

# FACIAL IDENTIFICATION RESULTS: 31977 images analyzed for duplication

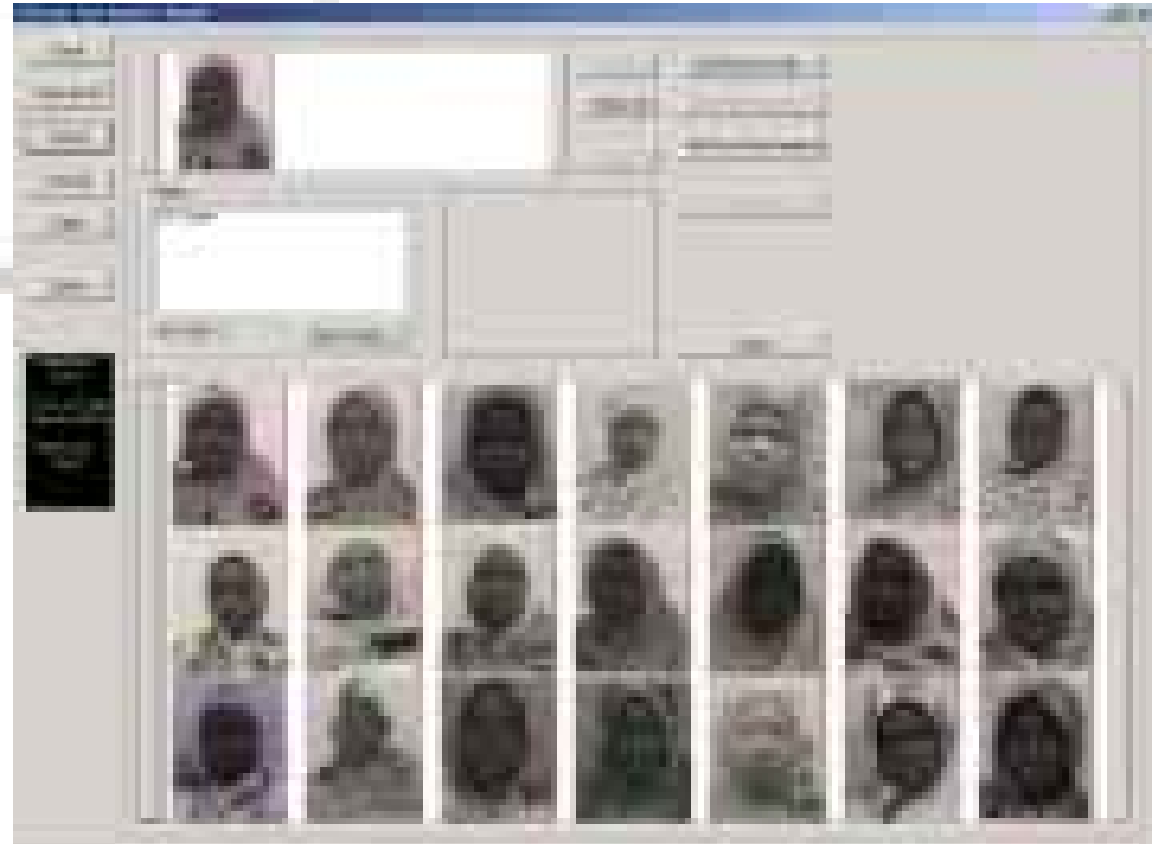
**Barry T. Dudley**  
**[images@I-Cube.co.za](mailto:images@I-Cube.co.za)**  
**Tel: 031 764 3077**  
**Cell: 082 562 8225**





Two systems were used for the analysis:

- A traditional 2D analysis (all **31977** images)
- An advanced 3D analysis (4 000 images ONLY due to time limitations)



## Facial Recognition

2D System

3D System

# Facial Recognition

ALIGNMENT took around 1 second per image

## 2D System



# Facial Recognition

## 2D System



AFTER ALIGNMENT EACH IMAGE WAS COMPARED TO EVERY IMAGE IN THE DATABASE



# Facial Recognition

## 2D System

|    |         |
|----|---------|
| 1  | 10      |
| 2  | 8.26619 |
| 3  | 8.26268 |
| 4  | 8.23806 |
| 5  | 8.23371 |
| 6  | 8.17779 |
| 7  | 8.1525  |
| 8  | 8.12338 |
| 9  | 8.11942 |
| 10 | 8.1091  |

