



COMPARISION ON SHARING OF IMAGES: DECISION TREE VS SVM

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Abstract—Personal Photos are shared in Online Social Network which is the most attractive features in many social sites. In present days, the protection of the shared photos is becoming very important. There are so many techniques to protect those photos from unauthorized access. Encryption and Decryption are the most familiar methods for preserving the images. Genetic Algorithm(GA) has been popular in encrypting and decrypting the image because of its ease implementation. A Face Recognition (FR) system act as a database which recognizes everyone in the photo. To prevent possible privacy leakage, image encryption and decryption is done using Genetic Algorithm for the shared images which has been stored in a Face Recognition System. Genetic Algorithm exploits its effective features of crossover and mutation operations for providing much more security. At the time of sharing, users are asked to specify the request on the basis of friends circle. A powerful classifier called Support Vector Machine(SVM) has been enchanced for achieving high accuracy rate. Finally the photos shared in online provides much more security as before by the use of high level security algorithm and best feature selection technique.

Index Terms— Online Social Network(OSN), Encryption, Decryption, Genetic Algorithm, Support Vector Machine

I INTRODUCTION

Social network is a famous trend in growing technology which existed since our society has been started. Human beings have always sought to live in social environments. Social Networks leads to a huge volume of change in recent years and those networks provide suitable space to shares various of resources between a single and their neighbors in the social circle. In 21st century social networks provides reflection of the structure and dynamics of the society and the interaction of the generation with internet by both technology and other people. It has

generated a new research area called “multimedia computing” in social sites, which has a growth in well-established computing and multimedia networking technologies are brought together with emerging social media research.

Social Networking services are changing the way we communicate with others, and signifies beyond the way we live. Social Networking is one of the primary reasons that many people have become avoid Internet users; which involves the people until the social network emergence could not find any more interests in the web. The process of natural selection is



used to raise the effectiveness of group of possible solutions to meet an environment optimum. Genetic Algorithm (GA) is based on the principle of “fittest Survival”. In the upcoming days, the digital images security plays a major area concern, especially when we deal with digital images, the sending or storing of the process happens through the communication channel. Genetic Algorithms are mainly based on optimization algorithms. Genetic Algorithms play a vital role in solving different problems which can model a simplified version of genetic processes. For Secure sharing of images Encryption and Decryption is done by using Genetic Algorithm. GA focused mainly on three operators, namely, (1) reproduction, (2) crossover, and (3) mutation. Reproduction recollects the current chromosome's genes, crossover join up existing genes into new combinations, and mutation produces new genes. The procedure of GA is started by defining an initial population in the first generation, and during each generation, the population undergo reproduction for every individuals, crossover and mutation operations, to rehabilitate their offspring.

Support Vector Machine (SVM) is an important machine learning technique and has already been applied to many pattern classification problems. SVM play a key role since they can handle high-dimensional data even with a limited number of training samples. The general idea behind SVM is to separate training samples belonging to different classes by tracing maximum margin hyperplanes in the space where the samples are mapped. SVM classifier classifies data by finding best hyperplane that separates all data points from one class to another class. Largest margin between two classes is called as best hyperplane. The maximum width of the slab parallel to hyperplane is called as margin. Margin does not have interior data points. Data points that are close to the separating hyperplane are called as support vectors.

II RELATED WORK

Online social sites are services based on web which allows individuals to construct a semi-public or public profile in a bounded system as well as to combine a list of others so as to share connections, views and thoughts. However the type, separation and nature connections may vary from site to site. A collaborative Face Recognition (FR) framework which improves the face annotation accuracy by making use of many FR engines which has been available in an social network circle. To reduce the effect of this limitation, some of existing methods employed the combination of several local features to create a big feature vector. This feature vector was caused high redundancy, as a result, dimension reduction methods such as PCA have been employed. The selection of FR engines has a main goal to determine a set of FR engines which has been designed for personalized and that are suitable for recognizing query face images. FR framework with collaborative of multiple FR engine has a low calculation cost and that comes with a design which has been suited for the enhancement of decentralized Social networks[1]. The social network context becomes the key for identifying face recognition of photos in a large scale that are shared personally on the Web through online social network sites, leverage such social networks to improve face recognition rates for the images shared[4]. The need for many users, resulting in a set of design considerations for tagged photos which are under privacy. This result in turn identify the social tensions that tagging generates, and the needs for some tools that are listed in privacy is to address the social impacts which occur for photo privacy management [2]. The social network context for face detection and recognition which are manipulated automatically in personal photographs that associate the recognition scores with that of conditional random field (CRF) which is a model of social media and hence apply this CRF to label matched faces in a posted photos[3]. A stochastic search algorithm called genetic algorithm (GA) is applied to find solutions with near-optimal quality in a



