LITERATURE SURVEY

[1]Recommender Systems: An overview of different approaches to recommendations

This paper presents an overview of the field of recommender systems and describes the present generation of recommendation methods. Recommender systems or recommendation systems (RSs) are a subset of information filtering system and are software tools and techniques providing suggestions to the user according to their need. Many popular Ecommerce sites widely use RSs to recommend news, music, research articles, books, and product items. ecommendation systems use personal, implicit and local information from the Internet. This paper attempts to describe various limitations of recommendation methods and their advantages. . The integration of machine learning and artificial intelligence will enable these systems to adapt in real-time to changing user preferences and behaviors. Additionally, advancements in natural language processing and sentiment analysis will enhance the understanding of user feedback, further improving recommendation quality.

[2] Recommender Systems Challenges and Solutions

The recommender system's main idea is to build relationship between the products, users and make the decision to select the most appropriate product to a specific user. There are four main ways that recommender systems produce a list of recommendations for a user – contentbased, Collaborative, Demographic and hybrid filtering. In content-based filtering the model uses specifications of an item in order to recommend additional items with similar properties. Recommender system gain information about the user using different methods and sources to predict which user needs and recommend items according to this analysis processes results. These systems recommend items to users based on their interests and past ratings. This paper discusses four techniques in recommender systems, highlighting the advantages and disadvantages of each. It also addresses challenges such as cold start, scalability, privacy, and others, proposing solutions and discussing their benefits.

[3] Online Face Recognition System through the Internet

This paper presents an online face recognition system through the Internet. Generally speaking, the amount of transmitted data is related to the time delay over the Intemet, and thus the compressed image is transmitted to the remote server to reduce the time delay in this work. First we investigate the relation among the face recognition rate, the compression ratio and image size, and then present the effective multi-frame-based online face recognition system based on the observation. Finally, experimental results tested on the real Internet environment are provided to show the superior performance of the proposed system.Exploring novel approaches for dimensionality reduction beyond KPCA could enhance scalability and adaptability across diverse datasets and environments

[4] Face Detection and Recognition System using Digital Image Processing

While recognizing any individual, the most important attribute is face. It serves as an individual identity of everyone and therefore face recognition helps in authenticating any person's identity using his personal characteristics. The whole procedure for authenticating any face data is sub-divided into two phases, in the first phase, the face detection is done quickly except for those cases in which the object is placed quite far, followed by this the second phase is initiated in which the face is recognized as an individual. Then the whole process is repeated thereby helping in developing a face recognition model. In the Future inconvenient because in spite of the congruity exist among faces but several factors like age, skin color and facial expression can vary considerably.

[5] User Authentication based on Face Recognition with Support Vector Machines

The proposed recognition procedures are based on both a global approach and on a combination of a global and a component-based approaches. Two different features extraction methods and three light compensation algorithms are tested. The combined system outperforms the global system and yields a significant performance enhancement with respect to the prior results obtained with the one-class Support Vector Machines approach for face recognition.The global system produces one feature vector per frame and uses at least 50 feature vectors for the training of the one-class Gaussian SVM classifier. The component-based system detects four facial components and produces four sets of feature vectors, each of which is used for the training of a separate one-class SVM. The global and component based approaches are then combined in a unique recognition system.

[6] Personal based authentication by face recognition

Authentication is a significant issue in system control. Traditional account-based authentication doesn't guarantee the exact person of the account. It also suffers from the easily guessed problem. On the other hand, the camera is more and more popular. Personal based authentication via cameras becomes possible for mobile users. In the paper, we propose the PBAS, which conducts the authentication depends on both face image and password. We claim that the password information can be used to enhance face recognition rate, which is the most significant benchmark for identification system. Finally, we simulate the PBAS by PCA method based on both database we constructed and a subset of FERET. The result of experiment shows that our system performs much better than the PCA method without password integration.

