International Journal of Multidisciplinary Engineering in Current Research - IJMEC
Volume 10, Issue 6, June-2025, http://ijmec.com/, ISSN: 2456-4265

Networking Services: A Dynamic Network Perspective

Dr R Dinesh Kumar, Edla Sathvika, Atnala Soundarya

[1]Associate Professor,CSE Department Bhoj Reddy Engineering College for Women

[2,3]B. Tech Students, Department Of CSE, Bhoj Reddy Engineering College For Women, India.

ABSTRACT

Social networking services such as Twitter and Weibo have become integral to online communities, where millions of users interact daily. A critical challenge in these platforms is ranking users based on their vitality—their level of engagement and activity—accurately and in a timely manner. Effective vitality ranking benefits numerous stakeholders, including advertisers and platform operators. However, due to the massive scale and dynamic nature of social data, developing reliable ranking mechanisms is technically challenging.

This paper introduces a novel approach to quantify user vitality by analyzing dynamic user interactions in social networks. The proposed framework includes two algorithms: the first uses direct user interaction metrics, while the second incorporates mutual influence between users through an iterative computation model. In addition to ranking, the study also addresses vitality prediction using a regression-based model. Evaluations on two real-world datasets demonstrate the effectiveness and efficiency of the proposed methods in both vitality ranking and prediction. The outcomes offer substantial value for applications such as targeted advertising, trend detection, and enhanced user engagement strategies.

1.INTRODUCTION

In the rapidly evolving digital landscape, Social Networking Services (SNS) have become integral platforms for communication, content sharing, and community engagement. Understanding user behaviour on these platforms is critical for enhancing user experience, driving engagement, and supporting platform monetization strategies. This project focuses on addressing the challenge of ranking and predicting user vitality defined as the level of a user's activity and influence within the network. Traditional systems often rely on static metrics like follower count or number of likes, which fail to reflect the dynamic nature of user interactions over time. These approaches lack the ability to adapt to changes in user behaviour and often yield limited predictive accuracy.

To overcome these limitations, our project introduces a dynamic model that evaluates users based on multidimensional metrics, including interaction frequency, engagement depth, and recency of activity. By incorporating temporal aspects of user behaviour, we develop algorithms capable of ranking users more accurately and forecasting future vitality trends. Additionally, we integrate trust scores derived through sentiment analysis and user feedback, offering a comprehensive view of both the quantity and quality of user engagement.

Existing System

Current social networking platforms typically measure user activity and influence using static metrics, such as the number of followers, likes, shares, and comments. These metrics provide a snapshot of a user's engagement at a single point in time, lacking the depth needed to capture the dynamic and evolving nature of user interactions. Additionally, most existing systems do not consider the temporal aspect of activity such as how recent or consistent a user’s interactions are nor do they incorporate qualitative measures like trust or sentiment.

Proposed System

The proposed system introduces a dynamic model for ranking and predicting user vitality in social networks. It evaluates users based on recent interactions, engagement intensity, influence, and trustworthiness capturing the true essence of their activity over time. By tracking and analysing user behaviour longitudinally, the model provides a more accurate and adaptive ranking system.

2. LITERATURE SURVEY

1.1 Author: Huan Wang, Chunming Qiao

1.2 Title: "A Nodes' Evolution Diversity Inspired Method to Detect Anomalies in Dynamic Social Networks"

1.3 Description: Dynamic social networks have seen a surge in popularity, especially for anomaly detection. While text-based methods perform well, they are limited to user-provided social text. This research introduces a graph-based approach called Nodes' Evolution Diversity Method (NEDM) for detecting anomalies in generalized social networks. Unlike existing methods that rely on structural features, NEDM focuses on diverse evolution mechanisms. It uses link prediction algorithms to model node behaviour and evaluates their fit in edge removal and generation processes. NEDM effectively detects anomalies by capturing these fluctuations over time.