AFTER ALIGNMENT EACH IMAGE WAS COMPARED TO EVERY IMAGE IN THE DATABASE

|                 |    |         |                 |
|-----------------|----|---------|-----------------|
| PICZ0338572.jpg | 11 | 8.10222 | PICZ0338590.jpg |
| PICZ0338571.jpg | 12 | 7.99342 | PICZ0338586.jpg |
| PICZ0162383.jpg | 13 | 7.98174 | PICZ0338380.jpg |
| PICZ0338376.jpg | 14 | 7.98128 | PICZ0338363.jpg |
| PICZ0338565.jpg | 15 | 7.97555 | PICZ0338399.jpg |
| PICZ0338591.jpg | 16 | 7.95411 | PICZ0162382.jpg |
| PICZ0338596.jpg | 17 | 7.89517 | PICZ0338393.jpg |
| PICZ0338597.jpg | 18 | 7.88028 | PICZ0338370.jpg |
| PICZ0338563.jpg | 19 | 7.84406 | PICZ0162397.jpg |
| PICZ0338574.jpg | 20 | 7.831   | PICZ0162398.jpg |
|                 | 31 | 7.60877 | PICZ0338377.jpg |
|                 | 32 | 7.59173 | PICZ0162378.jpg |
|                 | 33 | 7.53163 | PICZ0338398.jpg |
|                 | 34 | 7.49768 | PICZ0162355.jpg |
|                 | 35 | 7.49326 | PICZ0162393.jpg |
|                 | 36 | 7.47952 | PICZ0338352.jpg |
|                 | 37 | 7.46202 | PICZ0338582.jpg |
|                 | 38 | 7.45846 | PICZ0338384.jpg |
|                 | 39 | 7.45282 | PICZ0338366.jpg |
|                 | 40 | 7.43753 | PICZ0338579.jpg |
|                 | 41 | 7.4218  | PICZ0162387.jpg |
|                 | 42 | 7.39776 | PICZ0338569.jpg |
|                 | 43 | 7.36957 | PICZ0338356.jpg |
|                 | 44 | 7.35373 | PICZ0338357.jpg |
|                 | 45 | 7.33518 | PICZ0338112.jpg |
|                 | 46 | 7.3326  | PICZ0338355.jpg |
|                 | 47 | 7.33011 | PICZ0162374.jpg |
|                 | 48 | 7.32833 | PICZ0162364.jpg |
|                 | 49 | 7.32394 | PICZ0162363.jpg |
|                 | 50 | 7.31727 | PICZ0162365.jpg |



# Facial Recognition

## 2D System

### EXAMPLE 1

AFTER ALIGNMENT EACH IMAGE WAS COMPARED TO EVERY IMAGE IN THE DATABASE

1 10

This indicates AN EXACT MATCH

PICZ0338572.jpg

2 8.26619

Every other image in the database is then ranked against this image

PICZ0338571.jpg

|    |         |                 |
|----|---------|-----------------|
| 11 | 8.10222 | PICZ0338590.jpg |
| 12 | 7.99342 | PICZ0338586.jpg |
| 13 | 7.98174 | PICZ0338380.jpg |
| 14 | 7.98128 | PICZ0338363.jpg |
| 15 | 7.97555 | PICZ0338399.jpg |
| 16 | 7.95411 | PICZ0162382.jpg |
| 17 | 7.89517 | PICZ0338393.jpg |
| 18 | 7.88028 | PICZ0338370.jpg |
| 19 | 7.84406 | PICZ0162397.jpg |
| 20 | 7.831   | PICZ0162398.jpg |
| 31 | 7.60877 | PICZ0338377.jpg |
| 32 | 7.59173 | PICZ0162378.jpg |
| 33 | 7.53163 | PICZ0338398.jpg |
| 34 | 7.49768 | PICZ0162355.jpg |
| 35 | 7.49326 | PICZ0162393.jpg |
| 36 | 7.47952 | PICZ0338352.jpg |
| 37 | 7.46202 | PICZ0338582.jpg |
| 38 | 7.45846 | PICZ0338384.jpg |
| 39 | 7.45282 | PICZ0338366.jpg |
| 40 | 7.43753 | PICZ0338579.jpg |
| 41 | 7.4218  | PICZ0162387.jpg |
| 42 | 7.39776 | PICZ0338569.jpg |
| 43 | 7.36957 | PICZ0338356.jpg |
| 44 | 7.35373 | PICZ0338357.jpg |
| 45 | 7.33518 | PICZ0338112.jpg |
| 46 | 7.3326  | PICZ0338355.jpg |
| 47 | 7.33011 | PICZ0162374.jpg |
| 48 | 7.32833 | PICZ0162364.jpg |
| 49 | 7.32394 | PICZ0162363.jpg |
| 50 | 7.31727 | PICZ0162365.jpg |

