTE USERS ACCESS

Remote users access the web application from external locations, such as through the internet, utilizing web browsers or dedicated client applications. This introduces considerations for network security, scalability, and ensuring a responsive user experience despite potential latency.

4. DESIGN

4. DESIGN

4.1 USECASE DIAGRAM

A use case diagram is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users the system has. The use cases are represented by either circles or ellipses. The actors are often shown as stick figures.

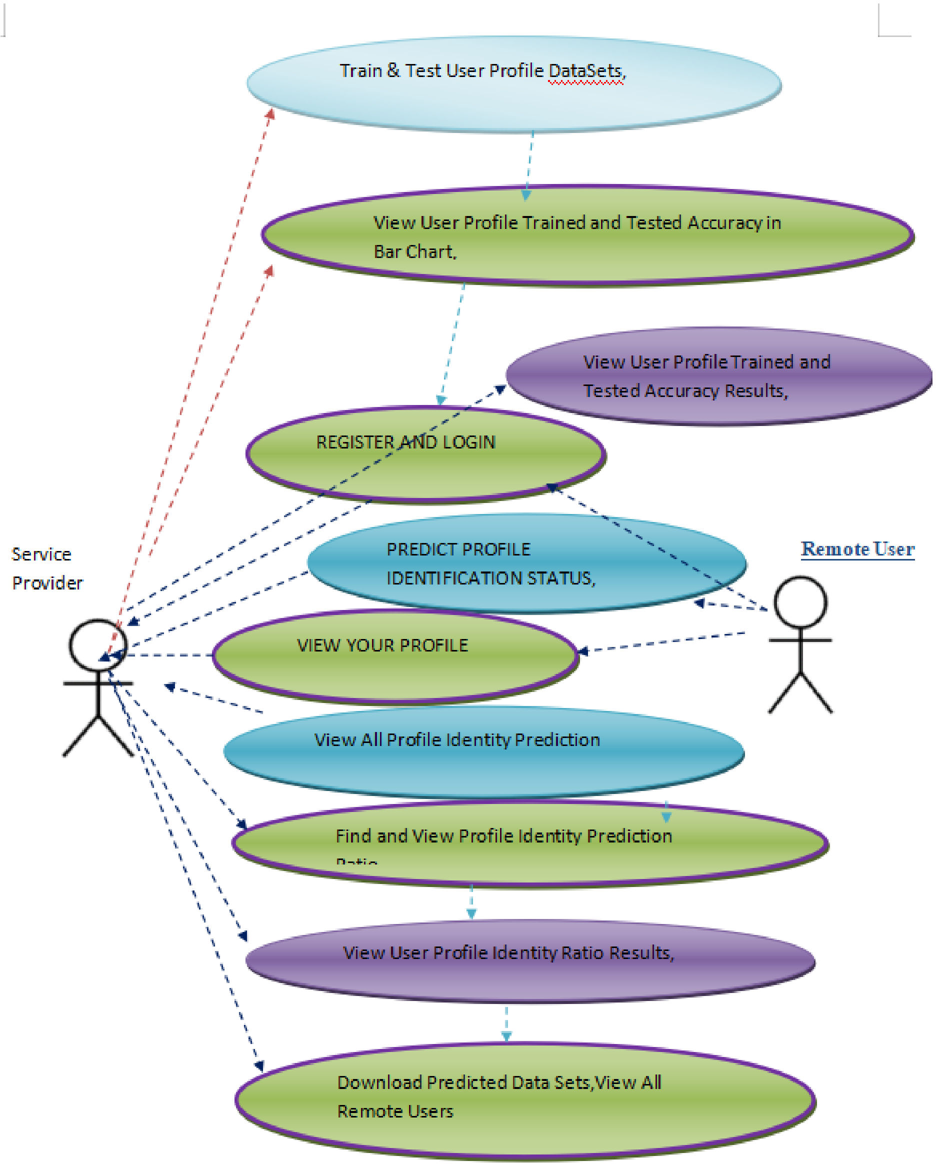

Train & Test User Profile DataSets,
View User Profile Trained and Tested Accuracy in Bar Chart,
View User Profile Trained and Tested Accuracy Results,
REGISTER AND LOGIN
Service Provider
PREDICT PROFILE IDENTIFICATION STATUS,
Remote User
VIEW YOUR PROFILE
View All Profile Identity Prediction
Find and View Profile Identity Prediction Ratio
View User Profile Identity Ratio Results,
Download Predicted Data Sets,View All Remote Users

Figure 4.1: UseCase diagram for Fake Profie Identification in Social Network using Machine Learning and NLP.