reasonable amount of time. Moreover, GA has been successfully applied to solve analogous optimization problems, which includes travelling salesman problem, vehicle routing problem, shortest path routing problem, terminal assignment problem, etc[6].

III FRAME WORK

The application gets developed by PHP framework using WAMP server and SQLYOG as a backend for connectivity. SQLYOG act as a database for storing all the details. The framework of this system involves

A. OSN Login/Signup

A log in/out button is used for log in/out to the account. After logging in, a greeting message and the profile picture will be shown. The user can login to the existing account they have, if not they have to signup to have an account in OSN. The login and Signup page is developed where new user can sign up and the old user can use login menu for login to the account. A new user details are stored in a database once when a signup button gets clicked. By the username and password the user can login using the login menu, if the given password doesn't match with the database details user cannot login to the face book.

B. Friends Update

By typing Friends name or a first letter of a searching friend in the Friend name text box and by clicking the "search button", friend list gets displayed above by corresponding to their profile picture, name and the Mail ID. "Add Friend" button is there for adding the search contact in your friends circle. A friend request involves two action one is Accept friend and the other is Reject Friend. It displays a profile picture along with the mail id to identify the friend who has requested for. The Friends list gets displayed in the page where the Friend Request has been accepted as before. In this a preferred category has to be chosen, the category depends on General, Friend, Unfriend, Close Friend. If chosen General or Friend the profile picture gets displayed, in case of choosing the

Close Friend the original picture they kept will be displayed.

C. Secure Posting

The post gets displayed according to the role of policy a user has followed. Depending upon the policy the posted photos are enables or else it will be in a blur manner.

IV SECURITY REQUEST

A security request is followed by set of principles to obtain decisions and achieve correct results. A rule based set of request is followed by certain principles, and is executed as a set of procedure. Request can insist in decision making of both subject as well as objective manner. Request here refers to the process of making decisions which are important among the organizations, including the alternative findings of programs or according to some priorities, and finding the basis of impact among the all they will have. Request may be of Privacy Request and Exposure Request.

A. Privacy Request

A privacy Request is a document that discloses legally with some or all of the ways a party gathers, and manages a customer by using client data. It satisfies a legal requirement to protect a customer or client's privacy. Information that comes under personal which can be used to recognize an individual, not limited to but including all their personal information. Privacy Request is used to identify a group of users who has a permission to access a photo when being the owner (ie, who is posting a photo). At the time of accepting the friend request, if the accepted friend is a close friend, this privacy request can be accepted by them and their photo can be shared by the owner at any time without giving request each and every time of posting the photos. Privacy Request can be applied to those who comes under the Close Friend circle, so that the user has the right to post their close Friends photo at any time. A request has been send at the time of accepting the Friend Request in terms of this type of request.



B. Exposure Request

An Exposure Request is one who doesn't come under Close Friend circle, So while posting the photo the user has to send a request to his/her friend. Once the request has been accepted, the photos are enabled from the blur look or else it will be in a blur manner. Exposure Request is used to define group of users that are able to access when being a co-owner. The exposure Request is treated as a private one and that shall not be revealed, where the secure set intersection protocol is used to identify the access policy. This is a type of request, where each time a request is send when the photos are posted on Online Social Network.

