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# HW#6 (Project)

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이 상 화



# Eigenfaces and Face Recognition

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- Use PCA and gray-scale face images
  - Find eigenfaces
  - Show face recognition performance



# How to do?

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## □ 1. Collect face images

- Crop the same image size for face area
- Image size: 32x32
- At least 1000 gray images



# How to do?

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- ❑ 2. Construct data matrix and covariance matrix using the face images
  - Calculate the mean vectors of your collected face images
- ❑ 3. Apply SVD (PCA) to the covariance matrix
- ❑ 4. Find some eigenvectors for the largest singular values.



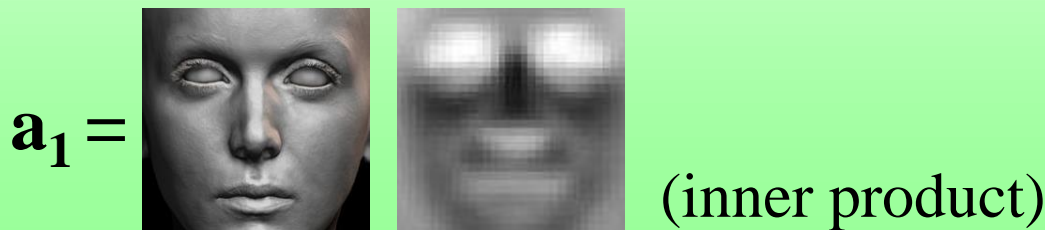
# How to do?

## □ 5. Test for face recognition

- Collect 10 different cropped face images
  - 5 test images for one face
- Represent each face images using the eigenfaces
- Compare the coefficients  $\{a_1, a_2, \dots, a_n\}$  for eigenfaces



$$\text{Target Face} = a_1 \text{Eigenface}_1 + a_2 \text{Eigenface}_2 + a_3 \text{Eigenface}_3 + \dots + a_n \text{Eigenface}_n$$



$$a_1 = \text{Target Face} \cdot \text{Eigenface}_1 \quad (\text{inner product})$$



# Report

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## □ ppt presentation within 20 pages

- Collected images, eigenfaces
- Analysis of face recognition

## □ Due:

- 10월 21일 (Wed) 22:00
- Submission to black board with pdf file