4.2 CLASS DIAGRAM

Class diagram is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

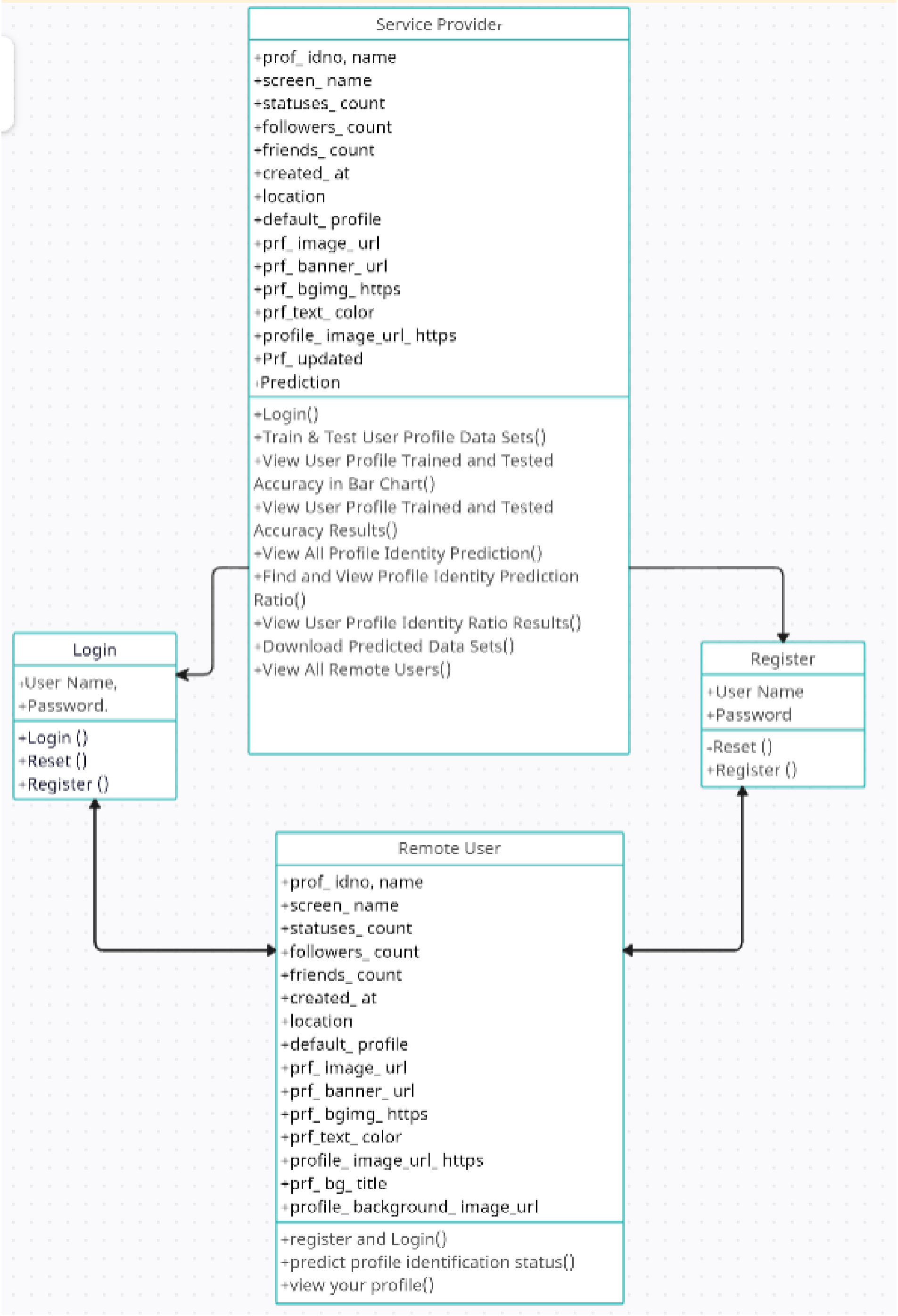


Figure 4.2: Class diagram for Fake Profie Identification in Social Network using Machine Learning and NLP.