VFACE RECOGNITION SYSTEM

Modern image search systems depends on the user mentioning words to describe the images that they are looking for. A facial recognition (FR) system is an application for automatic recognition or verifying a person from a digital image. One of the way to do this is by matching the selected features presented in the faces from the image and a facial database. The most widely used facial recognition solutions are based on a number of similar approaches or algorithms. The main approach is to calculate the relative distance between the eyes, ears and nose of a face detected in an image. These calculations are then used in an algorithm to derive other faces with similar features. Another approach is to use an image as a yardstick and applying templates of matching techniques. A system database consist of tables related to signup, originalpicture, friend, post, postfeatures, features. All the data's entered in the framework gets stored in the database. The feature gets compared by the original picture that has been stored, the feature of posted picture and the original picture of the users feature has been compared and it gets displayed.

VI VIOLA JONES ALGORITHM

Viola Jones Object Detection framework has been found by Paul Viola and Michael Jones in

2001. It was one of the first methods to provide object detection at very fast rates. It is the method for object detection through Adaboost machine learning. The Viola-Jonesface detection algorithm was used for detecting face images in personal photos shared anywhere.

A method for object detection in real time which each image contains a location size of 10-50 thousand. This algorithm manually detected labelled face images of individuals who appear at least ten times in each photo collection used. Locating and tracking human faces plays a major role in identifying face recognition and for facial expressions, it is often predicted that a face image has a normalized value that are available. Also, all of the detected face images were individually rotated and rescaled to 86x86 pixels using the center coordinates of the eyes. For detection of the faces through eyes, it gives information to evaluate the face length and breadth on the basis of various parameters and relationship between different parameters of the face. The algorithm has four main stages

- Haar Features Selection.
- Integral Image Creation.
- Adaboost Training.
- Cascaded Classifiers.

VII GENETIC ALGORITHM FOR IMAGE ENCRYPTION AND DECRYPTION

Genetic Algorithm:

The genetic algorithm is a method for solving both constrained and unconstrained optimization problems that is based on natural selection, the process that drives biological evolution. The genetic algorithm repeatedly modifies the individual solutions for population. At every consequent step, the genetic algorithm



selects individuals from the current population randomly (parents) and uses them to produce the next generation children. Over successive generations, the population "evolves" toward an optimal solution. Genetic Algorithm are one of the best ways to solve a problem where a little is known. The function GeneticAlgo () can be applied to work on the image for enhancement. The main steps in solving a problem using GAs are :

1. Initializing the population of possible solutions .
2. Evaluation Calculation i.e. fitness function which plays the vital role in the environment, the solution can be rated in terms of their 'fitness' .
3. Defining Genetic operators which includes selection, crossover, mutation that alters the composition of children during reproduction.
4. Providing values for the parameters that includes population size, probabilities of applying genetic operators that can be used for genetic algorithm .

The genetic algorithm follows the certain criteria.

A. Initial Population

GAs search for the possible optimal solution under without having knowledge about the search spaces. Usually in GAs, the initial population consists of entirely random strings (chromosomes). However, binary strings are provided randomly, each of length pq (q bits for each of the parameters) can be considered as chromosomes for individuals of the initial population .

B. Fitness Function

Reproduction is a process in which individual strings are copied according to their objective function values, F , called the fitness function. The fitness function is an objective type, where no human subjective term is required. In computer world, genetic material is replaced by strings of bits and natural selection replaced by fitness function. An individual fitness is measured by the sum of intensities of edges in an enhanced image, because an image which is of grayscale with a good visual contrast includes many intensive edges.

C. Genetic Operators

Genetic algorithm uses the principle of selection to produce solutions at each generation. Mating of parents is represented by cross-over and mutation operations. Selection is used to select the individuals for next generation. The crossover is used to recombine the information. It is used to recombine two input strings that is called as parent string to get better output string usually called as child string. Crossover has many types such as single point , double point crossover and uniform crossover. Mutation may be the chromosomes of individuals to be different from their parent individuals.

Crossover

Crossover is a genetic parameter which will combines two chromosomes (can also be called as parents) to produce a new chromosome (also called as offspring). The result of crossover will give the new chromosome may be better than both of the parents if it takes the best characteristics from each parent. Crossover happens for every evolution according to a user-definable crossover probability. The new offspring will



have some properties from one parent and some properties from other parent.