[7] Scientific Paper Recommendation

Globally, the recommendation services have become important due to the fact that they support e-commerce applications and different research communities. Recommender systems have a large number of applications in many fields, including economic, education, and scientific research. Different empirical studies have shown that the recommender systems are more effective and reliable than the keyword-based search engines for extracting useful knowledge from massive amounts of data. The problem of recommending similar scientific articles in scientific community is called scientific paper recommendation. Scientific paper recommendation aims to recommend new articles or classical articles that match researchers' interests. It has become an attractive area of study since the number of scholarly papers increases exponentially. In this paper, we first introduce the importance and advantages of the paper recommender systems.

[8] Research Paper Recommender Systems: A Random-Walk Based Approach

In this paper we propose a research paper recommending algorithm based on the Citation Graph and random-walker properties. The PaperRank algorithm is able to assign a preference score to a set of documents contained in a digital library and linked one each other by bibliographic references. A data set of papers extracted by ACM Portal has been used for testing and very promising performances have been measured. PaperRank is a support for the resource filtering process, in fact it requires a user to select an initial small subset of documents, relevant for the topic he is writing about. Then the algorithm can spread its boosting effect, due to selected papers, through the citation graph in order to discover other interesting and useful resources.

[9] Recommender Systems Clustering Using Bayesian Non Negative Matrix Factorization

Recommender Systems present a high-level of sparsity in their ratings matrices. The collaborative filtering sparse data makes it difficult to: 1) compare elements using memory-based solutions; 2) obtain precise models using model-based solutions; 3) get accurate predictions; and 4) properly cluster elements. We propose the use of a Bayesian non-negative matrix factorization (BNMF) method to improve the current clustering results in the collaborative filtering area. We also provide an original pre-clustering algorithm adapted to the proposed probabilistic method. Results obtained using several open data sets show: 1) a conclusive clustering quality improvement when BNMF is used, compared with the classical matrix factorization or to the improved KMeans results; 2) a higher predictions accuracy using matrix factorization based methods than using improved KMeans; and 3) better BNMF execution times compared with those of the.

Comparison between different Research papers and Articles Referred

SL. NO	PAPER	TECHNOLOGIES USED	APPROACH	FUTURE SCOPE	REMARK/ RESULT
1.	Recommender Systems: An overview of different approaches to recommendations, Kunal Shah1 Akshaykumar Salunke2 , Saurabh Dongare3 , Kisandas Antala	Collaborative filtering, neighborhood based method, Model-based recommendation methods, hybrid approach to recommendations	This paper presents an overview of the field of recommender systems and describes the present generation of recommendation methods. Recommender systems or recommendation systems (RSs) are a subset of information filtering system and are software tools and techniques providing suggestions to the user according to their need. Many popular Ecommerce sites widely use RSs to recommend news, music, research articles, books, and product items. Recommendation systems use personal, implicit and local information from the Internet. This paper attempts to describe various limitations of recommendation methods and their advantages.	In the future, recommender systems will continue to evolve, leveraging advanced algorithms and data analytics techniques to provide more personalized and accurate recommendations. The integration of machine learning and artificial intelligence will enable these systems to adapt in real-time to changing user preferences and behaviors. Additionally, advancements in natural language processing and sentiment analysis will enhance the understanding of user feedback, further improving recommendation quality.	Recommender systems offer recommendations based on user interactions, with common approaches like content-based, collaborative filtering (CF), and Hybrid systems. CF relies solely on ratings but requires existing ratings to generate recommendations.
2.	Recommender Systems Challenges	Content-based recommendations	Today's Recommender system is a relatively new area of research in machine learning. The recommender	Recommender system gain information about the user using	Recommender systems are crucial in today's research