4.3 SEQUENCE DIAGRAM

A sequence diagram shows object interactions arranged in time sequence. It depicts the objects involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the logical view of the system under development.

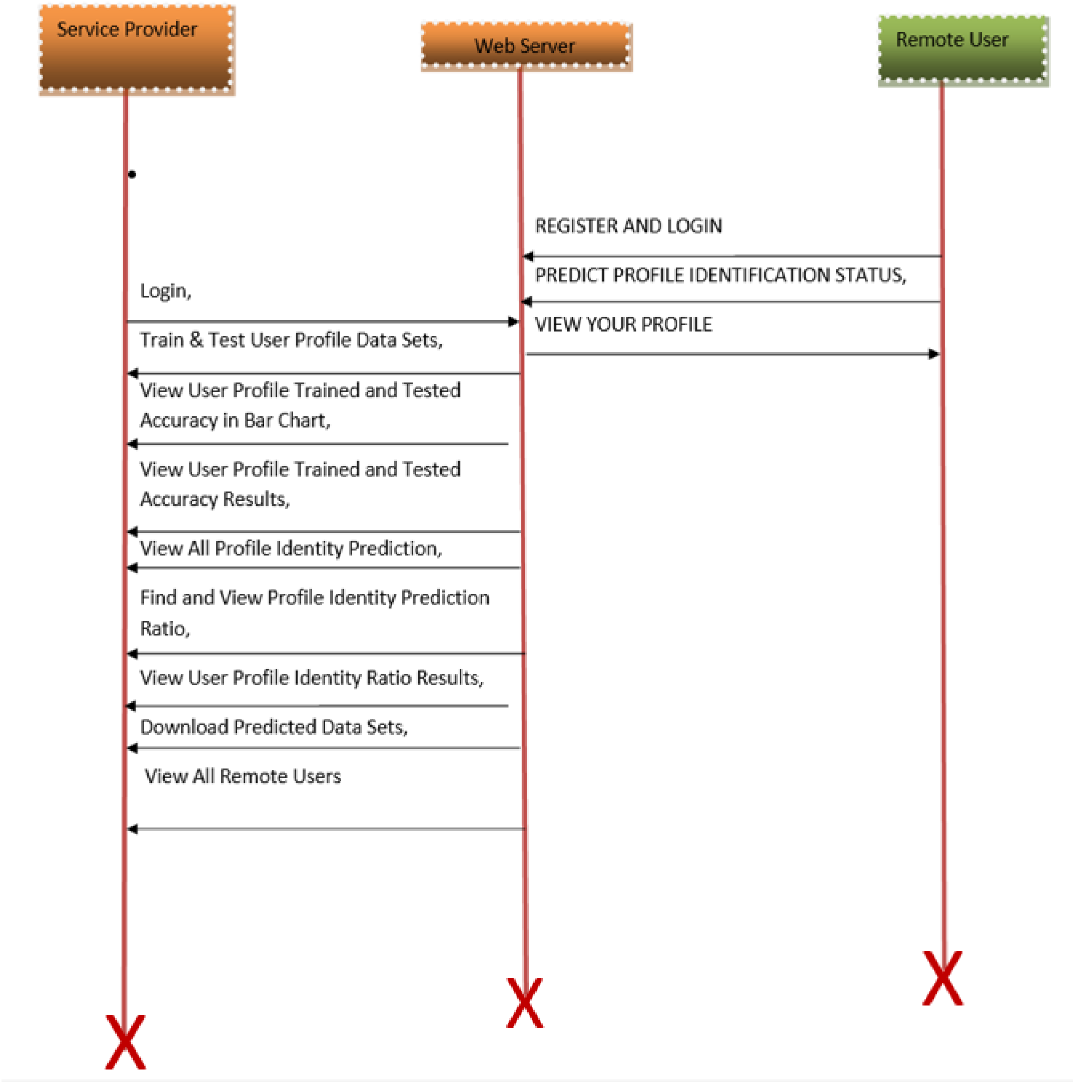
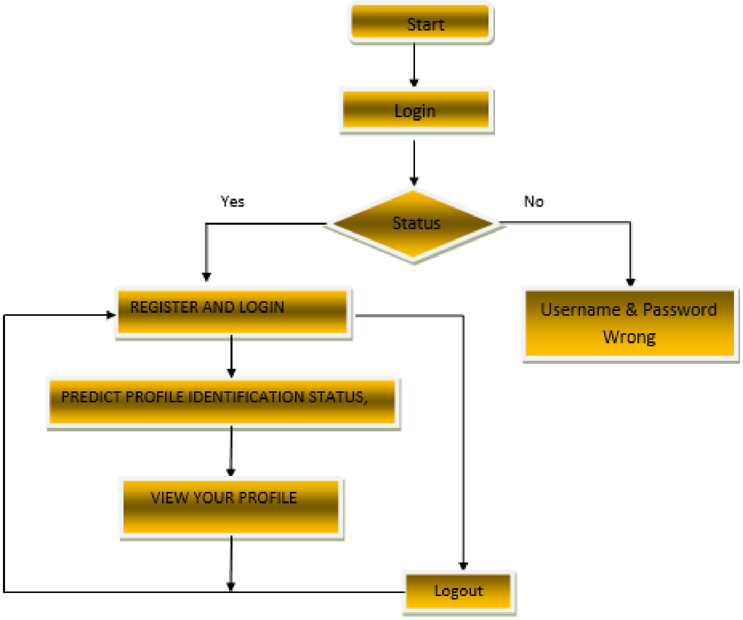

