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Using Recommendation Systems for assistance in Friend Recommendation

A Swathi #1, Ch Maha Lakshmi #2, Yelimineti Kiran #3, Nivas #4, G Harsha Sree #5
#1Asst. Professor, #2,3,4,5 B.Tech.., Scholars
Department of Computer Science and Engineering,
QIS College of Engineering and Technology

Abstract.

The recommendation system works in a manner similar to that of a content filtering system, tailoring the information it presents to the individual user's tastes and habits. Pictures of all sorts are shared on social media sites like Facebook, linkedin, and Instagram. Components to share their feelings with associated peers. With the rise in popularity of social media platforms in recent years, the sharing of images has become an integral part of our everyday lives. However, picture breaches and improper usage have caused many to worry about their personal privacy. It's preferable to encrypt photos before sharing them on social media, but decrypting them and looking for matches is computationally intensive. Prior models suggested utilising a 2-step compression strategy (AES encryption) and a lengthy classification process (deep autoencoders). In the proposed model, we encrypt pictures using the Gaussian blur method and a deep learning approach for feature extraction and image classification in order to create a privacy-protected buddy recommendation system. Features retrieved from the blurred photos are used to train a new model using the deep learning system, which employs the Keras model with the CNN approach. After that, the model built for comparable image prediction is compared to the test dataset. The graph is constructed using the accuracy metrics of val acc and val loss. The original image's accuracy result is 91.8%, while the blurred image's result is 86.2%, proving that our methodology is both very efficient and leads to less data loss.

1. Introduction

Information filtering systems like recommender systems are used to predict a user's probable bias or evaluation of an item. Customers are turning to recommendation systems for assistance in sifting through seemingly conflicting pieces of data. Many successful businesses, like Amazon and Spotify, rely on recommendation algorithms to attract and retain customers and increase revenue. Recommendation tools that rely on user input, expert analysis, and other elements of the web's content are all on the table. Almost all major social media platforms now provide some kind of friend-recommendation system, which paves the path for the emergence of a highly intelligent community of users. A higher chance of a shared connection exists for people who have a similar appearance. To implement neural networks at a high level, you may use Keras, a high-level Python API.

Tensorflow and/or Theano are used in the backend processing. As a result, Keras was developed to simplify the process of implementing neural networks. The layers of a

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Convolutional Neural Network are often quite long and are followed by completely linked layers. CNN employs fully linked layers during classification, which increases the complexity and weights of convolution layers utilised in feature extraction. Because of this, neural networks are often used in the fields of image recognition, voice recognition, and video analysis. In this work, we implement a CNN-based user recommendation system using the Keras model for feature extraction and classification. The user's own data makes up the dataset, of which we use 80% for training and 20% for testing. The quality of a buddy recommendation system that protects users' privacy, however, will influence how precise the feature retrieval from the photographs will be.

2. Related Work

The information used by the recommendation system comes from the user's browsing history, completed surveys, and website cookies, among other places. Several research projects have been conducted on recommendation systems for this purpose. The proposed approach is similar to a privacy-protected buddy recommendation system in that it prevents sensitive data from being taken from the picture. In order to be effective, a recommender system has to collect information and filter it based on the tastes of its users. An image blurring algorithm [5] was developed for hiding private regions of photographs and partitioning them into private and public parts. In addition, the user may create unique content by choosing them. For security purposes, we adopted a hybrid method of picture encryption [8] that involves both blurring the images and AES encryption. Using binary data for classification, a deep autoencoder is trained to extract features from images, which are then utilised to create profiles for individual users. Using a confusion matrix derived from graph mining, Facebook was able to create its friend-recommendation system [7]. The confusion matrix is used to generate the algorithm's performance matrix, while the random forest method is used for classification. Lifestyle data is collected from users through their mobile phones' sensors and then used in a recommender system [6]. Activity recognition is used for categorization, and a probability distribution method is used to collect information about the user's way of life. A recommender system has recently found use in the field of medical study [18]. An efficient RS for food recommendation to patients was developed using k-clique and deep learning techniques. In order to improve the accuracy of deep learning classifiers applied to patient datasets annotated with various health problems, the k-clique is utilised in combination with DRS.

3. System Analysis

The Friendbook, suggested by Wang et al. [12], is a semantic-technology-based FRS that makes friend recommendations based on users' interests and activities rather than their social networks. After analysing the sensor data from a user's smartphone, Friendbook is able to analyse the user's lifestyle and provide recommendations based on the users' shared interests and activities. However, Yu et al. [13] introduced geofriends, an FRS that promotes friends that are geographically similar by the study of social network structures and the use of GPS data. Silva et al. [14] devised a method that does a disjoint analysis of the subgraph generated

by a user and all the other users linked to that user through a three-way split. However, only people who are two degrees apart are eligible for friend suggestions.