	and Solutions Marwa Hussien Mohamed, Helmy Khafagy, Mohamed Hasan Ibrahim	, Collaborative recommendations , Demographic recommendations, Hybrid Approaches.	system's main idea is to build relationship between the products, users and make the decision to select the most appropriate product to a specific user. There are four main ways that recommender systems produce a list of recommendations for a user – contentbased, Collaborative, Demographic and hybrid filtering. In content-based filtering the model uses specifications of an item in order to recommend additional items with similar properties.	different methods and sources to predict which user needs and recommend items according to this analysis processes results Content-based recommendations ● Collaborative recommendations ● Demographic recommendations ● Hybrid Approaches	landscape, with data sizes rapidly increasing, necessitating big data analysis techniques like Spark, Map-Reduce, and Apache Hadoop. These systems recommend items to users based on their interests and past ratings. This paper discusses four techniques in recommender systems, highlighting the advantages and disadvantages of each. It also addresses challenges such as cold start, scalability, privacy, and others, proposing solutions and discussing their benefits.
3.	Online Face Recognition System through the Internet Hwangjun Song, Sun Jae Chung,	Face Detection at the Client, Relation between KPCA Face Recognition, Relation between KPCA Face	This paper presents an online face recognition system through the Internet. Generally speaking, the amount of transmitted data is related to the time delay over the Intemet, and thus the compressed image is	The future scope lies in further enhancing the online face recognition system's capabilities by leveraging advanced deep	The presented online face recognition system utilizes multiple frames, a unique feature compared to existing algorithms

	Kyoungwon Min and Hyeok-Koo Jung	Recognition Rate and Image Size, Face Recognition Rate and Computational Complexity When Multiple Images are Available.	transmitted to the remote server to reduce the time delay in this work. First we investigate the relation among the face recognition rate, the compression ratio and image size, and then present the effective multi-frame-based online face recognition system based on the observation. Finally, experimental results tested on the real Internet environment are provided to show the superior performance of the proposed system.	learning techniques for feature extraction and classification. Integration with real-time video processing frameworks could improve accuracy and efficiency in handling multiple frames. Exploring novel approaches for dimensionality reduction beyond KPCA could enhance scalability and adaptability across diverse datasets and environments.	using only original images. To reduce transmission and processing delays, resizing and compression techniques are employed. The system demonstrates superior performance through effective implementation, leveraging KPCA, with potential for extension to other face recognition algorithms.
4.	Face Detection and Recognition System using Digital Image Processing Gurlove Singh, Amit Kumar Goel	Relation between KPCA Face Recognition , Relation between KPCA Face Recognition Now, we investigate the relation between the image size and KPCA face recognition rate	Recognizing any individual, the most important attribute is face. It serves as an individual identity of everyone and therefore face recognition helps in authenticating any person's identity using his personal characteristics. The whole procedure for authenticating any face data is sub-divided into two phases, in the first phase, the face detection is done quickly except for those cases in which the object is placed quite far, followed by this the second phase is initiated in which the face is recognized as an individual. Then the whole process is repeated thereby	In the Future inconvenient because in spite of the congruity exist among faces but several factors like age, skin color and facial expression can vary considerably. Then this problem is furthermore intricate by the arrival of factors like environment factors affecting light, risk of imitation and also probability of limited obstruction in	The system's accuracy in face recognition was limited to below 90% due to the restriction on the number of Eigen faces used in PCA transformation. Further work is needed to develop a fully automated frontal view face detection system for virtual display with perfect accuracy. Integrating an eye detection

			helping in developing a face recognition model which is considered to be one of the most extremely deliberated biometric technology. Basically, there are two type of techniques that are currently being followed in face recognition pattern that is, the Eigenface method and the Fisherface method.	image. The face detection system that can easily recognize any face from a given image that too under any circumstance with any kind of lighting environment is thus considered as the finest face detection system.The function of the face detection system can be further bifurcated into two phases.	system is essential for achieving high accuracy comparable to manual face detection. Despite exceptional performance in other applications, such as surveillance and mugshot matching, the developed system requires enhancement to handle minute changes in face stability and rotation.
5.	User Authenticatio n based on Face Recognition with Support Vector Machines Paolo Abeni, Madalina Baltatu, Rosalia D'Alessandr o	There are mainly three types of models for one-class classification: density estimators, reconstruction methods and boundary methods.	The present paper proposes an authentication scheme which relies on face biometrics and one-class Support Vector Machines. The proposed recognition procedures are based on both a global approach and on a combination of a global and a component-based approaches. Two different features extraction methods and three light compensation algorithms are tested. The combined system outperforms the	As per future scope and a components-based technique for face recognition with one-class SVM classifiers and evaluated their performance with respect to various feature extraction approaches and different light normalization	A components-based technique for face recognition utilizes one-class SVM classifiers and evaluates various feature extraction approaches and light normalization methods. The system processes video sequences with