1.4

Author: Jiangpeng Lin, Yu Wu, Li Wang, Weidong Ai, Yan Zeng

Title: "A User Influence Rank Algorithm Based on Interaction Behaviours in Cyber Group Events"

Description: The study of user influence in cyber group events is of great significance to the analysis of user responsibility and the management of cyberspace. Aiming at the problem that the user influence rank algorithms existing in current research do not apply to cyber group events, this paper proposes a user influence rank algorithm based on interaction behaviours (IB-UIR) to measure users' influence in cyber group events. Based on PageRank, the IB-UIR algorithm comprehensively considers users' behaviours and the time interval between behaviours and calculates user influence iteratively in the user interaction network. Based on the real Sina Weibo data, experimental results show that the IB-UIR algorithm can effectively calculate users' actual influence in cyber group events, and it outperforms other related algorithms in the coverage, precision, recall, and F1-measure.

Author: R. Gnanakumari, P. Vijayalakshmi

Title: "Investigation Study on Virtual Community Formation in Social Networks"

Description: A social network (SN)permits the people with same interests to distribute the information, photos and videos. The person who connects on SN sites as personal effort interacts through different media to discuss the interests. The social networks are employed for familiar interaction. A virtual community is a SN with group of individuals who communicate through social media, crossing the geographical and maintaining the boundaries to track the mutual interests. Virtual communities are used for different social and professional groups where communication between community members changes from one individual to another. In order to address the problems, the machine learning and ensemble learning techniques are introduced to form the virtual community based on influencing, suspicious and trust behaviour with better classification accuracy and lesser time consumption.

Author:Priya Nair, Rohit Menon

Title: "An Adaptive Trust-Aware Framework for Enhancing Information Reliability in Dynamic Social Networks"

Description: In the era of rapid information dissemination, ensuring trust and reliability in social networks has become increasingly vital. This paper presents a trust-aware adaptive framework that dynamically evaluates and updates user trustworthiness based on behaviour consistency, interaction feedback, and temporal activity patterns. By integrating machine learning with graph-based modeling, the framework monitors fluctuations in user reliability across evolving network structures. Unlike static trust models, this approach leverages time-sensitive trust metrics and adaptive thresholds to detect misinformation and malicious actors. Experimental results on real-world Twitter datasets demonstrate that the proposed model significantly improves detection accuracy and maintains high precision in identifying untrustworthy nodes across different network dynamics.

3. METHODOLOGY

Random Forest

- Random Forest is well-suited for this task because:
- User behavior is complex and influenced by multiple factors (likes, comments, posts, reports, login frequency, etc.).
- It can handle both numerical and categorical features (e.g., user type, content type, sentiment).
- It is robust to noise (e.g., occasional toxic comments or inactive days).

Data Collection

From the social networking site, collect user-related data such as:

•Comments posted by users.

•User feedback: likes, dislikes, reports.

•Sentiment score of each comment (from sentiment analysis).

•Number of toxic words detected.

Data Preprocessing

•Apply text preprocessing: remove stopwords, tokenize, lemmatize.

•Use a sentiment analysis tool or model to label each comment:

•Positive → sentiment score > 0.5

•Neutral → score between -0.2 and 0.5

•Negative → score < -0.2

•Convert these into numerical/categorical features:

•sentiment_class = {positive: 2, neutral: 1, negative: 0}

Model Training

•Random Forest creates multiple decision trees.

•Each tree is trained on a random sample of users and a random subset of features.

•Each decision tree tries to learn patterns between features and the trust score:

•For example:

•If % of negative comments > 40% → lower trust.

•If toxic words > 10 → high chance of "Low Trust".

•Each tree gives a trust score prediction (e.g., "High", "Medium", "Low").

•The final output is based on majority voting across trees.

4- REQUIREMENT ANALYSIS

Functional Requirements

1.Admin

- Login
- View User profile
- Activate or Deactivate User Account
- View User Vitality Score
- View Trust Score
- Logout

2.User

- Register
- Login
- Add or Delete Post
- View or Comment Post
- Like or Dislike Post
- Share post

- Search Friends
- Send Friend Requests
- Accept or Reject Friend Request
- Logout

Non-Functional Requirements

1. Performance**:** Handle large-scale data efficiently

2. Scalability**:** Handle increasing data and traffic. Add resources dynamically as needed.

3. Reliability**:** Ensure accuracy and system stability. Handle failures without losing data.

4. Security**:** Protect user data and ensure privacy**.**

5. Usability**:** Use clear visuals for rankings and predictions

6. Compatibility**:** The system is be compatible with all commonly used operating systems.

7. Maintainability**:** Use modular design for easy updates. Support adding new features or networks.

Software Resources

The software requirements document is the specification of the system. It should include both the definition and a specification of the requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the team's progress throughout the development activity.

