# OPTIMUM AND MUTUALLY ACCEPTABLE MULTI-PARTY PRIVACY IN SOCIAL REALM

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**Abstract -** *Photo sharing is one of the most striking features of online social networks (OSNs). It may invade the privacy of individuals if anyone is allowed to post group photos freely. Once a co-photo is posted this server will immediately verify using Face recognition & alert notification will be communicated to all the users in that photo. We are suggesting common mindset people through particle filtering. Communications between friends are monitored by the server and if any vulgar words are found, the user will be removed. Finding friends in immediate vicinity is possible through Bluetooth technology. Image processing is applied to identify people. So, MATLAB has been employed. Cascade object detector uses Viola jones to detect faces.*

***Key Words*: Face recognition, Particle filtering, MATLAB, Cascade object detector, viola jones algorithm, Bluetooth.**

## 1. INTRODUCTION

Large amount of data is involved when it comes to social networks. We employ Big data as it helps in correlation and deduction of information from related data sets. A group photo can be shared only after the permission is granted by all the individuals in it. Such kind of continuous tracking is not available yet. Currently, friend suggestion is only possible considering the data given by the user. It does not function in a dynamic way. Connecting like-minded people over the Network has never been done. To overcome these shortcomings we have implemented an application with more features and enhanced photo privacy[1] to the users.

## 2. PROCEDURE

### 2.1 Registration

The user has to register initially by giving the necessary credentials. Aadhar card number is mandatory so as to provide security.

### 2.2 Photo upload

When a group photo is uploaded all the users in the picture are recognized by face recognition[2] and intimated through email or their mobile number. Only if accepted by all the members the picture can be posted.

### 2.3 Like extraction

The server continuously monitors the kind of content a user likes. Through particle filtering it suggests likeminded people to each other.

### 2.4 Location based suggestion

Bluetooth technology is involved in finding people within vicinity and suggesting to the user.

### 2.5 Communication monitoring

The server monitors the conversation between its users. If it finds usage of vulgar words then that user will be removed immediately

## 3. ARCHITECTURE OVERVIEW

User first registers his/her personal information including Aadhar details in registration page. The server now contains details about user, extracting his/her likes and location based search information. If user wants to upload group photo, it first detects faces by using face detection algorithm and then alert notification send to the persons involved in that co-photo[3] via email or phone number about whether to upload photo or not. Extracting of likes and location search is made to have friend suggestions. Friends who are using vulgar words are removed immediately from friends list.

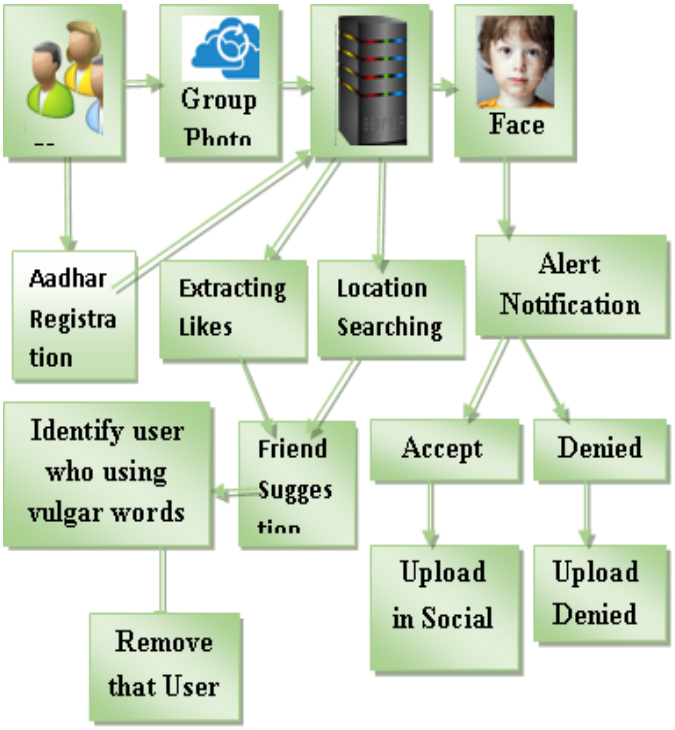


**FIG-1**: Architecture overview.

## 4. FACE DETECTION

### 4.1 Viola jones algorithm for face detection

Viola jones algorithm was created by paul viola and Michael jones ,it is efficient algorithm for face detection .The characteristics of viola jones algorithm are robust, real time (atleast 2 frames per second must be processed). This algorithm is used to detect many faces[4] and detect non-faces and remove it.