			global system and yields a significant performance enhancement with respect to the prior results obtained with the one-class Support Vector Machines approach for face recognition.	methods. The input to the system in both enrollment and verification is represented by video sequences, which contain an average of 150 frames. The global system produces one feature vector per frame and uses at least 50 feature vectors for the training of the one-class Gaussian SVM classifier. The component-based system detects four facial components and produces four sets of feature vectors, each of which is used for the training of a separate one-class SVM. The global and component based approaches are then combined in a unique recognition system.	an average of 150 frames, producing feature vectors for training. Four facial components are detected, each used to train a separate one-class SVM. The combined system achieves excellent performance, especially with Fourier features, adaptive image enhancement, and light direction compensation, reaching low equal error rates of 1.02%. Investigations into Fourier Mellin features and improvements in mouth and nose detectors and light normalization procedures are ongoing for further enhancements.
6.	Personal based authentication by face recognition Yung-Wei Kao, Hui-	Relation between KPCA Face Recognition , Relation between	Authentication is a significant issue in system control. Traditional account-based authentication doesn't guarantee the exact person of the account. It also	Face recognition has been developed for a long time. The most significant issue of face recognition is that	The PBAS solution proposes authentication based on both face images and passwords,

	Zhen Gu, and Shyan-Ming Yuan	KPCA Face Recognition Now, we investigate the relation between the image size and KPCA face recognition rate.	suffers from the easily guessed problem. On the other hand, the camera is more and more popular. Personal based authentication via cameras becomes possible for mobile users. In the paper, we propose the PBAS, which conducts the authentication depends on both face image and password. We claim that the password information can be used to enhance face recognition rate, which is the most significant benchmark for identification system. Finally, we simulate the PBAS by PCA method based on both database we constructed and a subset of FERET. The result of experiment shows that our system performs much better than the PCA method without password integration.	the recognition rate is difficult to be 100%. The recognition rate of face recognition should be as high as possible. In our research, we propose the personal based authentication system (PBAS). PBAS conducts the authentication depends on both face image and password. PBAS has several advantages. First, the account factors of account based authentication are replaced by face images. Hence, the person who he is will be guaranteed.	enhancing personal-based authentication. It replaces account factors with face images, ensuring the person's identity. Additionally, the system requires both face images and passwords for login, making it more secure against simple picture-based attacks. Furthermore, utilizing passwords significantly enhances the face recognition rate, improving overall system effectiveness.
7.	Scientific Paper Recommendation Xiaomei bai 1 , mengyang wang2 , ivan lee 3 , (senior member, ieee), zhuo yang2 , xiangjie kong	Collaborative filtering, neighborhood based method, Model-based recommendation methods, hybrid approach to recommendations	Globally, the recommendation services have become important due to the fact that they support e-commerce applications and different research communities. Recommender systems have a large number of applications in many fields, including economic, education, and scientific research. Different empirical studies have shown that the recommender systems are more effective and reliable	Compared to the traditional keyword-based search technique, recommender systems are more personalized and effective for massive amounts of data. The results of keyword-based searching are not always suitable, and the number of items is relatively large. Researchers	This paper surveys scientific paper recommendation systems, categorizing them into four groups based on recommendation techniques: content-based, collaborative filtering, graph-based, and Hybrid methods.