- Operating System : Windows 10
- Programming language : Python 3.7
- IDE : PyCharm
- Front end technologies : HTML5, CSS3, JavaScript
- Web Framework : Django
- Database : SQLite

Hardware Resources

Hardware Requirements are the most common set of requirements defined by any operating system or software application is the physical computer resources,

5. DESIGN

Design represents the number of components we are using as a part of the project and the flow of request processing i.e., what components in processing the request and in which order. An architecture description is a formal description and representation of a system organized in way that supports reasoning about the structure of the system.

Software Architecture

Software architecture design tools help to build software that doesn't have security issues. This is key because there are software risks in all software development process.When teams software flaws or bugs, they are able to move forward with confidence. However, since this isn't always possible, software architecture design tools need to have the ability to find flaws during the creation of software and correct them efficiently. When using software architecture design tools that can identify flaws, you will have the ability analyse the fundamental software design, assess chance of an attack, figure out potential threat elements, and identify any weaknesses or gaps in existing security.

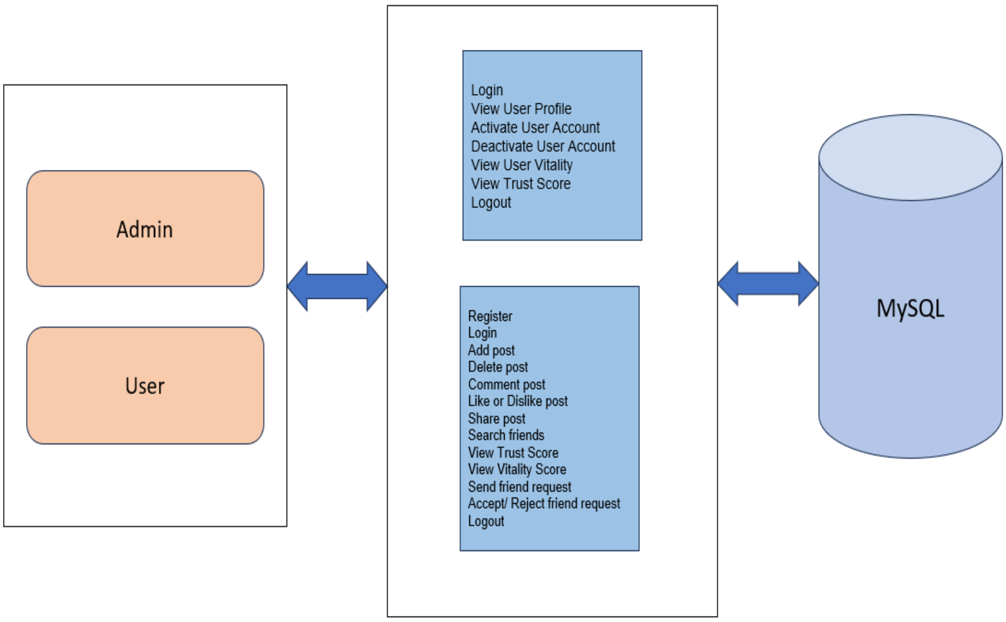


Fig.5.1 Software Architecture

Technical Architecture

Technical Architecture is a form of IT architecture that is used to design computer systems. It involves the development of a technical blueprint with regard to the arrangement, interaction, and interdependence of all elements so that system-relevant requirements are met.