The cohesion-based friend-recommendation system was suggested by Hamid et al. [15]. Using an enhanced network derived from the physical link network and information about mutual interests and interactions, they examined the cohesive subgroup. Matchmaker, developed by Bian and Holtzman [16] and Bian et al. [17], compares a user's Facebook information to those of fictional TV characters in order to offer friend suggestions. If Facebook user X is like TV character 1, and Facebook user Y is like TV character 2, and they are friends in the same TV programme, then the Matchmaker algorithm will suggest that user X become friends with user Y.

In the area of product suggestion, Tkalcic et al. [20] suggested a novel method for gauging user similarity in CF recommender systems built on the basis of the big-five personality model. Similarly, Hu and Pu [11] integrated human personality into the CF framework to solve the cold-start issue; they evaluated their system using public data sets from the fields of film and music. The effect of individual characteristics on the reliability of music recommendation systems has been examined by Ferwerda et al. [12], Ferwerda and Schedl [13], and Kle'c [14]. Golbeck and Norris [15] showed that there is a significant link between consumers' personalities and their preferred genres of film. Using questionnaires and system data for 73 Netflix subscribers, they were able to demonstrate connections between individual traits and cinematic tastes. Dhelim et al. [16] presented a smart home design that tailors suggestions for connected services to each individual user.

Disadvantages

Friend Recommendation is always spot-on, regardless of your personality type.

There is no support for hybrid filtering or personality computing in this system.

Proposed System

The suggested system displays and evaluates an FRS that utilises a hybrid filtering algorithm that takes into account both the user's personality characteristics and their assessment of their compatibility with the recommended buddy. As a means of testing the efficacy of the suggested system, we build a social networking site called personet that is centred on users' individual personalities and employs the proposed FRS.

The suggested approach not only improves recommendation system prediction accuracy, but also solves the cold-start issue of conventional collaborative filtering (CF) systems. Three recommendation systems were developed and analysed for their accuracy and recall levels in order to draw comparisons between personet and the older frss. There are three main types of FRS: 1) FRS that rely only on personality matching; 2) FRS that rely solely on CF; and 3) the suggested system, personet, which relies on personality characteristics and hybrid filtering. User ratings place personet ahead of the other two frss in terms of accuracy and recall. The following is a brief synopsis of the proposed system's contributions.

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1) Suggest a hybrid filtering system that takes into account the big-five personality qualities in order to create an FRS based on personality.

2) Have a social media platform include the suggested system.

3) Verify personet's reliability by doing an online experiment on the live site.

Advantages

When two users are found to have a high degree of similarity based on their personality traits, the system is said to be more efficient (similarity factor).

In addition to fixing the cold-start issue plaguing previous iterations of CF systems, the suggested approach improves the predictive power of recommendation engines.

4. Implementation

Server

Here, the Admin is required to provide a username and password in order to proceed. Assuming his login was successful, he'll have access to features like "View Users" and "Authorize Users." See the Characteristics of Every User, Check out the Friendship Request and Reply, You can see who has recommended you, who has liked your posts, how many total friends and posts you have, and who has liked and recommended you, respectively.

View and Authorized Users

The module allows the administrator to examine a list of all registered users. Users' names, emails, and physical addresses are all visible to the administrator, who also grants access to these accounts.

User

There are n people currently logged into this module. Prior to doing some actions, the user will be required to register. After his successful registration, he will have to wait to be allowed by the administrator. If he has a valid username and password, he can log in. After a successful login, he will be able to do actions such as adding a personality, seeing all of your personalities, viewing his profile, searching for friends on the same site, sending friend requests, and viewing his friends. Create New Posts, Browse My Posts, Check Out What Your Friends Have Recommended, and More!

Viewing Profile Details

User profile information (name, address, email, phone number, profile picture) is shown in this section.

Search Friends, Request, and View Friend Requests, View all Friend Details

A user may use this feature to look for other users by name, send out friend invitations, and peruse the requests they've received. It displays the user's whole list of friends together with photos and information about each one.

5. Conclusion

The experimental findings indicate that the deep learning technology used in this approach accurately predicts photos. Blurring photos for encryption and then categorising encrypted images using deep learning are both issues that the suggested architecture attempts to solve. The results show that with repeated training, the dataset's categorization becomes much better.

This method is effective at protecting individuals' anonymity, and its quality depends on the quantity of the dataset.

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