Mutation

Mutation can be takes place after the crossover get performed. This prevents falling of all solutions in population that can be converted into local optimum solved problem. The mutation rely on the encoding as well as the crossover.

VIII. FEATURE EXTRACTION

Feature Extraction is one among the important tasks in processing the image, with methods which allows determining the most matchable features for identifying the pattern. The main goal of feature selection is for dimensionality reduction with that of vectors combining to form patterns by a selection of attributes smaller than the original. The classifier performance is getting grown by rejecting the redundant features. Hence the purpose of feature generation is to calculate many new variables from the array of images which get concentrated on information to split the classes. When the input data becomes too large to execute an algorithm then it can be converted into a features reduction set. This method is called Extracting the Features. The features extracted are Mean, Standard Deviation, Skewness, Energy and Kurtosis.

The **Mean** is the value getting from an average, about the general brightness of the image. A brighter image will have a highest mean, and whereas a darker image will have a lowest mean.

Mean of GL = $\frac{\text{sum of (GLs * pixel Counts)}}{(\text{number of Pixels})}$

The **Standard Deviation**, also called as the square root of the variance, which means about the contrast. It describes that the higher contrast image will have a higher variance, and a lower contrast image will have a lower variance.

$sd = \sqrt{\text{variance GL}}$

The **Skewness** is a symmetric measure, or commonly, the large amount of symmetric. A data set, is said to be equal, if it seems to be the same of both the right and left of the point which focus on center. The skewness for a normal distribution is zero, and likewise any symmetric data can have a skewness value nearby to zero. Data that are skewed left indicates the values that are less than zero and for the data that are skewed right indicates the values that are greater than zero.

$$\text{Skewness} = \frac{\text{sum}((\text{GLs} - \text{GL}(\text{mean}))^3 * \text{pixel}(\text{Counts}))}{((\text{number of Pixels} - 1) * sd^3)}$$

The **Kurtosis** is a measure of whether the data are peaked to which has normal distribution. The data sets with highest kurtosis have a distinct peak near the mean.

$$\text{Kurtosis} = \frac{\text{sum}((\text{GLs} - \text{GL}(\text{mean}))^4 * \text{pixel}(\text{Counts}))}{((\text{number of Pixels} - 1) * sd^4)}$$

The **Contrast** measures the quantity of differences in an image. It enhances the sensitivity of the textures in relation to the intensity change. It returns the measure of contrast intensity between a pixel and by its neighborhood. Contrast is 0 for all the images which all are constant. It gets calculated by the amount of local variation present in a constant image. If the amount of local variation is large, the contrast feature also has the highest values equally. If the gray scale difference occurs continually, the texture area of the contrast image becomes too large. The texture becomes acute if the contrast has a small value.

The **Energy** is defined based on a histogram structure of the image. Energy shows how the grayscale of the images and their levels are distributed. When the gray levels are lowered then energy becomes higher. The **Entropy** is a measure that tells us how many bits for a particular image needs to code the data. An image which appears perfectly flat will have an



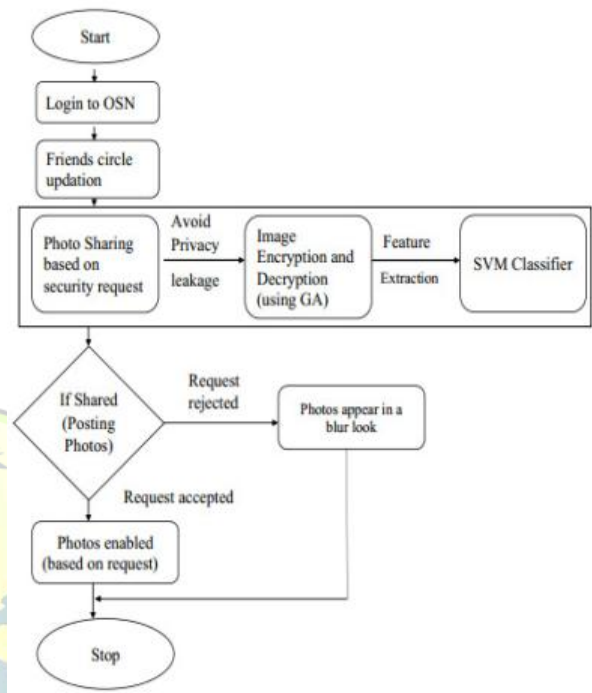
entropy of zero. Consequently, they can be reduced to a relatively small size.