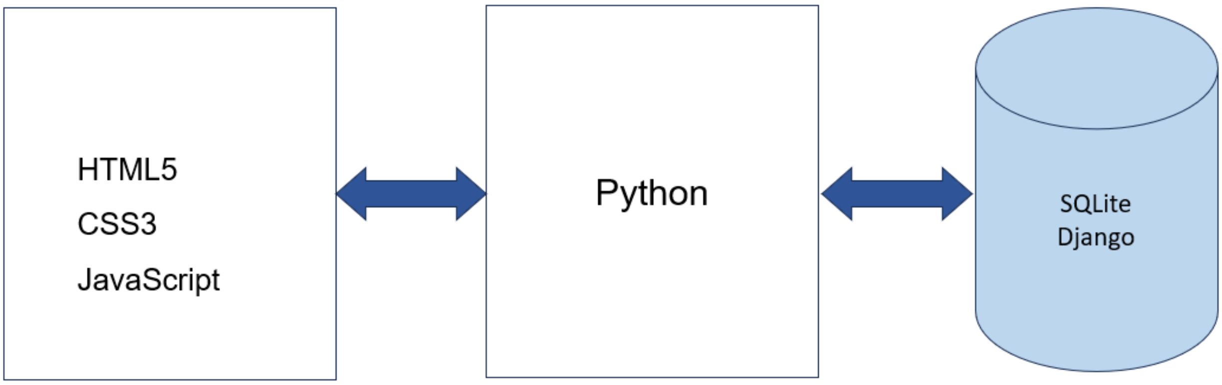


Fig 5.2 Technical Architecture

6. IMPLEMENTATION

PYTHON

Python is a powerful, high-level programming language that is widely recognized for its simplicity and readability. Created by Guido van Rossum and first released in 1991, Python was designed to be easy to learn and use, making it an ideal language for beginners and professionals alike. Its clean and intuitive syntax, which often resembles plain

English, allows developers to focus more on solving problems rather than struggling with complex syntax. Python's versatility enables it to be used in various domains, such as web development, data science, machine learning, artificial intelligence, and automation.

Features of PYTHON

Easy to Learn and Use: Simple syntax and highly readable, ideal for beginners.

Interpreted Language: Executes code line-by-line without compilation.

Dynamically Typed: No need to declare variable types explicitly.

Cross-Platform: Works seamlessly on Windows, macOS, and Linux.

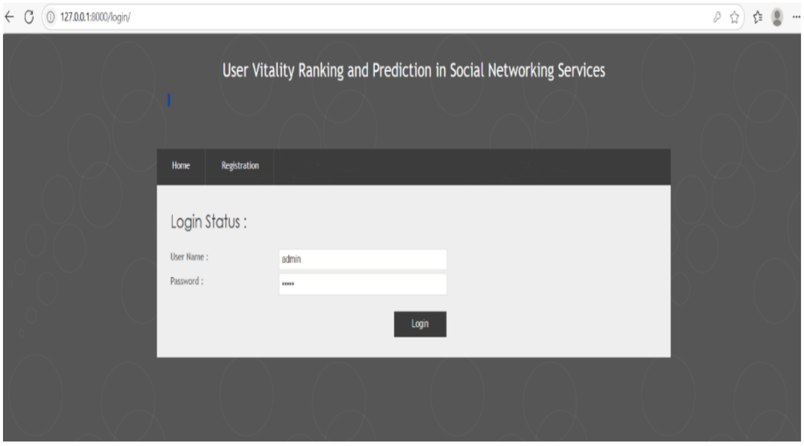
Extensive Libraries: Provides built-in modules for tasks like file handling, web scraping.

Supports Multiple Paradigms: Procedural, object-oriented, and functional programming.