Service Provider
Web Server
Remote User
REGISTER AND LOGIN
PREDICT PROFILE IDENTIFICATION STATUS,
VIEW YOUR PROFILE
Login,
Train & Test User Profile Data Sets,
View User Profile Trained and Tested Accuracy in Bar Chart,
View User Profile Trained and Tested Accuracy Results,
View All Profile Identity Prediction,
Find and View Profile Identity Prediction Ratio,
View User Profile Identity Ratio Results,
Download Predicted Data Sets,
View All Remote Users

Figure 4.3: Sequence diagram for Fake Profie Identification in Social Network using Machine Learning and NLP.

4.4 ACTIVITY DIAGRAM

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency.

REMOTE USER :


Start
Login
Status
Yes
No
REGISTER AND LOGIN
Username & Password Wrong
PREDICT PROFILE IDENTIFICATION STATUS,
VIEW YOUR PROFILE
Logout

SERVICE PROVIDER:

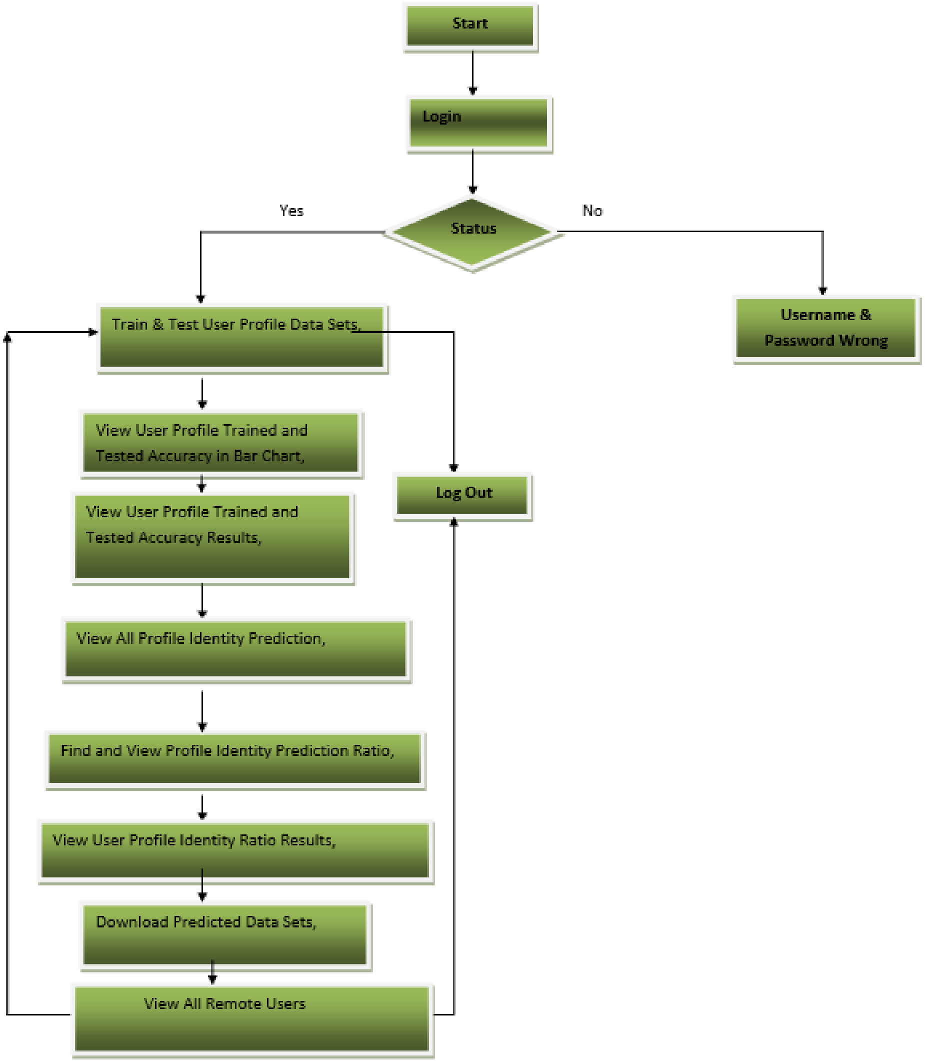

Start
Login
Yes
Status
No
Train & Test User Profile Data Sets,
Username &
Password Wrong
View User Profile Trained and
Tested Accuracy in Bar Chart,
Log Out
View User Profile Trained and
Tested Accuracy Results,
View All Profile Identity Prediction,
Find and View Profile Identity Prediction Ratio,
View User Profile Identity Ratio Results,
Download Predicted Data Sets,
View All Remote Users

Figure 4.4: Activity diagram for Fake Profie Identification in Social Network using Machine Learning and NLP.

5. IMPLEMENTATION

5.1 SAMPLE CODE

```
#!/usr/bin/env python
"""Django's command-line utility for administrative tasks."""
import os
import sys
def main():
    """Run administrative tasks."""
    os.environ.setdefault('DJANGO_SETTINGS_MODULE',
'fake_profile_identification.settings')
    try:
        from django.core.management import execute_from_command_line
    except ImportError as exc:
        raise ImportError(
            "Couldn't import Django. Are you sure it’s    installed    and "
            "available on your PYTHONPATH environment variable? Did you "
            "forget to activate a virtual environment?"
        ) from exc
    execute_from_command_line(sys.argv)



if __name__ == '__main__':
    main()
```

6. SCREENSHOTS

6. SCREENSHOTS

6.1 LOGIN :

User must login with username and password if user doesn't exist user need to register in this application by necessary details.