IX. SUPPORT VECTOR MACHINE

SVM has attracted much attention due to its capability of handling the curse of dimensionality in comparison with conventional classification techniques. The main reasons behind the success of the approach are that 1) SVM is based on a margin maximization principle that helps avoid estimating the statistical distributions of different classes in hyperdimensional feature space and that 2) SVM takes advantage of the strong generalization capability obtained by its sparse representation of the decision function.

X. FLOW CHART

The below Flow chart describes the overall process of the system. Once the user logged in the account, there are many activities such as updating their friends circle, changing original picture, keeping the profile picture etc. Photo sharing is mainly based on two request, ie) one is based on Privacy request and the other is exposure request. Once the photo has been decided to share in OSN, and to provide much more security, Genetic Algorithm invokes encryption and decryption technique for avoiding privacy leakage of the photos. For extracting the features, Support Vector Machine automatically predicts the images with the help of training sets of data. During sharing of photos in online social network the system requires two types of request. Once the process gets invoked by following privacy policy the photo has been shared in a secured manner or else the photo appears in a blur look.



XI CONCLUSION

Photo sharing in a social network has grown tremendously a passion over a billions of photos shared in a month. Photo sharing is one of the most popular features in online social networks such as Facebook, twitter etc. Unfortunately, careless photo posting may reveal privacy of individuals in a posted photo. To preserve the privacy leakage and to enable individuals in a photo to give the permissions before posting a group photo. Personal photos are highly variable in appearance but are increasingly shared online in social networks. Yet the tagging of photos on social network sites has caused users to lose their control on posting their photos. A privacy-preserving of Face Recognition (FR) system is used to identify individuals in a group photo. Finally, in this work, the Viola-Jones face detection algorithm has been used for detecting faces in personal photos. The accuracy of face detection has been achieved through this algorithm. By Genetic Algorithm, the images are

secured in both encrypted and decrypted manner. High feature accuracy rate is extracted by use of SVM classifier. The proposed scheme will be very useful in protecting users privacy by accepting the role of policies in sharing of photos over online social networks.

XII. EXPERIMENTAL RESULTS

Images are collected from group photos and image size has been specified with minimum range of 512*512 to the maximum range of 1024*768. The pixel range for an image has a size of 375*281. It finally concludes that Face Recognition system, totally 25 images are collected and used in database for testing.

User Login

A log in/out button is used for log in/out the OSN. After logging in, a greeting message and the profile picture will be shown. The user login to their account if they already have an OSN account, if not they have to signup to have an account in OSN.



Fig 1: Userlogin

Upload Original Picture

User have to upload the original picture for further comparison process to extract the feature of the images. [5] discussed about a method, Wireless sensor networks utilize large numbers of wireless sensor nodes to collect information from their sensing terrain. Wireless

sensor nodes are battery-powered devices. Energy saving is always crucial to the lifetime of a wireless sensor network. Recently, many algorithms are proposed to tackle the energy saving problem in wireless sensor networks. There are strong needs to develop wireless sensor networks algorithms with optimization priorities biased to aspects besides energy saving. In this project, a delay-aware data collection network structure for wireless sensor networks is proposed based on Multi hop Cluster Network. The objective of the proposed network structure is to determine delays in the data collection processes. The path with minimized delay through which the data can be transmitted from source to destination is also determined. AODV protocol is used to route the data packets from the source to destination.