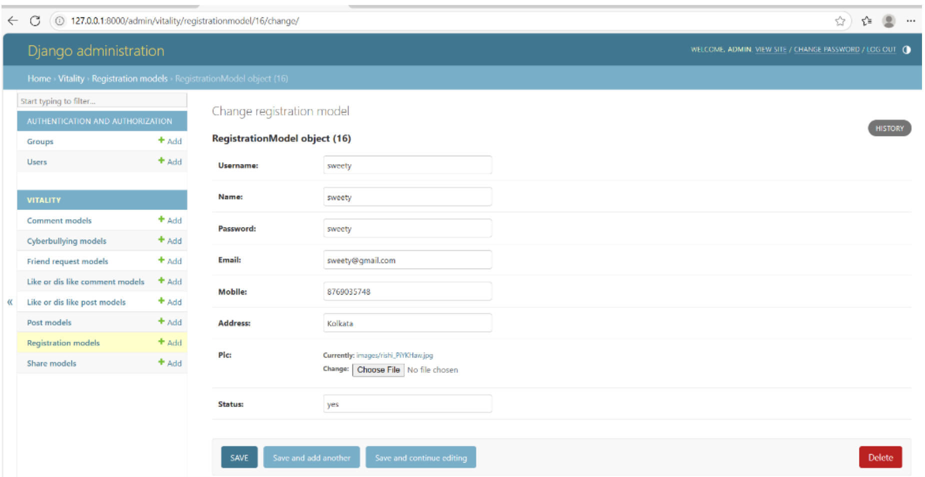
Django

Django is a high-level Python web framework designed to facilitate the development of robust and scalable web applications. Created in 2005, Django promotes rapid development and clean, pragmatic design.