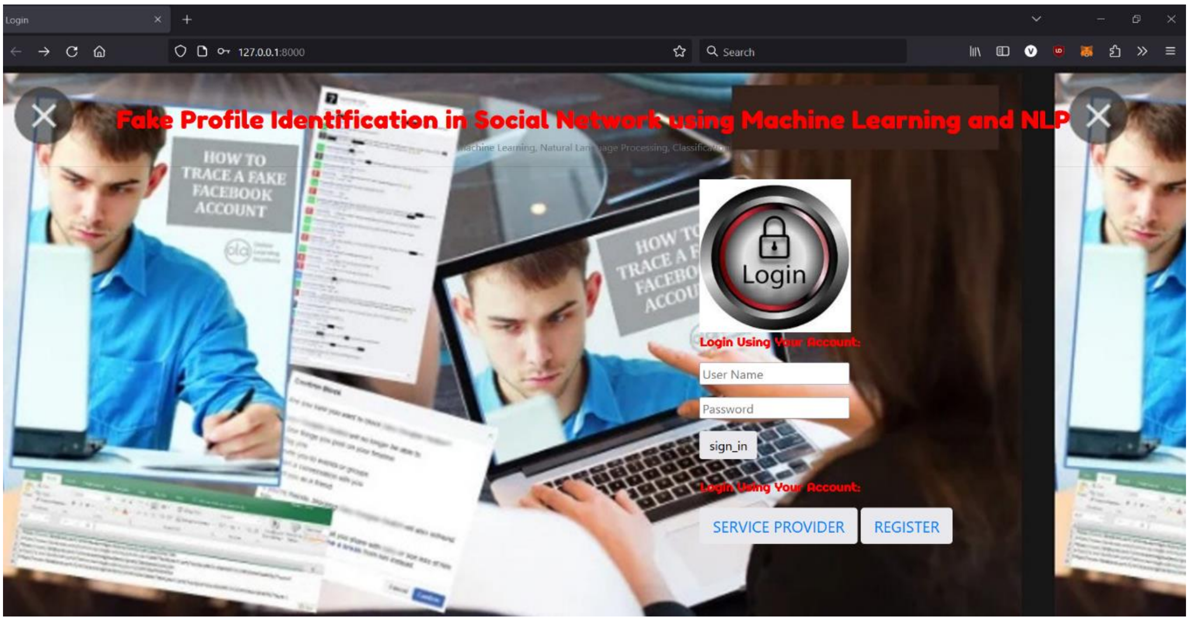
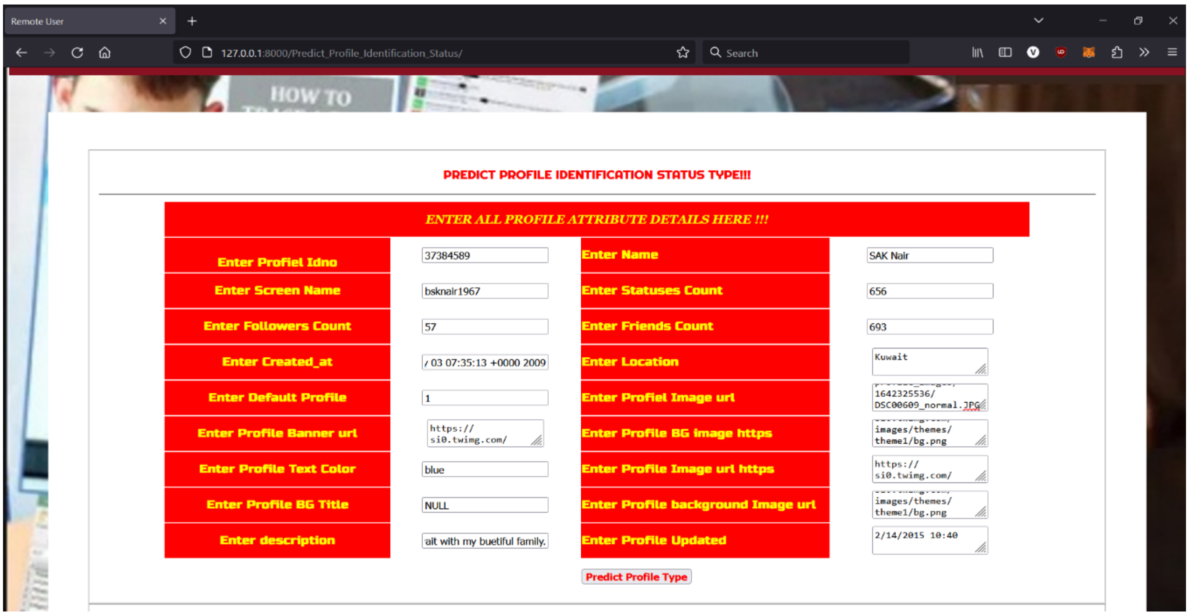

Login
127.0.0.1:8000
Search
Fake Profile Identification in Social Network using Machine Learning and NLP
Login
Login Using Your Account:
User Name
Password
sign_in
Login Using Your Account:
SERVICE PROVIDER
REGISTER

FIGURE 6.1: Login

6.2 PREDICTION

User has to give the profile details to Identify the Fake Profiles in Social Network.



PREDICT PROFILE IDENTIFICATION STATUS TYPE!!!