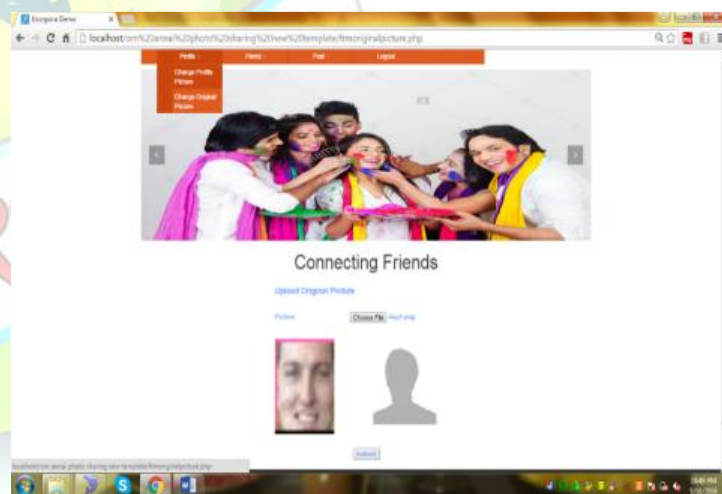


Fig 2: Upload original picture

The below default profile picture appears for all OSN login users.

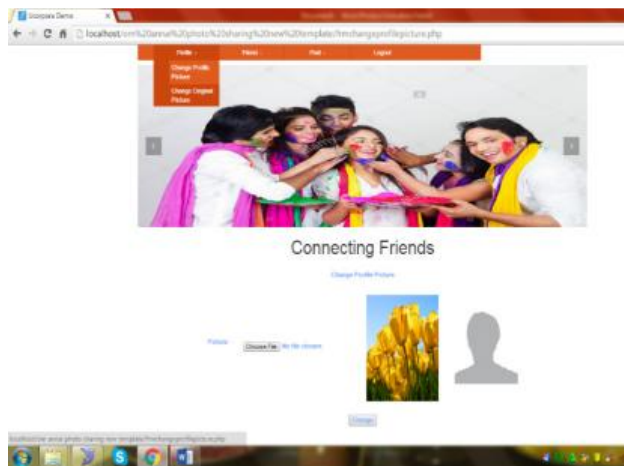


Fig 3: Default Profile picture

Add Friend

By typing Friends name or a first letter of a searching friend in the Friend name text box and by clicking “search button”, the list of friends name get displayed above by their profile picture, name and the Mail ID. “Add Friend” button is there for adding the search contact in your OSN circle in Fig 4

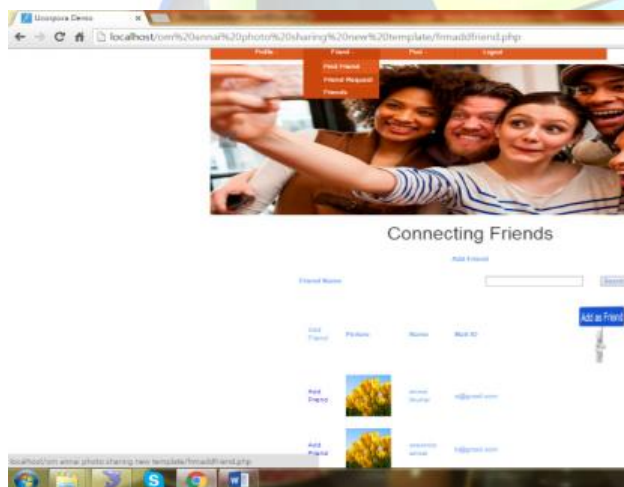


Fig 4: Add Friend

Friend Request

A friend request involves two action one is Accept friend and the other is Reject Friend. It displays a profile picture along

with the mail id to identify the friend who has requested for.



Fig 5: Friend Request

Friend List

The Friends list gets displayed in the page where the Friend Request has been accepted as before. In this a preferred category has to be choosen, the category depends on General, Friend, Unfriend, Close Friend as shown in Fig 6. If choosen General or Friend the profile picture gets displayed, in case of choosing the Close Friend the original picture they kept will be displayed.