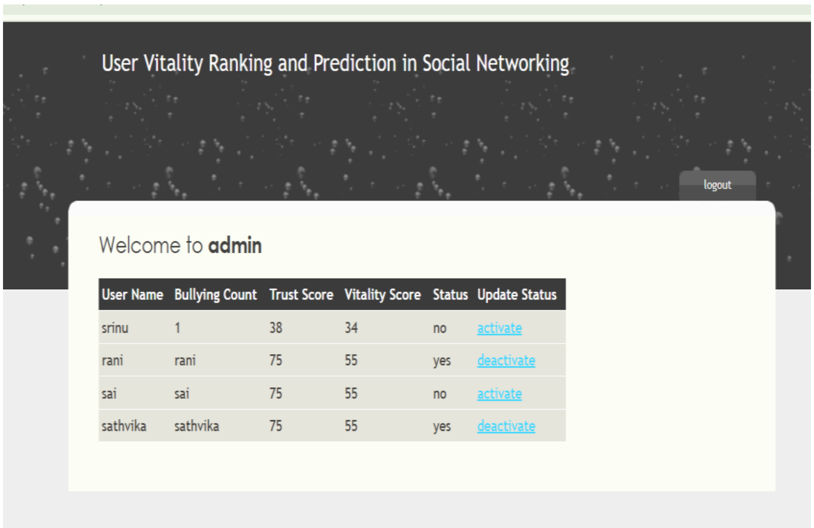
7-. SCREENSHOTS



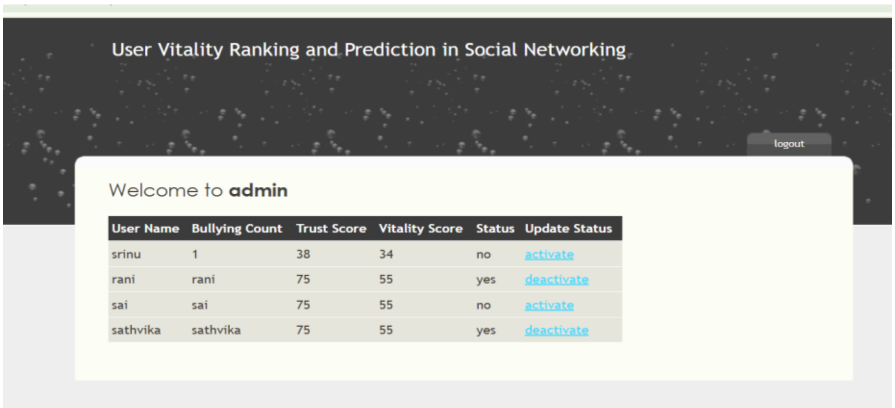
Screenshot 1 Admin Login Page



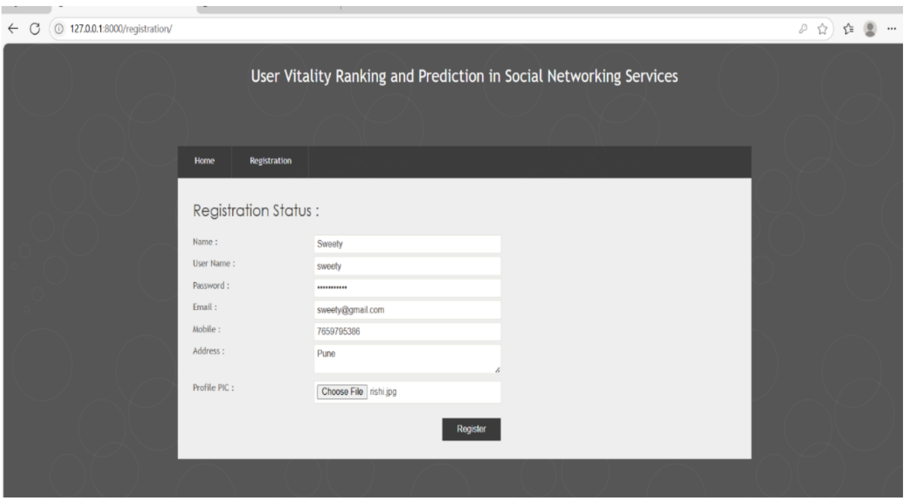
Screenshot 2 Admin Home Page



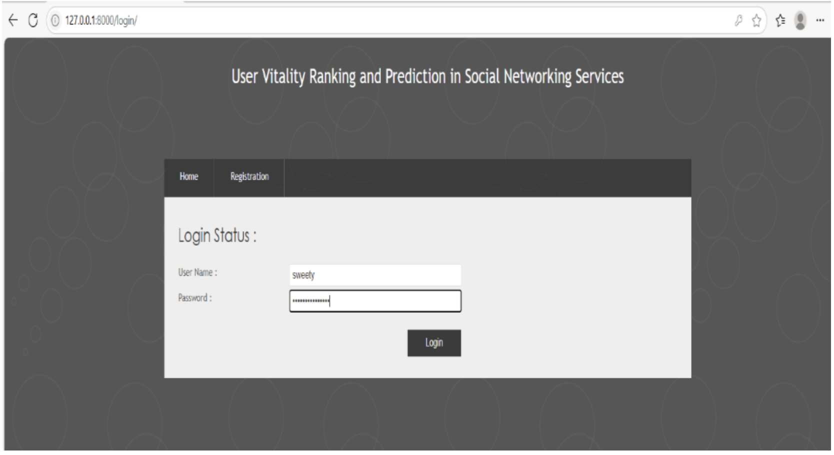
Screenshot 3 Admin Views User Vitality and Trust Score



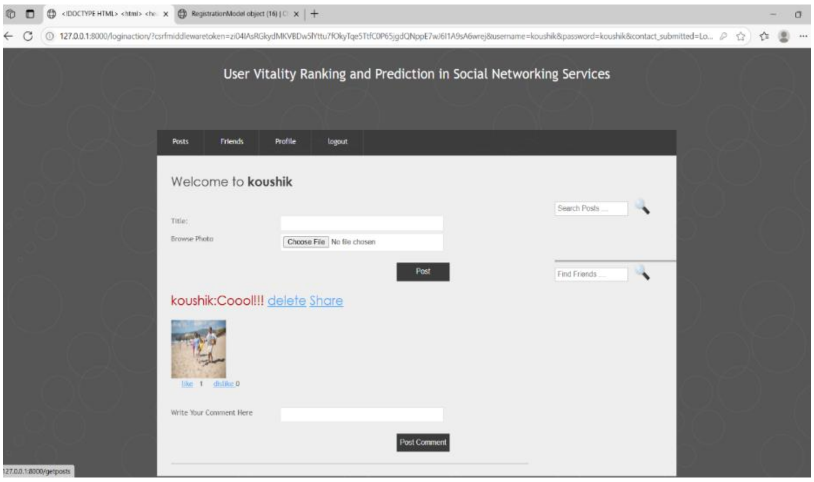
Screenshot 4 Admin Activate or Deactivate User



