CS 395T: Class Specific
FaceTracer: A Search Engine for Large Collections of Images with Faces

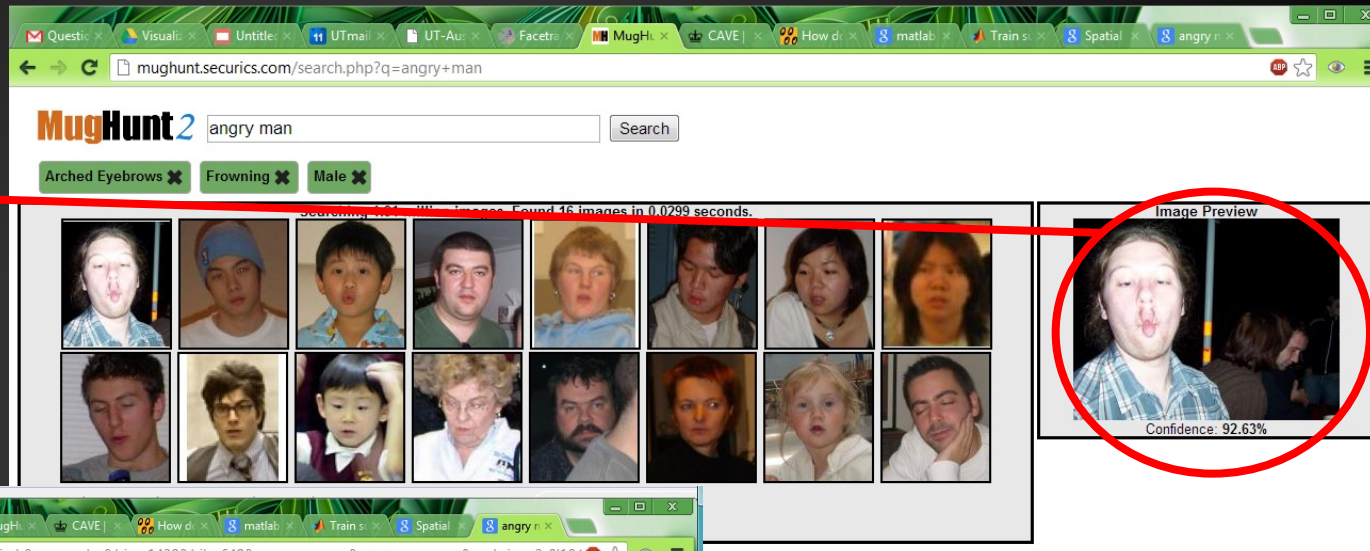
Nona Sirakova
October 19 2012

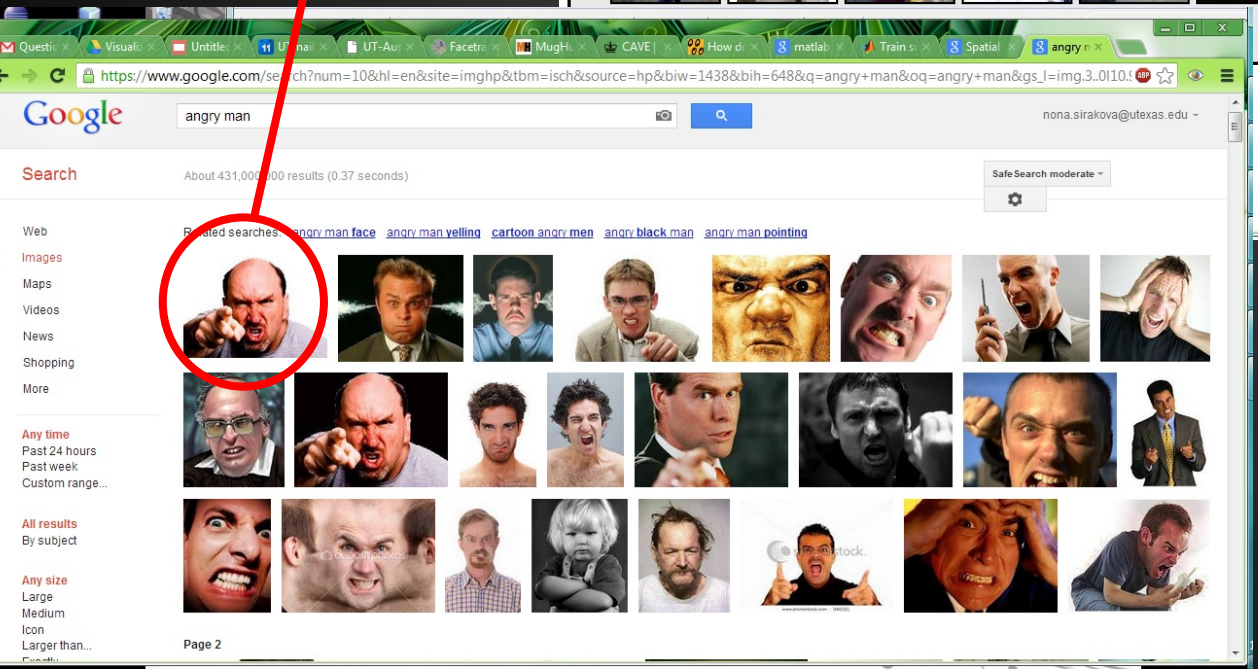
Database Fromat:

Eye & mouth corners for a single person per image

Google VS MugShot

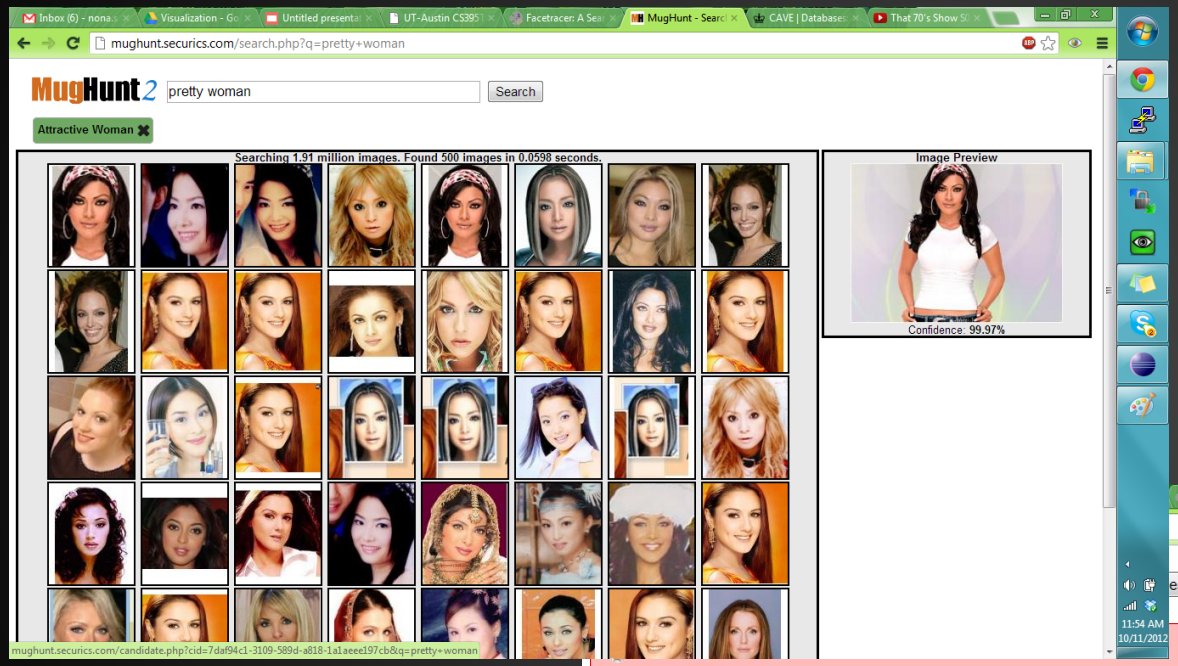
Top picks for angry man

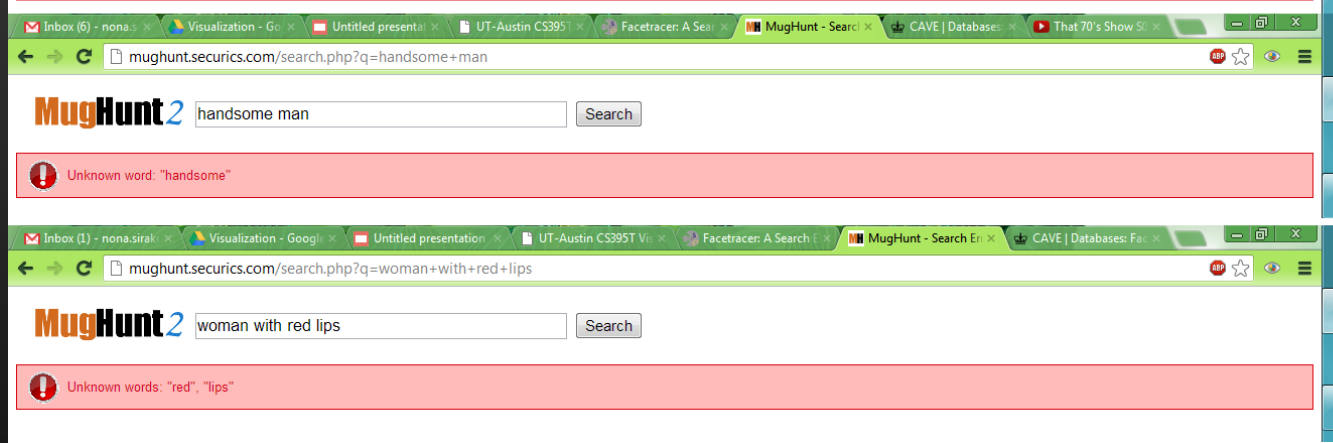




In the database, but not retrieved as angry.

Does MugHunt work with natural language?





Demo:

Mug Hunt: http://mughunt.securics.com/

Features and their values:

Attribute/ Options	Number Labeled	Attribute/ Options	Number Labeled	Attribute/ Options	Number Labeled
Gender	**1,954**	**Smiling**	**1,571**	**Race**	**1,309**
Male	867	True	832	White	433
Female	1,087	False	739	Black	399
Age	**3,301**	**Mustache**	**1,947**	Asian	477
Baby	577	True	618	**Eye Wear**	**2,360**
Child	636	False	1,329	None	1,256
Youth	784	**Blurry**	**1,763**	Eyeglasses	665
Middle Aged	815	True	763	Sunglasses	439
Senior	489	False	1,000	**Environment**	**1,583**
Hair Color	**1,033**	**Lighting**	**633**	Outdoor	780
Black	717	Flash	421	Indoor	803
Blond	316	Harsh	212	**Total**	**17,454**

Features to use in Experiment 1:

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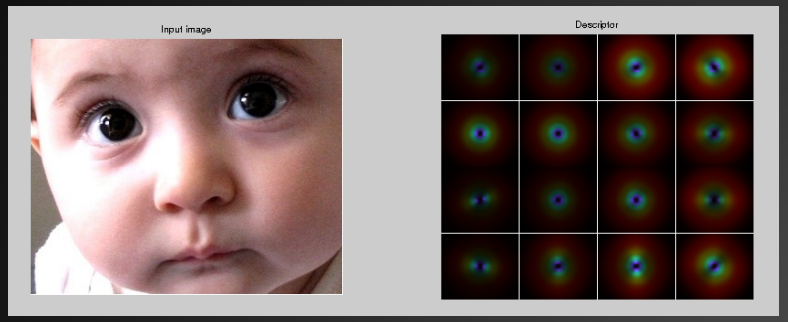
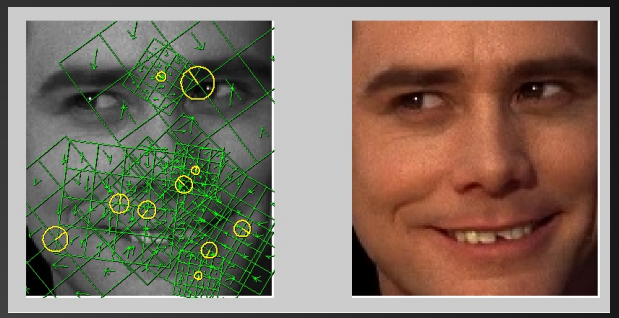
Examples:

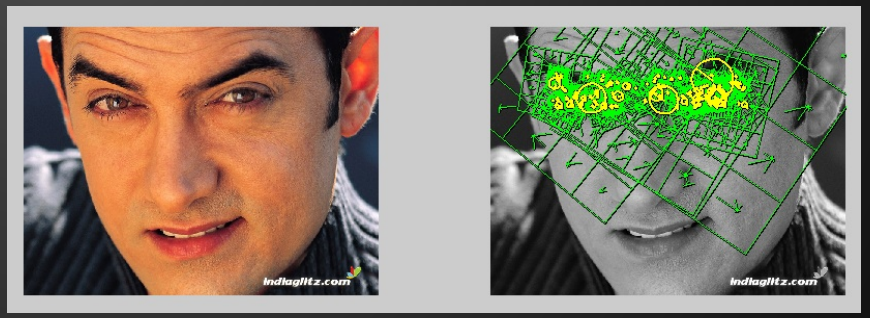


Face GIST



Face SIFT

Mouth SIFT

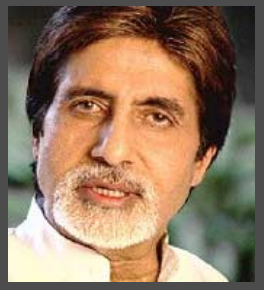


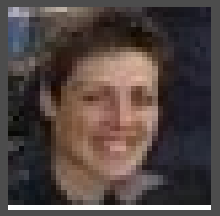
Eyes SIFT

Experiment 1 set-up:

Attribute	Face Gist Error	Face Sift Error	Eyes Sift Error	Mouth Sift Error
Gender (male, female)	6.0 %	14.8 %	22.2 %	18.0 %
Age (baby, child, youth, middle age, senior)				
Race (Asian, Black, White)				
Hair Color (Blonde, not Blonde)				
Eye Wear (none, eyeglasses, sunglasses)				
Mustache (true, false)				
Facial expression (smiling, not smiling)				

gender: male female





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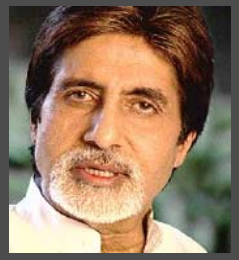

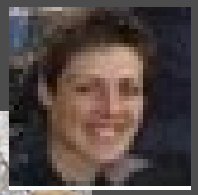
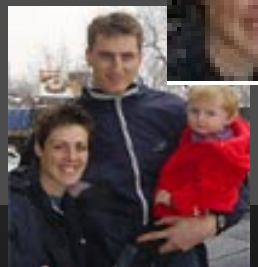

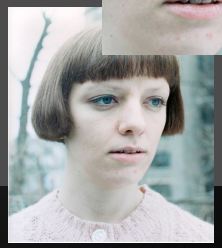

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Race (Asian, Black, White)				
Hair Color (Blonde, not Blonde)				
Eye Wear (none, eyeglasses, sunglasses)				
Mustache (true, false)				
Facial expression (smiling, not smiling)				

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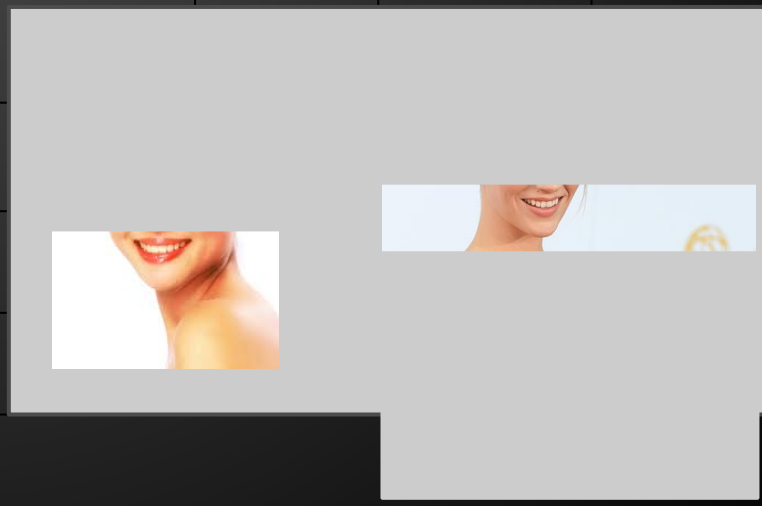
Race (Asian, Black, White)	6.0 %	35.2 %	17.2 %	21.8 %
Hair Color (Blonde, not Blonde)				
Eye Wear (none, eyeglasses, sunglasses)				
Mustache (true, false)				
Facial expression (smiling, not smiling)				



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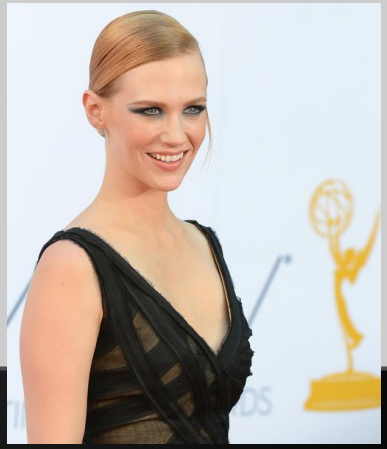

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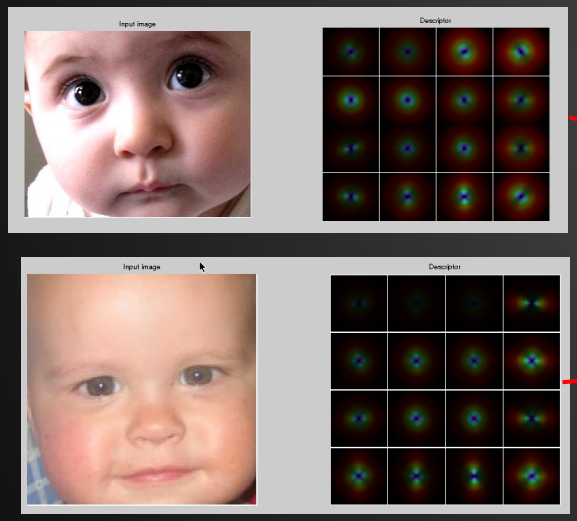
Age (baby, child, youth, middle age, senior)	14.3 %	20.0 %	24.0 %	24.4 %
Race (Asian, Black, White)				
Hair Color (Blonde, not Blonde)				
Eye Wear (none, eyeglasses, sunglasses)	4.0 %	9.0 %	4.4 %	43.0 %
Mustache (true, false)	3.7 %	8.2 %	34.8 %	4.0 %
Facial expression (smiling, not smiling)	3.5 %	4.0 %	43.8 %	6.4 %