It's a widely used method for real-time object detection. Training is slow, but detection is very fast. Training Data – 5000 faces, All frontal – 300 million non faces ,9400 non-face images. The cascade object detector uses the Viola-Jones algorithm to detect people's faces, noses, eyes, mouth, or upper body. The Viola-Jones algorithm uses Haar-like features, that is, a scalar product between the image and some Haar-like templates. More precisely, let I and P denote an image and a pattern, both of the same size N × N, The feature associated with pattern P of image I is defined by

$$\sum_{1\le i\le N}\sum_{1\le j\le N} I(i,j)1_{P(i,j) \text{ is white}} - \sum_{1\le i\le N}\sum_{1\le j\le N} I(i,j)1_{P(i,j) \text{ is black}}.$$

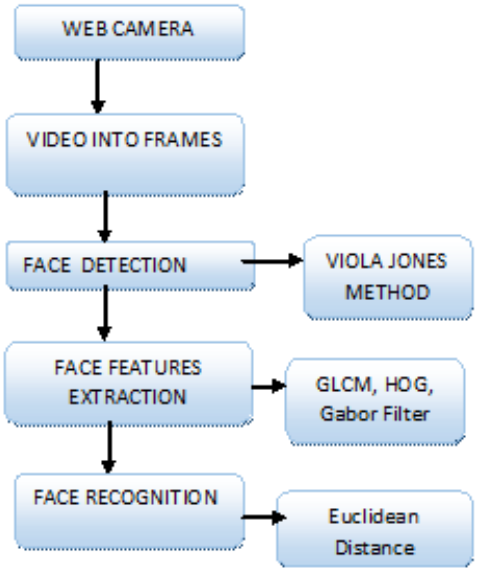


**Fig -2**: Face recognization

### 4.2 Feature extraction

Feature extraction a type of dimensionality reduction that efficiently represents interesting parts of an image as a compact feature vector. This approach is useful when image sizes are large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval. Feature extraction can be done by using GLCM, HOG, Gabor filter bank algorithm.

### 4.3 GLCM (Gray Level Co-occurrence Matrix) Features

The GLCM is a well-established statistical device for extracting second order texture information from images. A GLCM is a matrix where the number of rows and columns is equal to the number of distinct gray levels or pixel values in the image of that surface. GLCM is a matrix that describes the frequency of one gray level appearing in a specified spatial linear relationship with another gray level within the area of investigation. Given an image, each with an intensity, the GLCM is a tabulation of how often different combinations of gray levels co-occur in an image or image section. Texture feature calculations use the contents of the GLCM to give a measure of the variation in intensity at the pixel of interest. Typically, the co-occurrence matrix is computed based on two parameters, which are the relative distance between the pixel pair d measured in pixel number and their relative orientation.

### 4.4 HOG (Histogram of Oriented Gradient)

HOG features are a robust way of describing local object appearances and shapes by their distribution of intensity gradients or edge directions, and have been used successfully as allow level feature in a number of object recognition tasks. Human faces are generally considered interesting and important to detect in many applications such as surveillance, recognition systems, biomedical, and video. HOG descriptor shave been shown to significantly outperform existing feature sets for human detection.

### 4.5 Gabor Filter Bank

The Gabor filters (GF) are optimally localized in both space and spatial frequency and getting a set of filtered images which correspond to a specific scale and orientation component of the original texture. In this work 5 scales and6 orientations are used in terms of Homogenous Texture Descriptor. The Gabor function defined for Gabor filter banks is written as

$$G_{p_{s,r}}(\omega,\theta) = \exp\left[\frac{-(\omega-\omega_s)^2}{2\sigma_{\omega_s}^2}\right] \times \exp\left[\frac{-(\theta-\theta_r)^2}{2\sigma_{\theta_r}^2}\right]$$

Where $Gp_{s,r}(\omega, \theta)$ is Gabor function at the s-th radial index and r-th angular index $\sigma_{\omega s}$ and $\sigma_{\theta r}$ are the standard deviations of the Gabor function in the radial direction and the angular direction, respectively.

### 4.6 Face Recognition

In face recognition multiple FR engine[5] is used.