			than the keyword-based search engines for extracting useful knowledge from massive amounts of data. The problem of recommending similar scientific articles in scientific community is called scientific paper recommendation. Scientific paper recommendation aims to recommend new articles or classical articles that match researchers' interests. It has become an attractive area of study since the number of scholarly papers increases exponentially. In this paper, we first introduce the importance and advantages of the paper recommender systems.	have to filter the searching results to get the items needed. In the case of different researchers, if they input the same query, they can obtain the same searching results. Because the keyword-based search technique does not consider the users' different interests and purposes.	Content-based and hybrid methods emerge as the most utilized techniques. Each technique's rationale, advantages, disadvantages, and applications are analyzed. Evaluation metrics such as Precision, Recall, and F-measure are introduced to assess system performance. Finally, the paper addresses open issues and challenges for future improvement, including cold start, sparsity, scalability, privacy, serendipity, and unified scholarly data standards.
8.	Research Paper Recommend er Systems: A Random-	Content-based recommendatio ns	Every day researchers from all over the world have to filter the huge mass of existing research papers with the crucial aim of	In this paper we propose a research paper recommending algorithm based	This paper introduces a random-walk based scoring algorithm for

	Walk Based Approach Marco Gori Dipartimento di Ingegneria dell'Informazione, Augusto Pucci Dipartimento di Ingegneria dell'Informazione.	, Collaborative recommendations , Demographic recommendations, Hybrid Approaches	finding out useful publications related to their current work. In this paper we propose a research paper recommending algorithm based on the Citation Graph and random-walker properties. The PaperRank algorithm is able to assign a preference score to a set of documents contained in a digital library and linked one each other by bibliographic references. A data set of papers extracted by ACM Portal has been used for testing and very promising performances have been measured	on the citation graphs and random-walker properties. PaperRank is a support for the resource filtering process, in fact it requires a user to select an initial small subset of documents, relevant for the topic he is writing about. Then the algorithm can spread its boosting effect, due to selected papers, through the citation graph in order to discover other interesting and useful resources.	recommending papers based on a small set of user-selected relevant articles. Tested on an ACM Portal Digital Library dataset, the algorithm performed strongly, with target papers often ranking within the top 20 positions. Future research aims to experiment with the algorithm further, exploring its potential applications and enhancements.
9.	Recommender Systems Clustering Using Bayesian Non Negative Matrix Factorization Jesús bobadilla 1 , rodolfo bojorque 2 , antonio hernando	Matrix factorization based recommender systems, recommender systems clustering motivation and hypothesis	Recommender Systems present a high-level of sparsity in their ratings matrices. The collaborative filtering sparse data makes it difficult to: 1) compare elements using memory-based solutions; 2) obtain precise models using model-based solutions; 3) get accurate predictions; and 4) properly cluster elements. We propose the use of a Bayesian non-negative matrix	The paper highlights the importance of clustering in recommender systems, emphasizing its role in recommendation explanation, data analytics, visualization, and browsing. It introduces Bayesian non-	Recommender systems benefit from clustering beyond accuracy, addressing challenges such as recommendation explanation, data analytics, and visualization. Model-based methods,

	esteban 1 , and remigio Hurtado.		factorization (BNMF) method to improve the current clustering results in the collaborative filtering area. We also provide an original pre-clustering algorithm adapted to the proposed probabilistic method. Results obtained using several open data sets show: 1) a conclusive clustering quality improvement when BNMF is used, compared with the classical matrix factorization or to the improved KMeans results; 2) a higher predictions accuracy using matrix factorization based methods than using improved KMeans; and 3) better BNMF execution times compared with those of the.	negative matrix factorization (BNMF) as a flexible method for clustering and improving accuracy. BNMF offers configurable trade-offs between accuracy and clustering quality, with significant execution time improvements. The paper proposes BNMF+ pre-clustering algorithm for enhanced performance and suggests future exploration of soft BNMF for improved accuracy through probabilistic clustering of users or items.	particularly matrix factorization techniques like Bayesian non-negative matrix factorization (BNMF), offer flexibility and efficiency in prediction. Experiments demonstrate BNMF's ability to simultaneously enhance accuracy and clustering quality, with potential for configurable improvements in execution times. This paper introduces an original BNMF pre-clustering algorithm (BNMF+) to enhance