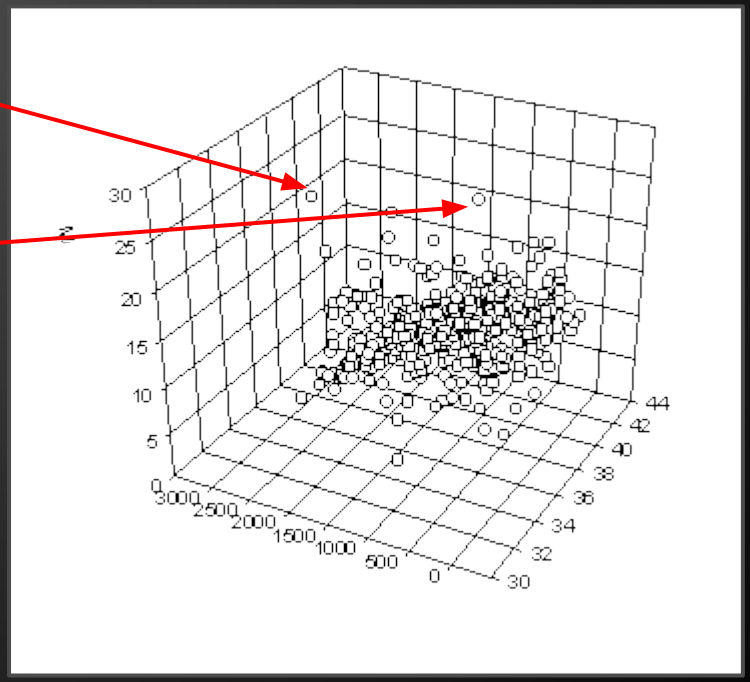
Experiment 2 set-up:

- Part 1:
  - Find the GIST descriptor for each face.
  - Plug in GIST space.
  - For a query, plug the query in GIST space.
  - Find query's 5 nearest neighbors.
- Part 2:
  - Find the GIST descriptor for each face.
  - Plug in GIST space & create descriptors.
  - Create an attribute space, and describe every image in terms of its attributes.
  - For a query, find the nearest 5 neighbors in the attribute space.
- Compare part 1 and part 2.

Experiment 2 set-up Part 1:

- Find the GIST descriptor for each face.
- Plug in GIST space.

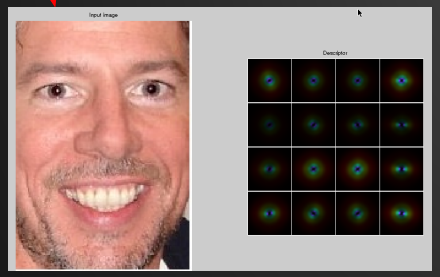


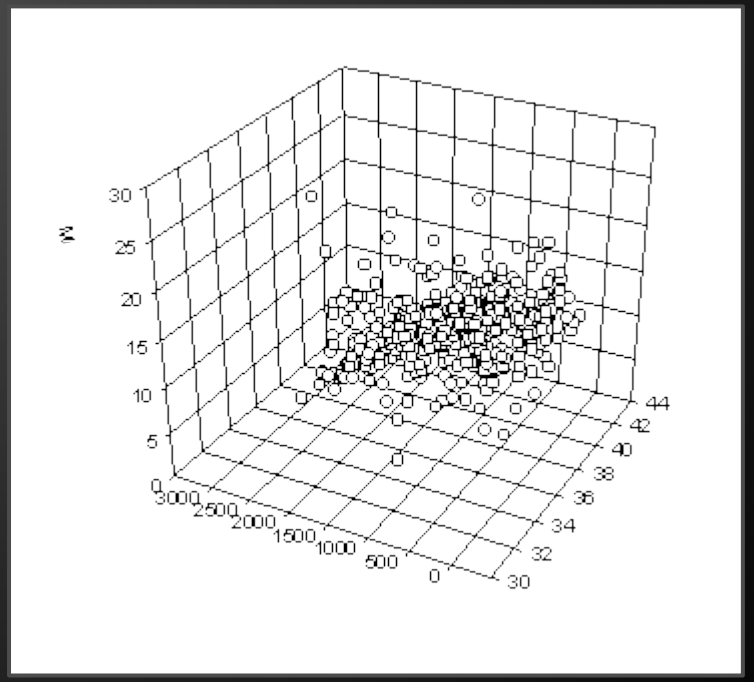


Experiment 2 set-up Part 1:

- Find the GIST descriptor for query face.