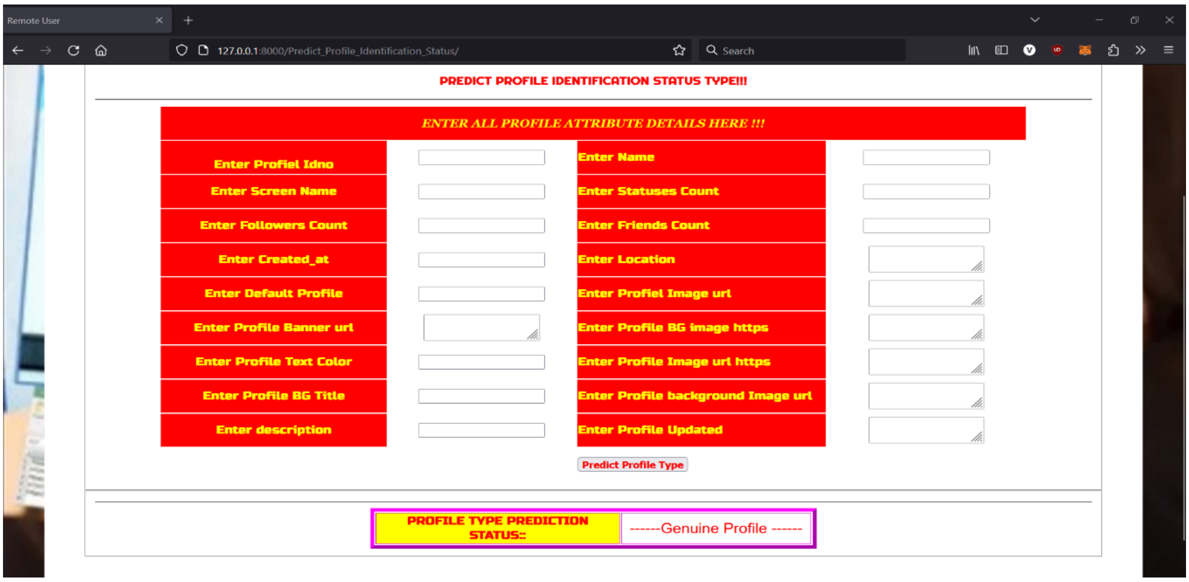
ENTER ALL PROFILE ATTRIBUTE DETAILS HERE !!!

Enter Profiel Idno	37384589	Enter Name	SAK Nair
Enter Screen Name	bsknair1967	Enter Statuses Count	656
Enter Followers Count	57	Enter Friends Count	693
Enter Created_at	/ 03 07:35:13 +0000 2009	Enter Location	Kuwait
Enter Default Profile	1	Enter Profiel Image url	1642325536/ DSC00609_normal.JPG
Enter Profile Banner url	https:// si0.twimg.com/	Enter Profile BG image https	images/themes/ theme1/bg.png
Enter Profile Text Color	blue	Enter Profile Image url https	https:// si0.twimg.com/
Enter Profile BG Title	NULL	Enter Profile background Image url	images/themes/ theme1/bg.png
Enter description	ait with my buetiful family.	Enter Profile Updated	2/14/2015 10:40

FIGURE 6.2: Status

6.3 IDENTIFYING FAKE PROFILES

After user entering all the profile details user need to click the predict and it will predict whether it is fake profile or genuine profile.



PREDICT PROFILE IDENTIFICATION STATUS TYPE!!!

ENTER ALL PROFILE ATTRIBUTE DETAILS HERE !!!

Enter Profiel Idno		Enter Name	
Enter Screen Name		Enter Statuses Count	
Enter Followers Count		Enter Friends Count	
Enter Created_at		Enter Location	
Enter Default Profile		Enter Profiel Image url	
Enter Profile Banner url		Enter Profile BG image https	
Enter Profile Text Color		Enter Profile Image url https	
Enter Profile BG Title		Enter Profile background Image url	
Enter description		Enter Profile Updated	

Predict Profile Type

PROFILE TYPE PREDICTION STATUS:: ------Genuine Profile ------

FIGURE 6.3: Profile Type Prediction

6.4 BAR CHART

It shows User profile Trained and Tested Accuracy in Bar Chart.