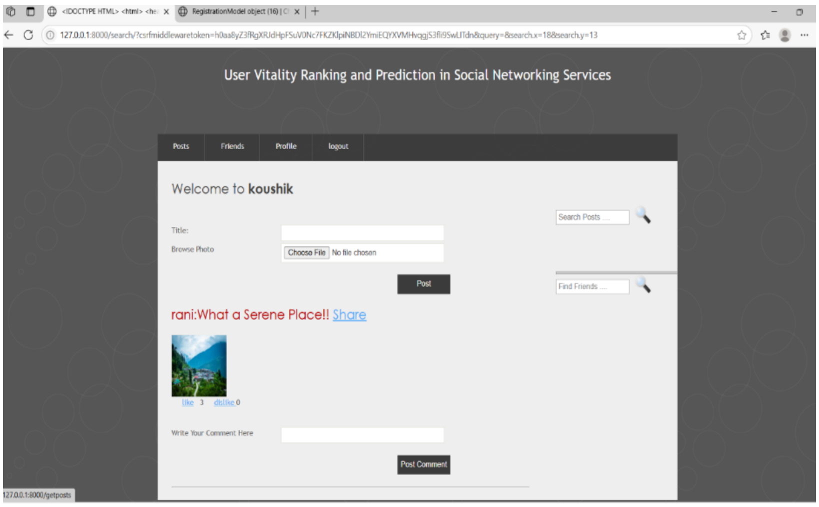
Screenshot 5 User Registration Page



Screenshot 6 User Login Page



Screenshot.7 Add or Delete Post



Screenshot 8 View or Comment or Share Post

8-CONCLUSION

The This project overcomes the limitations of static user analysis by introducing a dynamic model that predicts user vitality based on temporal interactions and the sentiment-based trust. Using the Random Forest algorithm, it provides accurate, real-time insights into user behaviour. With its modular, secure, and scalable design, the system is well-suited for real-world social media applications, enabling personalized recommendations, effective moderation, and targeted user engagement.

REFERENCES

[1] Eytan Bakshy, Jake M Hofman, Winter A Mason, and Duncan J Watts. Everyone's an influencer: quantifying influence on twitter. In Proceedings of the fourth ACM international conference on Web search and data mining, pages 65–74. ACM, 2017.

[2] Robert Goodell Brown. Smoothing, forecasting and prediction of discrete time series. Courier Corporation, 2016.

[3] Meeyoung Cha, Hamed Haddadi, Fabricio Benevenuto, and P Krishna Gummadi. Measuring user influence in twitter: The million follower fallacy. ICWSM, 10(10-17):30, 2020.

[4] Pedro Domingos and Matt Richardson. Mining the network value of customers. In Proceedings of the seventh ACM SIGKDD international conference on Knowledge discovery and data mining, pages 57–66. ACM, 2018.

[5] Jian Jiao, Jun Yan, Haibei Zhao, and Weiguo Fan. Expertrank: An expert user ranking algorithm in online communities. In New Trends in Information and Service Science, 2019. NISS'09. International Conference on, pages 674–679. IEEE, 2019.

[6] Daniel M Romero, Wojciech Galuba, Sitaram Asur, and Bernardo A Huberman. Influence and passivity in social media. In Machine learning and knowledge discovery in databases, pages 18–33. Springer, 2017.

[7] Yuanfeng Song, Wilfred Ng, Kenneth Wai-Ting Leung, and Qiong Fang. Sfp-rank: significant frequent pattern analysis for effective ranking. Knowledge and Information Systems, 43(3):529–553, 2015.

[8] Yuto Yamaguchi, Tsubasa Takahashi, Toshiyuki Amagasa, and Hiroyuki Kitagawa. Turank: Twitter user ranking based on user-tweet graph analysis. In Web Information Systems Engineering–WISE 2010, pages 240–253. Springer, 2021.

[9] Amin Omidvar, Mehdi Garakani, and Hamid R Safarpour. Context based user ranking in forums for expert finding using wordnet dictionary and social network analysis. Information Technology and Management, 15(1):51–63, 2018.