# Facial Recognition

AFTER ALIGNMENT EACH IMAGE WAS COMPARED TO EVERY IMAGE IN THE DATABASE

2D System

EXAMPLE 2

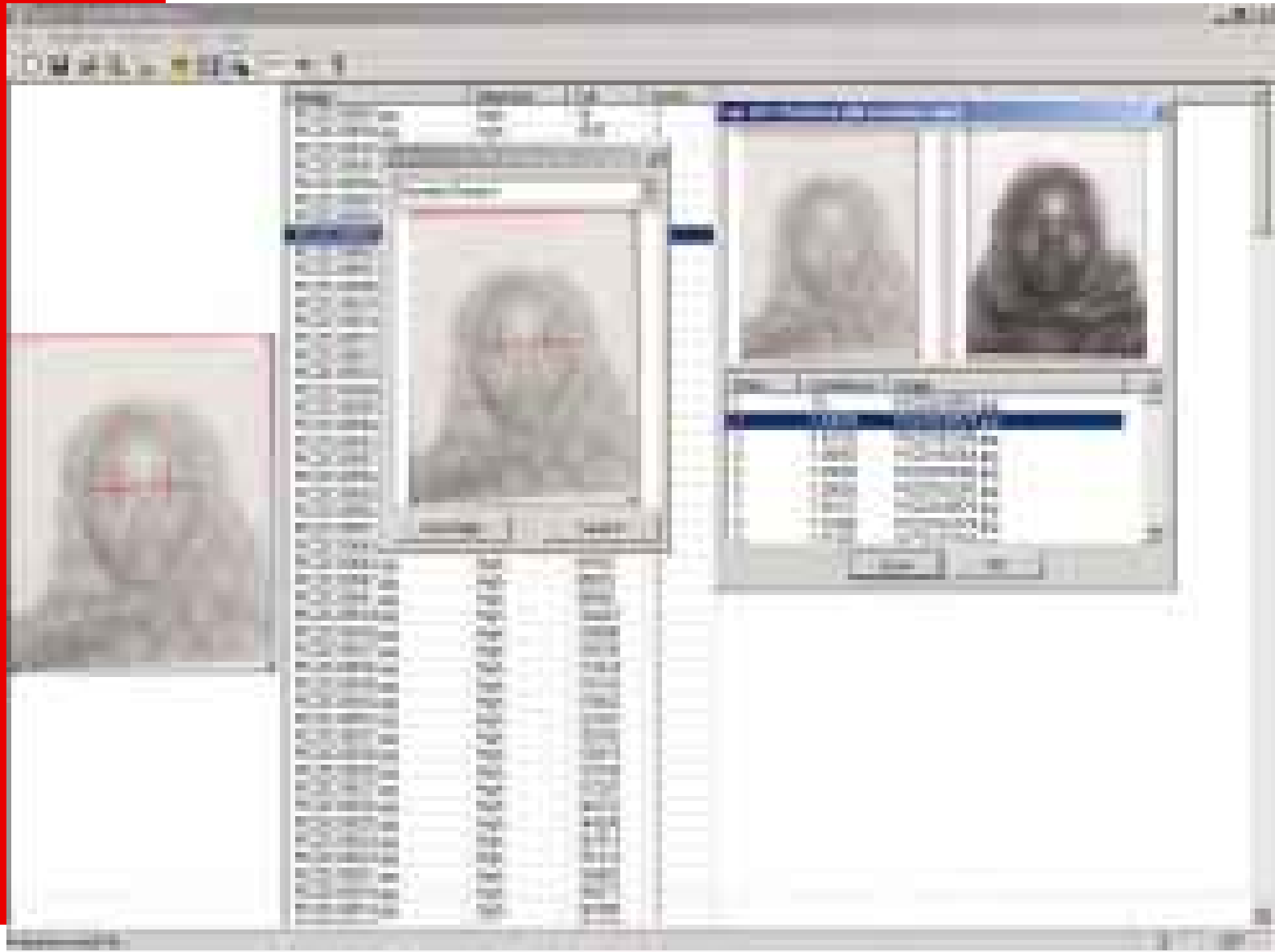


# Facial Recognition

AFTER ALIGNMENT EACH IMAGE WAS COMPARED TO EVERY IMAGE IN THE DATABASE

2D System

EXAMPLE 3



# Facial Recognition

## 2D System EXAMPLE 3



AFTER ALIGNMENT EACH IMAGE WAS COMPARED TO EVERY IMAGE IN THE DATABASE

|    |         |                 |     |         |                 |
|----|---------|-----------------|-----|---------|-----------------|
| 1  | 10      | PICZ0338583.jpg |     |         |                 |
| 2  | 7.44694 | PICZ0338575.jpg | 11  | 7.17993 | PICZ0162354.jpg |
| 3  | 7.43192 | PICZ0162398.jpg | 12  | 7.16664 | PICZ0338380.jpg |
| 4  | 7.36053 | PICZ0162364.jpg | 33  | 6.79341 | PICZ0338596.jpg |
| 5  | 7.35058 | PICZ0338388.jpg | 34  | 6.76138 | PICZ0338376.jpg |
| 6  | 7.26666 | PICZ0162387.jpg | 50  | 6.62713 | PICZ0162352.jpg |
| 7  | 7.26172 | PICZ0338570.jpg | 51  | 6.62654 | PICZ0338572.jpg |
| 8  | 7.24286 | PICZ0162374.jpg | 221 | 5.27165 | PICZ0338035.jpg |
| 9  | 7.21865 | PICZ0162359.jpg | 222 | 5.27105 | PICZ0162416.jpg |
| 10 | 7.19932 | PICZ0162383.jpg | 276 | 4.55506 | PICZ0338189.jpg |
|    |         |                 | 277 | 4.53467 | PICZ0338528.jpg |
|    |         |                 | 278 | 4.5313  | PICZ0338033.jpg |
|    |         |                 | 279 | 4.52284 | PICZ0338149.jpg |
|    |         |                 |     |         | ETC             |

# Facial Recognition

## 3D System

- A batch file containing all the image “details” was created and each image was automatically enrolled into the database

