Images containing faces are essential to intelligent vision-based human computer interaction, and research efforts in face processing include face recognition, face tracking, pose estimation, and expression recognition. The rapidly expanding research in face processing is based on the premise that information about a user’s identity, state, and intent can be extracted from images and that computers can then react accordingly, e.g., by knowing person’s identity, person may be authenticated to utilize a particular service or not. A first step of any face processing system is registering the locations in images where faces are present. However, face registration for whole database is a challenging task because of variability in scale, location, orientation (up-right, rotated), and pose (frontal, profile). Facial expression, occlusion, and lighting conditions also change the overall appearance of face. The Image registration algorithm will register all these images present in the database. The face recognition algorithm which is insensitive to large variation in lighting direction and facial expression is to be implemented. Taking a pattern classification approach, each pixel in an image can be considered as a coordinate in a high-dimensional space. The advantage of this is that the images of a particular face, under varying illumination but fixed pose, lie in a 3D linear subspace of the high dimensional image space—if the face is a Lambertian surface. However, since faces are not truly Lambertian surfaces and do indeed produce self-shadowing images will deviate from this linear subspace. Rather than explicitly modeling this deviation, project the image into a subspace in such a manner which discounts those regions of the face with large
 deviation. This is achieved by using dimension reduction techniques like Principal component analysis (PCA), Linear Discriminant analysis (LDA), Laplacian faces and other modified approaches like A Priori Laplacian and A Priori Laplacian with Hamming Distance.

References

2002.  

**Index Terms**

Computer Science  
Artificial Intelligence

**Keywords**

Hamming Distance  
Principal component analysis  
Linear discriminant analysis  
Linear projective projection

Eigen value

Laplacian faces

A Priori Laplacian