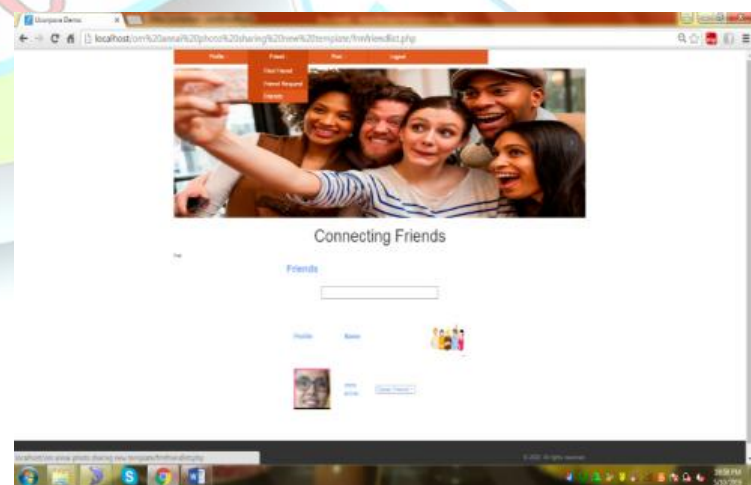


Fig 6: Friend List



Feature Extraction

Once the photo gets shared, the face area gets cropped and features are extracted and is shown in Fig 7



Fig 7: Feature Extraction

Photo Posting

The photos gets posted by a message as shown in Fig 8



Fig8:Photo Sharing

At the time of posting the request gets generated to the users in the photos



Fig 9: Request Generation

Type of request

The blur look of the face will get enable only if they accept the request

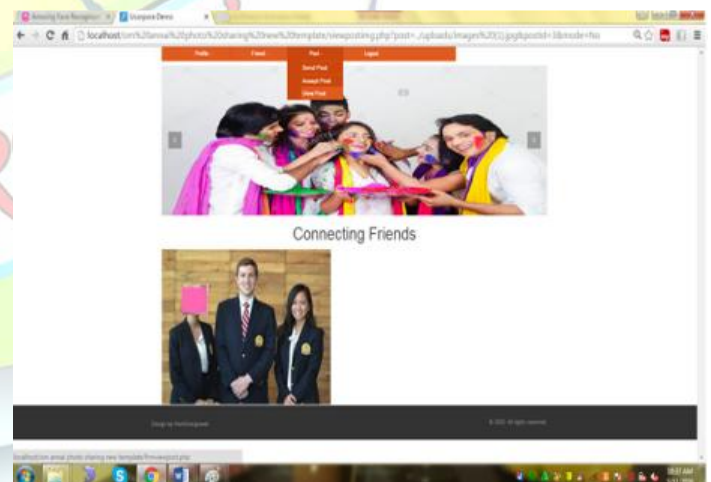


Fig 10: Type of Request at the time of posting

Encryption on shared photos

The posted images are stored in Encrypted form

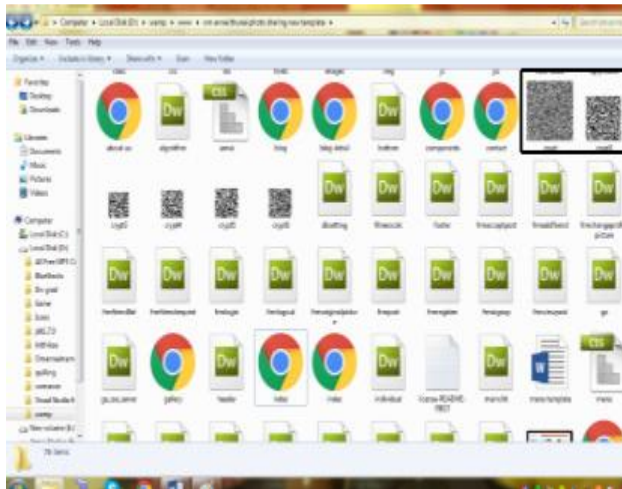


Fig 11: Encryption on Shared photos

Performance Analysis

Fig 12 shows the comparative analysis of Decision tree and SVM classifier. SVM classifier tends to give more accuracy than Decision tree.



Fig 12: Performance Analysis

Comparative Analysis of SVM and Decision Tree

Photos	Photo Faces	Decision Tree (Correctly Detected)	SVM (Correctly Detected)
1	7	5 (71.4%)	6 (85.7%)
2	4	2 (50%)	3 (75%)

3	6	4 (66.6%)	5 (83.3%)
4	5	3 (60%)	4 (80%)
5	3	2 (75%)	3 (75%)

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