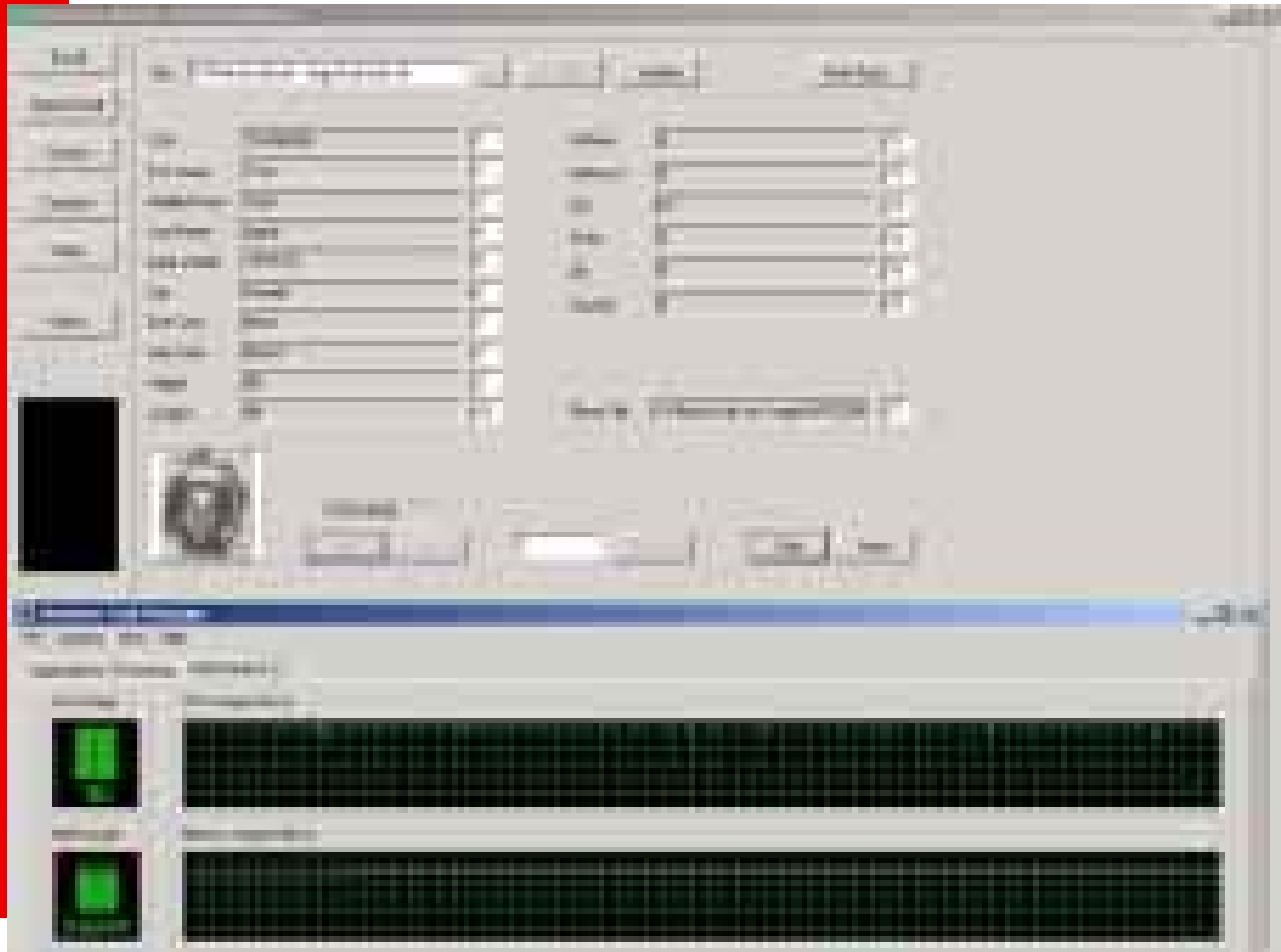


# Facial Recognition

## 3D System



- The enrolment used both CPU and MEMORY, unlike the 2D, which used only CPU



# Facial Recognition

## 3D System



- Enrolment of 4000 images into the database

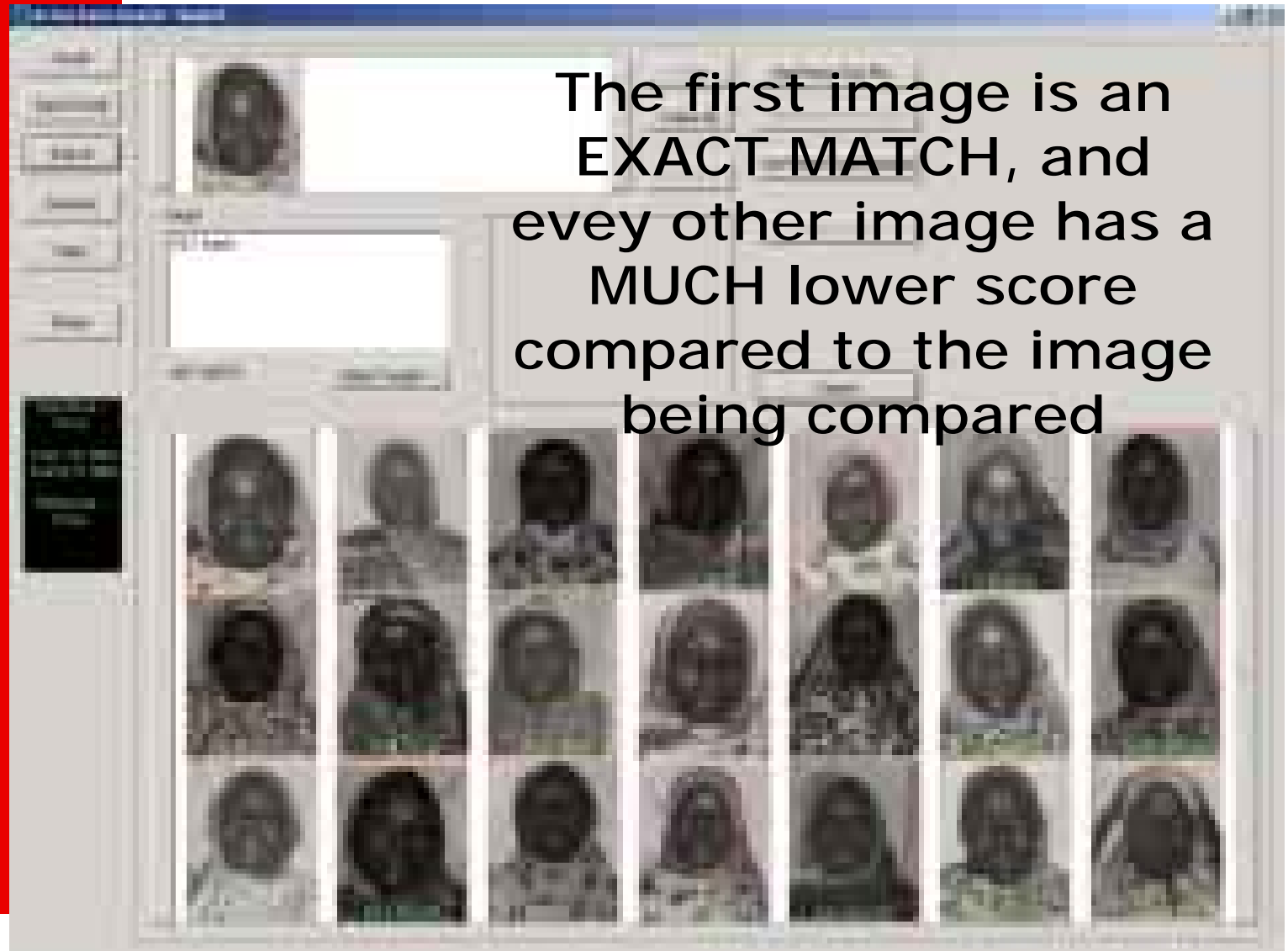


# Facial Recognition

## 3D System

### EXAMPLE 1

- Once enrolled each of the 4000 images in the database was compared to every image in the DATABASE



# Facial Recognition

## 3D System

### EXAMPLE 2

The first image is an **EXACT MATCH**, and every other image has a **MUCH** lower score compared to the image being compared

- The information stored with each image can be reviewed to check for a possible match



# Facial Recognition

## 3D System

### EXAMPLE 3

The scores are normally not close (0.1.007 compared to 0.521), showing the people are very different

IMAGE VALUES



# Facial Recognition

## 3D System

### EXAMPLE 4

This is the **ONLY** possible **MATCH** found, where the scores are **VERY** close (0.969 compared to 0.941)

- THIS IS THE SAME IMAGE, with different eye positions



# Facial Recognition

## 3D System

### EXAMPLE 5

This is an example of a suspected duplicate (1 of 667 images), BUT NO MATCH WAS FOUND.