Visual Query

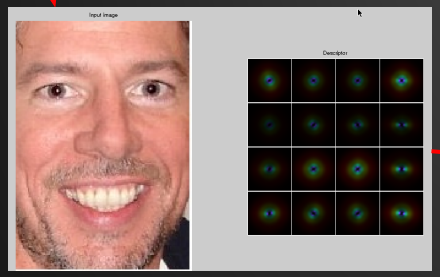


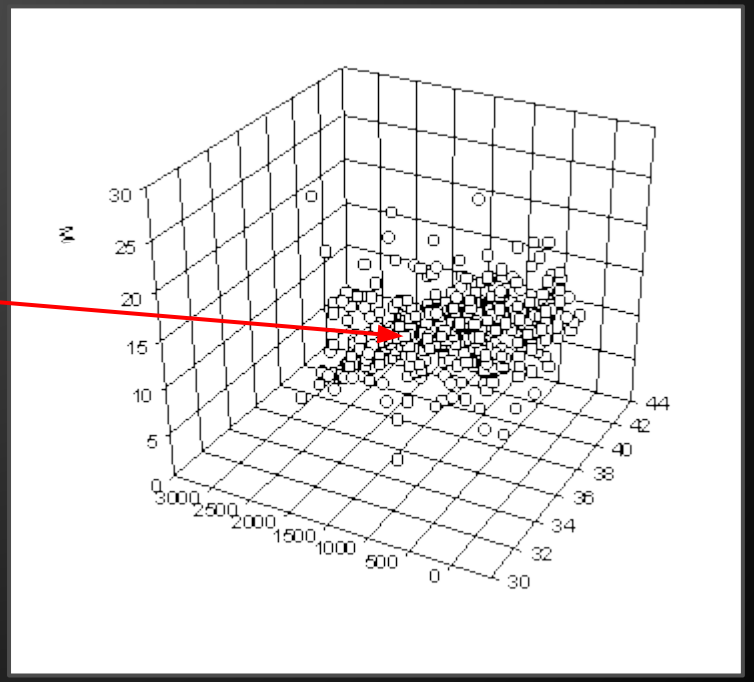


Experiment 2 set-up Part 1:

- Plug query's GIST descriptor in GIST space.

Visual Query

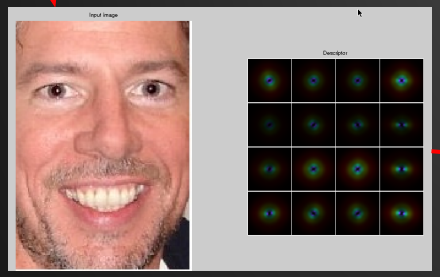


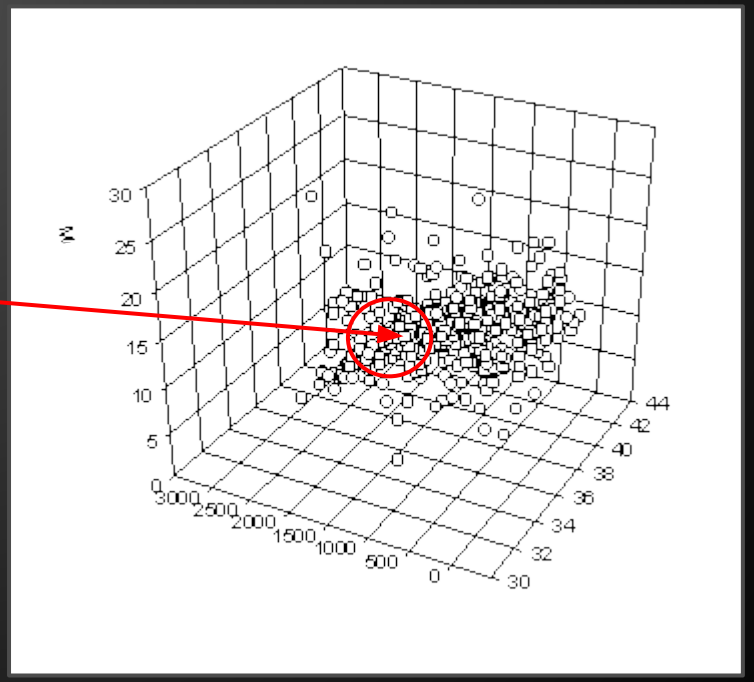


Experiment 2 set-up Part 1:

- Find query's 5 nearest neighbors.

Visual Query





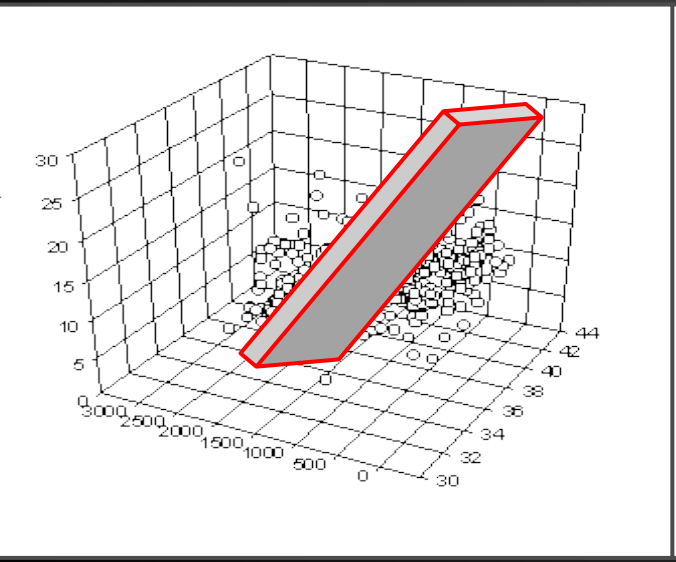
Experiment 2 set-up Part 2:

- Find the GIST descriptor for each face.
- Plug descriptor in GIST space.
- So far, just like part 1.

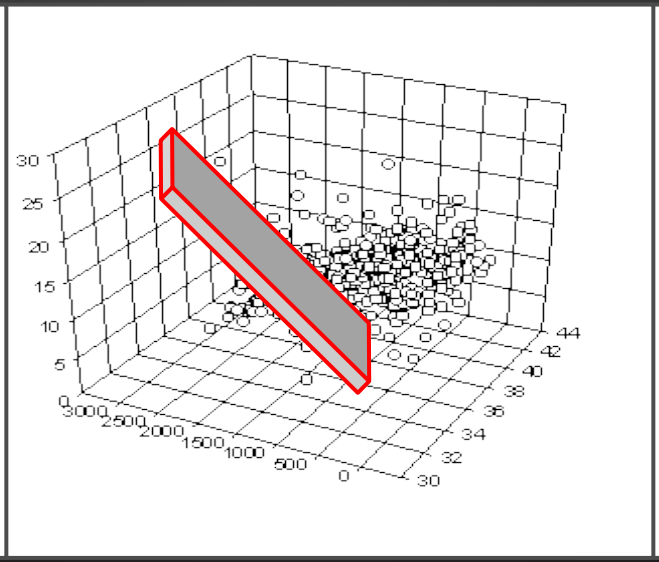
Experiment 2 set-up Part 2:

- Use SVM on for to train for each attribute.