**Euclidean distance method :** In image analysis, the distance transform measures the distance of each object point from the nearest boundary and is an important tool in computer vision, image processing and pattern recognition. In the distance transform, binary image specifies the distance from each pixel to the nearest non-zero pixel. The

euclidean distance is the straight-line distance between two pixels and is evaluated using the euclidean norm. The city block distance metric measures the path between the pixels based on a four connected neighborhood and pixels whose edges touch are one unit apart and pixels diagonally touching are two units apart.

## 5. LOCATION BASED SUGGESTION

A major wireless technology that is used to transfer data over short distances is Bluetooth. It operates at frequency between 2400 and 2483.5 MHZ. It uses short wavelength UHF radio waves. People who are within this particular range are suggested based on location [6].

## 6. EXTRACTING LIKES

The Server will analyze the likes of the Users and then extract the Keywords using Particle Filter. By Analyzing the likes of people from their profile information, our system will automatically suggest like-minded people to each other.

## 7. OUTPUT

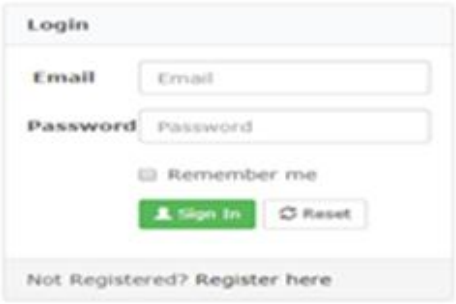


**FIG-3: Login page screenshot**

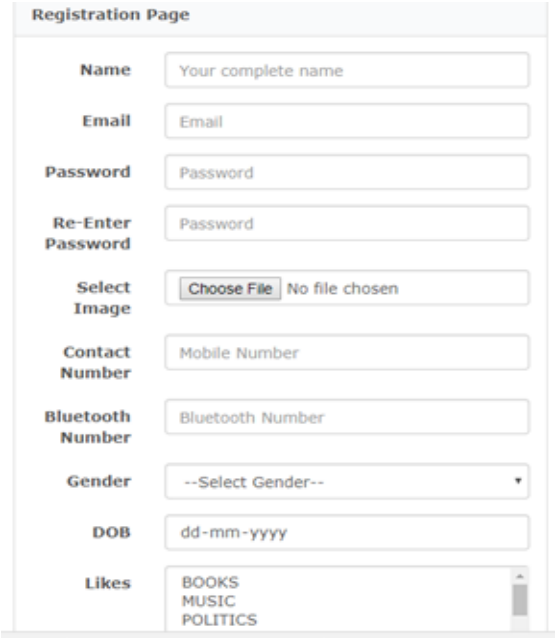


**FIG-4: Registration page screenshot**

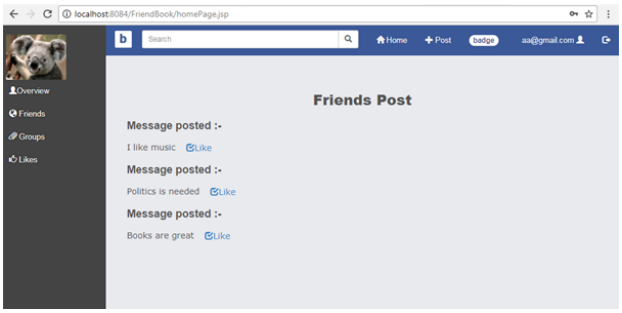


**FIG-5: User post screenshot**

## 8. FUTURE ENHANCEMENT

We have restricted the usage of vulgar words in the user's post,. The vulgar words are identified from the data set and the stemming is used for identifying the words. In future, if user posts any vulgar words other than our dataset, then the meaning of those words can be directly searched from google server and analyzed. Later, those words can be stored in our dataset. Usage of vulgar words are hereby restricted.

## 9. CONCLUSIONS

We have introduced privacy of individual's photo in co-photo. In order to protect individual's photo in co-photo, we make use of Viola jones algorithm for detecting faces and compare it with Aadhar photos. Viola jones algorithm is used to detect faces at faster rate. Location based suggestion of friends is made by using bluetooth within short range. People who are interested in same topic are suggested as friends using Particle filter. Our future enhancement would be to remove user who are using vulgar words from friends list by using words in google search engine.

## 10. REFERENCES

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