#### RESULTS FROM POSSIBLE DUPLICATES



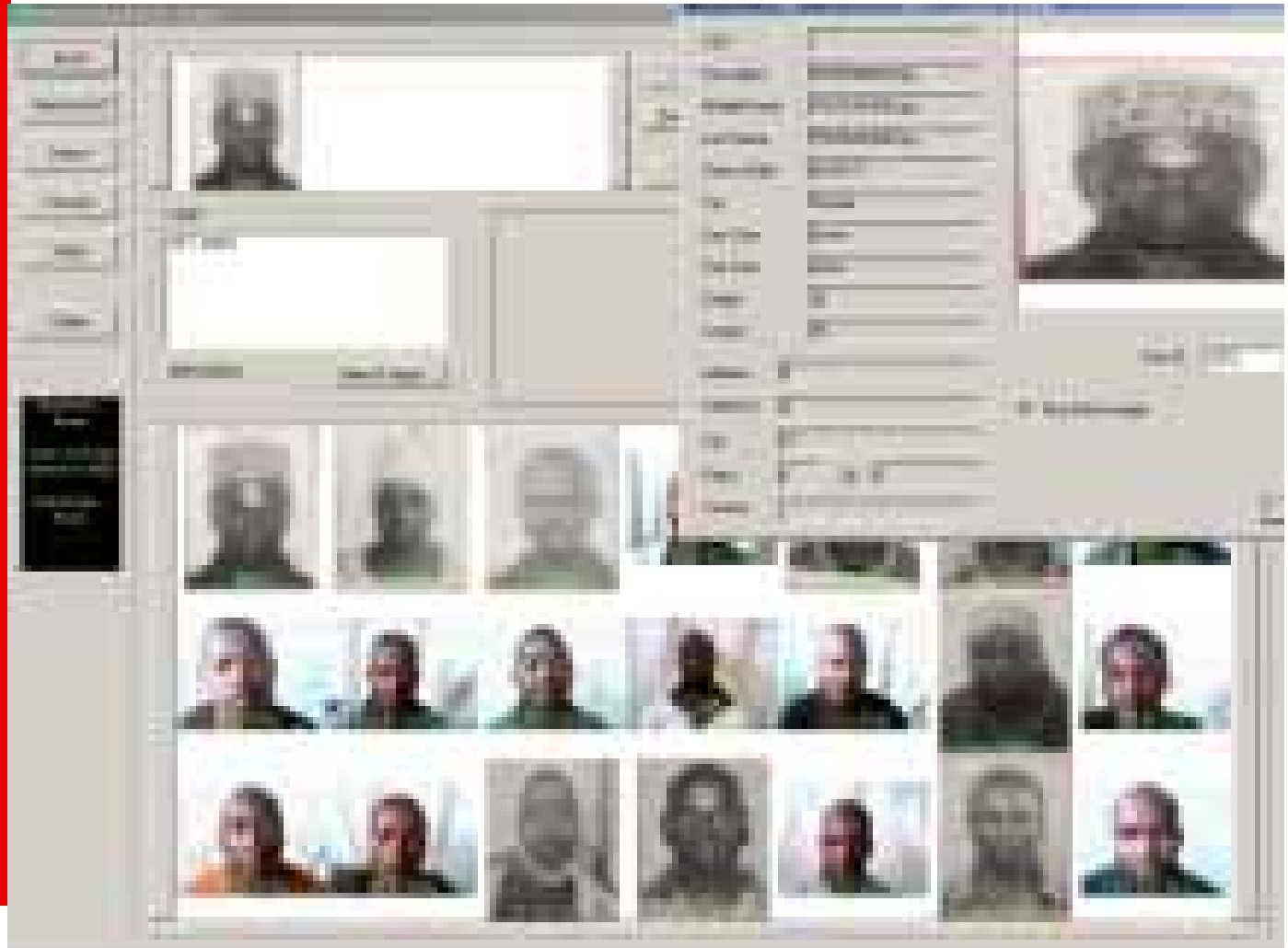
# Facial Recognition

## 3D System

### EXAMPLE 6

This is an example of a suspected duplicate (667 images), BUT NO DUPLICATE MATCHS WERE FOUND.