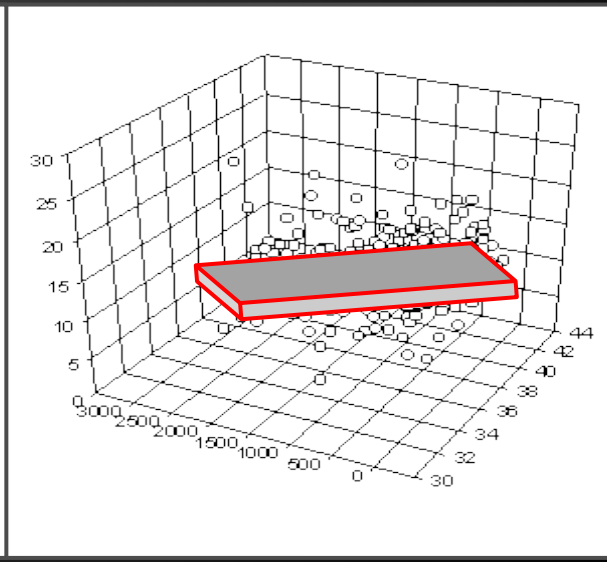
Male VS Female



Smiling VS Not Smiling



Eye Wear VS No Eye Wear



Experiment 2 set-up Part 2:

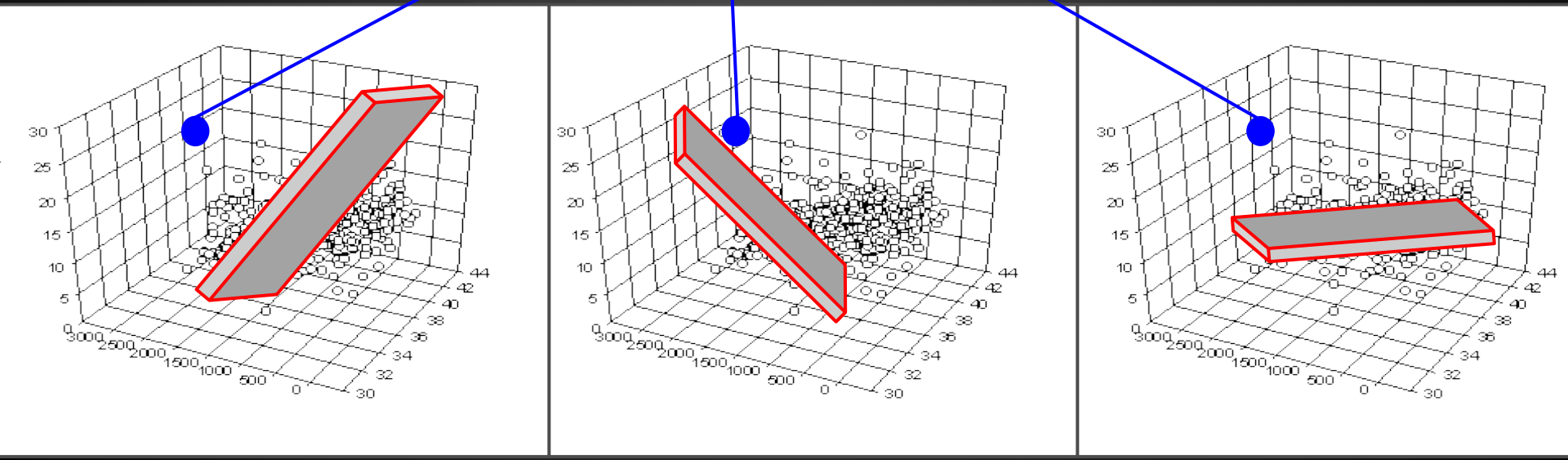
- Each GIST point now has attribute-space coordinates:

[- 3.7, 0.4 , 3.5]

Male VS Female

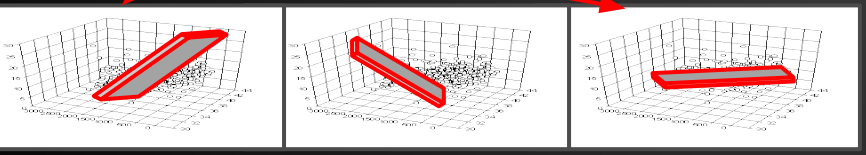
Smiling VS Not Smiling

Eye Wear VS No Eye Wear

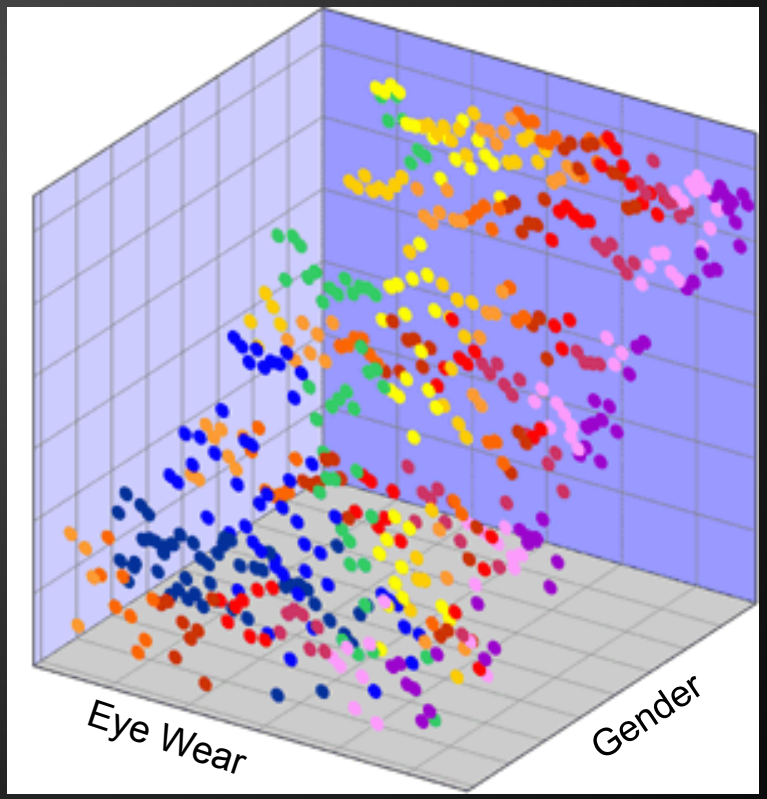


Experiment 2 set-up Part 2:

- Create an attribute space, and describe every image in terms of its attributes.