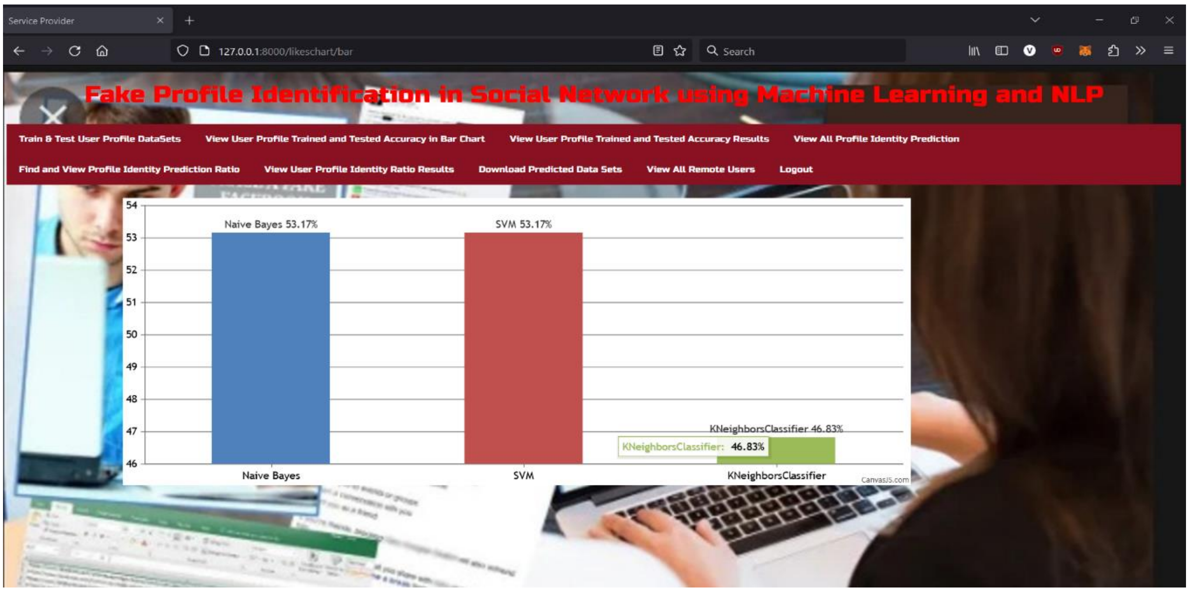

Service Provider
127.0.0.1:8000/likeschart/bar
Search
Fake Profile Identification in Social Network using Machine Learning and NLP
Train & Test User Profile DataSets
View User Profile Trained and Tested Accuracy in Bar Chart
View User Profile Trained and Tested Accuracy Results
View All Profile Identity Prediction
Find and View Profile Identity Prediction Ratio
View User Profile Identity Ratio Results
Download Predicted Data Sets
View All Remote Users
Logout
54
53
52
51
50
49
48
47
46
Naive Bayes 53.17%
SVM 53.17%
KNeighborsClassifier 46.83%
KNeighborsClassifier: 46.83%
Naive Bayes
SVM
KNeighborsClassifier
CanvasJS.com

FIGURE 6.4: Bar Chart

7.TESTING

7.TESTING

7.1 INTRODUCTION TO TESTING

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

7.2 TYPES OF TESTING

7.2.1 UNIT TESTING

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

7.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Integration tests demonstrate that although the components were individually satisfactory, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

7.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input mustbe rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputsmust be exercised.

Systems/Procedures : interfacing systems or procedures must be invoked.

7.3 TEST CASES

7.3.1 CLASSIFICATION

Test Case ID	Test Case Description	Expected Outcome	Status
01	Data Validation Test	Validate that incoming data falls within acceptable ranges.	Passed
02	Predictive Model Accuracy Test	Validate the accuracy of Fake Profile predictions against actual data.	Passed
03	User Access Control Test	Check that different user roles have appropriate data access.	Passed

8. CONCLUSION

8.CONCLUSION & FUTURE SCOPE

8.1 PROJECT CONCLUSION

In conclusion, employing machine learning (ML) and natural language processing (NLP) techniques for fake profile identification in social networks holds immense promise. By integrating ML algorithms like SVM and Naïve Bayes with NLP methods, we enhance our ability to detect fraudulent profiles with greater accuracy and efficiency. This approach not only improves the overall security and trustworthiness of online platforms but also provides users with a safer and more authentic social networking experience. As we continue to refine and develop these technologies, we move closer to creating a digital environment where users can interact confidently and securely.

8.2 FUTURE SCOPE

Collaboration with Cybersecurity Frameworks:

Collaboration with cybersecurity frameworks will lead to the development of comprehensive solutions that combine fake profile detection with broader security measures, safeguarding users from various online threats.

Adaptation to Emerging Platforms:

As new social media platforms and communication mediums emerge, future efforts will focus on adapting fake profile detection techniques to these platforms, ensuring proactive detection and prevention of fraudulent activities across diverse online environments.

9. REFERENCES

9.1 REFERENCES

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9.2 GITHUB LINK

https://github.com/vinayreddy2/FAKE_PROFILE_IDENTIFICATION