- The presence of a HAT OR SCARF made no difference to the results obtained

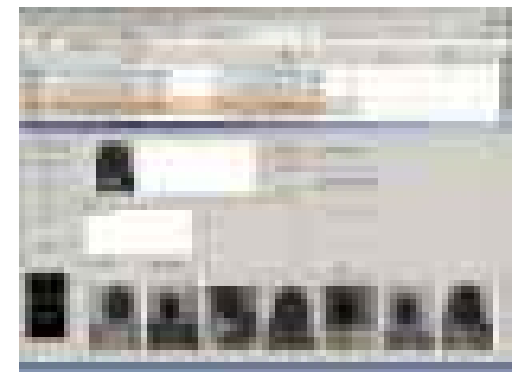
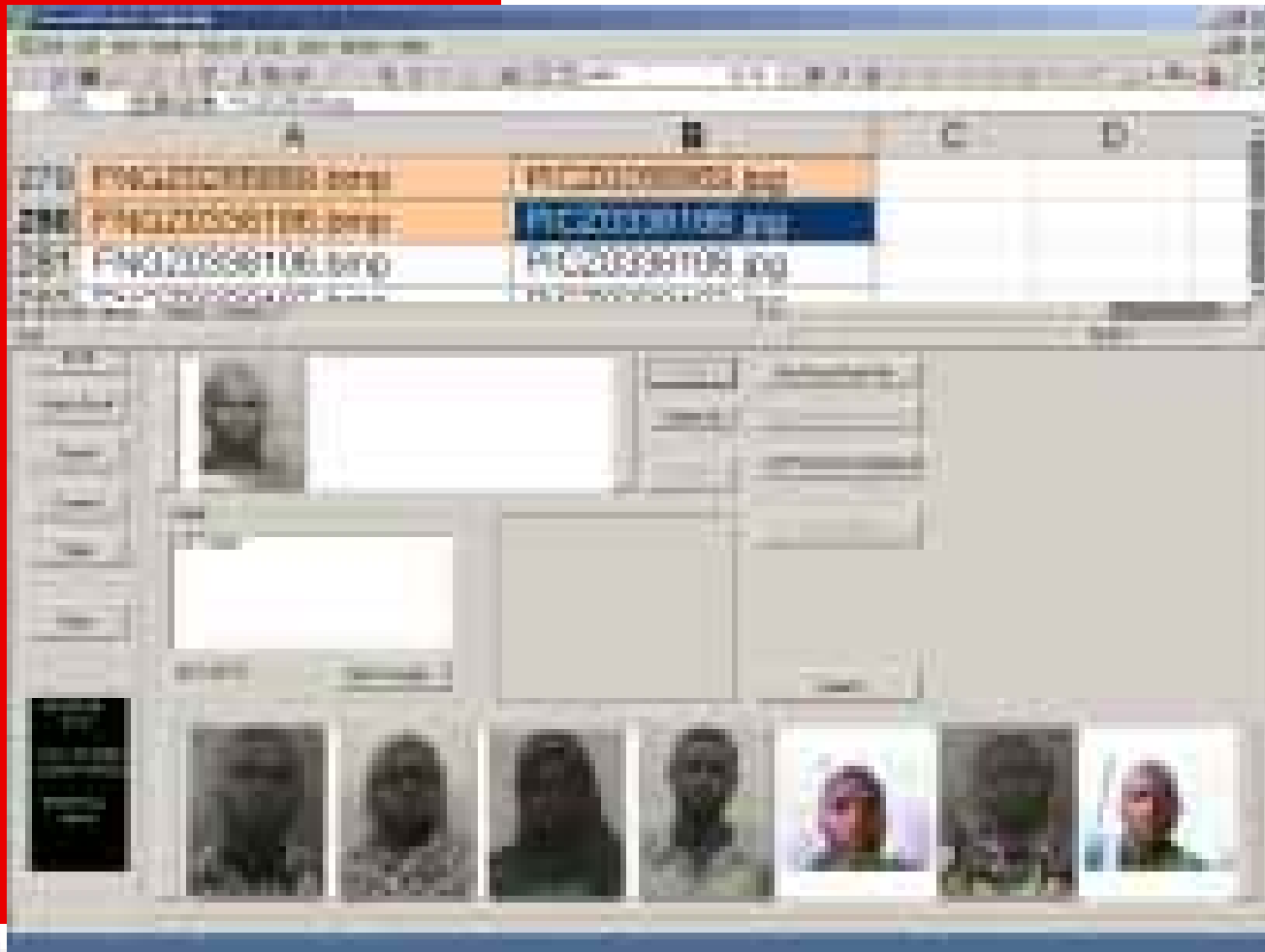


# Facial Recognition

## 3D System

### EXAMPLE 7

Examples (3) of suspected duplicates (667 images), where no match found at all in the DB.



**Requirement: With a sub-set of 31 977 images, check for:**

**Photo rejection- 0.05% (once enhanced)**

**Photo Automatic enrolment – over 70% (with training)**

**Manual enrolment / checking - 28% (less than)**

**Duplication Checking – 0 FOUND**