[7.2, 11, -3]



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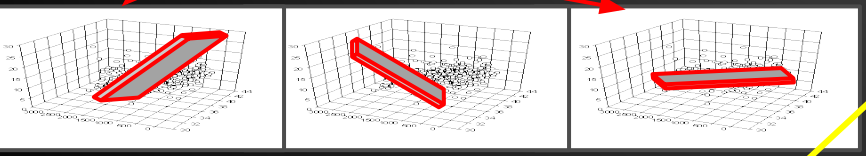

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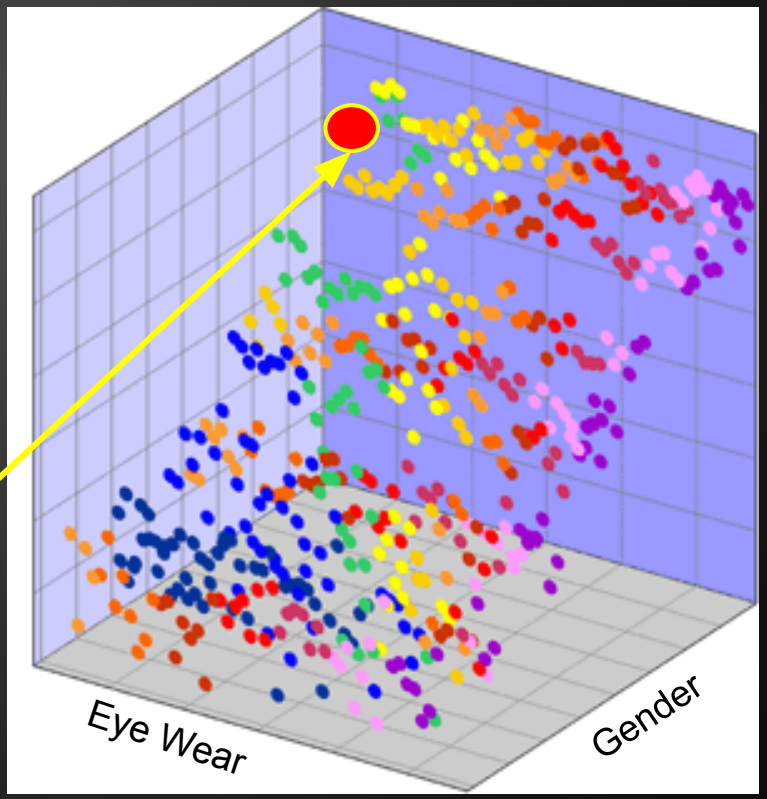
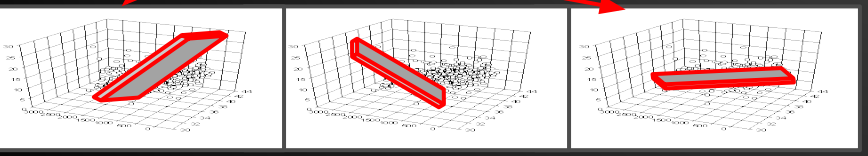
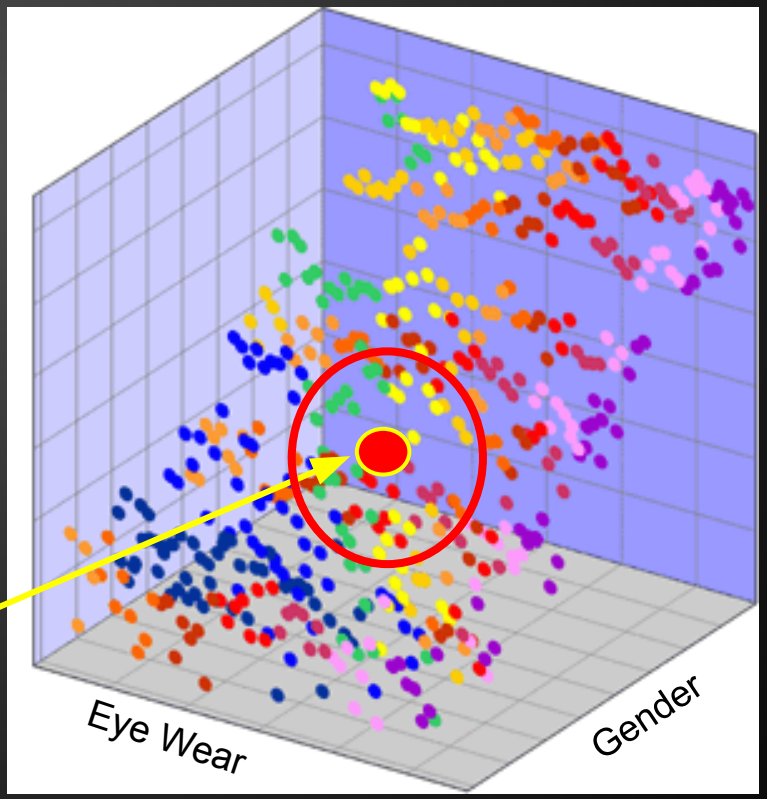


Experiment 2 set-up Part 2:

- For a query image: plug the attribute vector into the attribute space and take the closest 5 neighbors:



[15.2, 6, 22]



Exp 2 Results Attribute VS Gist Space:

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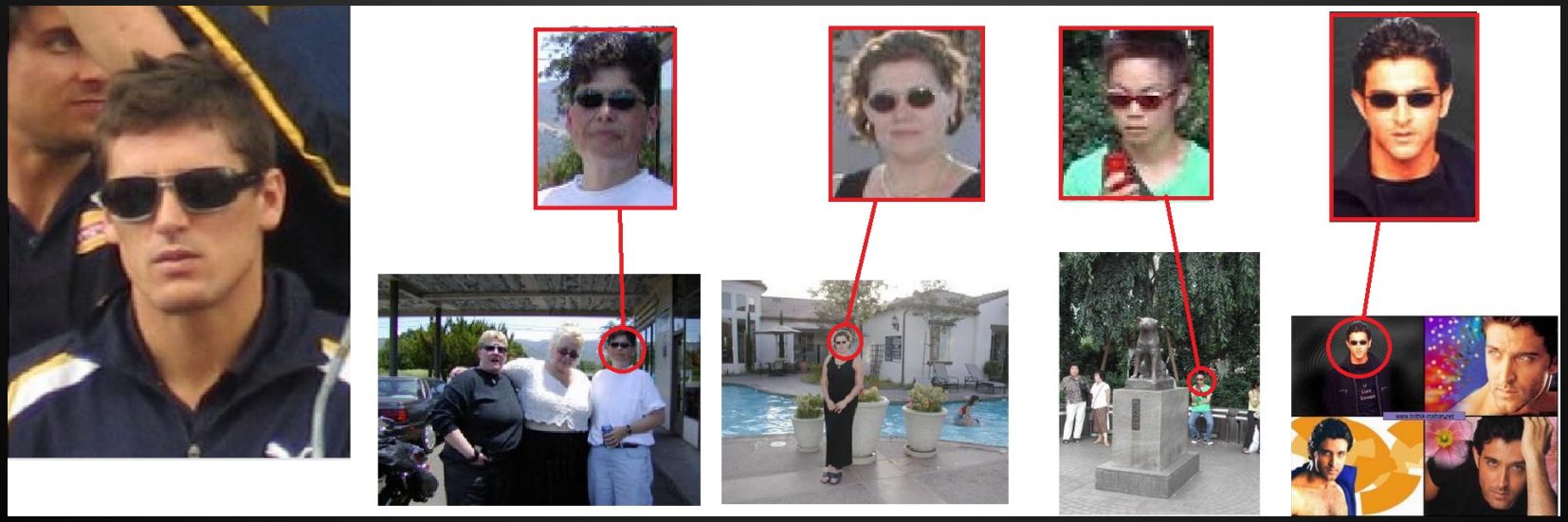
I drew in the beard to illustrate how much the man looks like the one in the closest image.

Exp 2 Results Attribute VS Gist Space:



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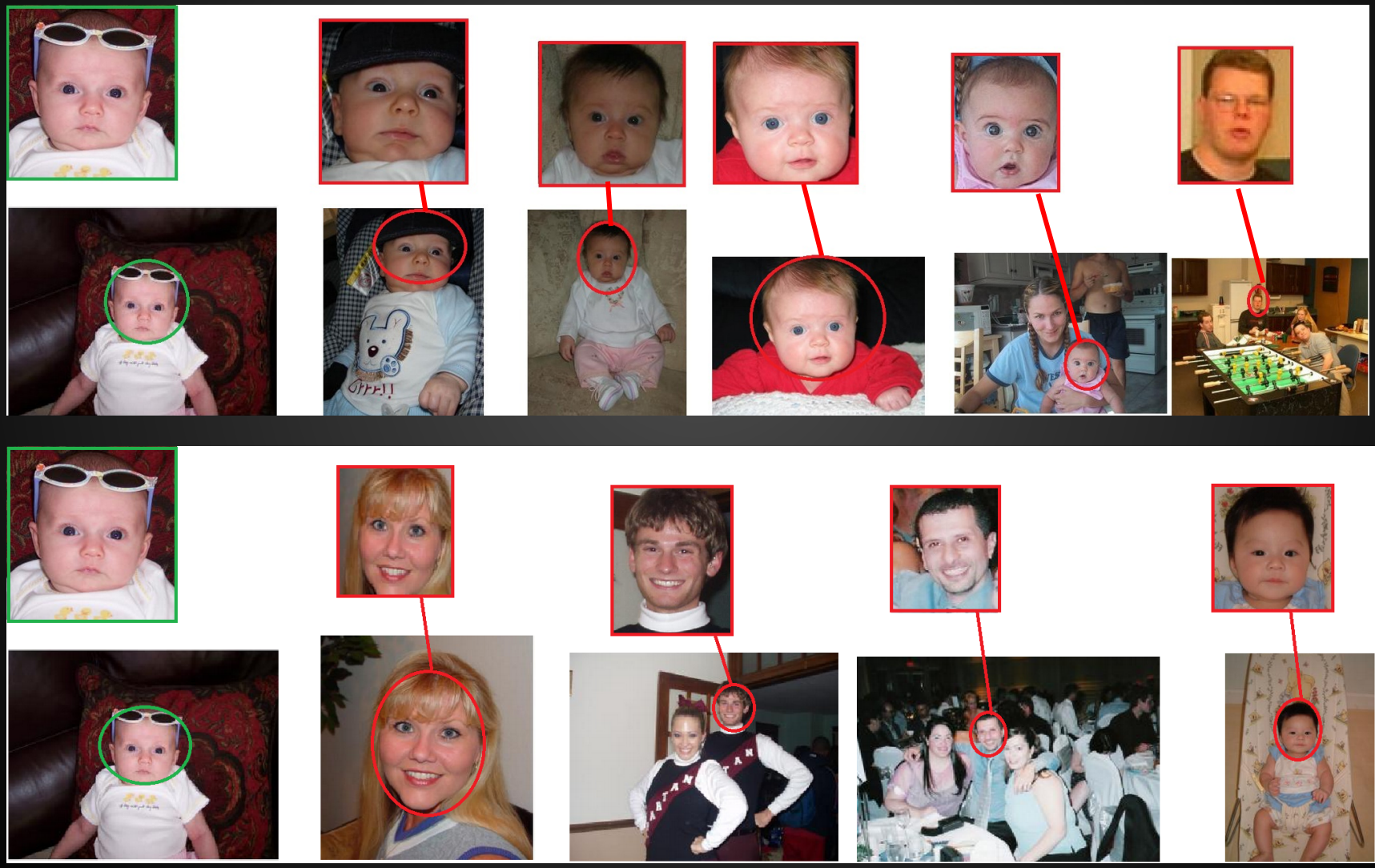

Questions