AMERICAN INTERNATIONAL UNIVERSITY BANGLADESH (AIUB)

FACULTY OF SCIENCE & TECHNOLOGY

Course Title

INTRODUCTION TO DATABASE (2108)

Semester: Spring 23-24

Section: [T]

TITLE

Criminal Face Detection System

Supervised By

JUBAYER AHAMED

Submitted By: Group-04 [CRUD Riders]

Name	ID
JOY, MD. HOSNE JAIM	23-50947-1
RAKIB, MD SANUAR ALAM	23-50982-1
BHUIYAN, KAMRUL HASAN	23-50831-1
SINA, MD. ABDULLA IBNA	23-50331-1
SHAHADOUT, MD. EFAT AL KHALID	23-50823-1

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Criminal Face Detection System

Introduction: A criminal face detection system utilizes advanced computer vision and machine learning techniques to identify individuals involved in criminal activities. Key components include data acquisition from various sources, feature extraction and analysis to create unique facial signatures, and machine learning for pattern recognition. The system classifies new facial images by comparing them with a database of known criminals or suspects, with continuous evaluation and refinement to ensure accuracy. Ethical and legal considerations, such as privacy protection and mitigation of biases, are paramount. In summary, these systems serve as powerful tools for law enforcement, contributing to public safety while upholding principles of privacy and justice.

To support the development and deployment of criminal face detection system, two primary tools:

- **Lucidchart**
- **Database Schema** we are utilized.

Goals:

We aim to enhance public safety by swiftly identifying and apprehending known criminals and suspects, thereby reducing crime rates and fostering a safer environment for all citizens. This proactive approach to law enforcement contributes significantly to community well-being and security. Through the implementation of automated facial recognition technology, we seek to streamline investigative processes, leading to more efficient allocation of resources. This will expedite suspect identification and tracking, ultimately reducing time and effort expended on case resolution. Upholding principles of transparency, accountability, and privacy protection is paramount in our utilization of facial recognition technology.

Contribution to the Tech Sector:

A criminal face detection system project has the potential to contribute significantly to the tech sector by advancing computer vision and machine learning, innovating privacy-preserving technologies, mitigating biases in AI, improving real-time processing and scalability, fostering interdisciplinary collaboration, enhancing data security and integrity, and promoting user-centric design and human-computer interaction.

Target User:

Different types of people and organizations benefit from this type of project. Law enforcement agencies, justice system professionals, victims and communities, government and policymakers, and technology developers and researchers stand to benefit from the implementation of a Criminal Face Detection System project. These stakeholders experience enhanced public safety, improved crime resolution, informed policy-making, and technological innovation. We have also some targeted users. Targeted users of the system include law enforcement personnel, forensic experts, system administrators, legal professionals, and policymakers. They utilize the system for identifying criminals, supporting legal proceedings, managing infrastructure, and informing policy decisions.

Case Study / Scenario

StudentID1: 23-50947-1 Name: JOY, MD. HOSNE JAIM	StudentID4: SINA, MD. ABDULLA IBNA Name: 23-50331-1
StudentID2: 23-50982-1 Name: RAKIB, MD SANUAR ALAM	StudentID5: SHAHADOUT, MD. EFAT AL KHALID Name: 23-50823-1
StudentID3: BHUIYAN, KAMRUL HASAN Name: 23-50831-1	
CO2: Understand the fundamental concepts underlying database systems and gain hands-on experience with ER diagram Case study	
PO-c2: Develop process for complex computer science and engineering problems considering cultural and societal factors.	Marks

Case Study-01:

In response to rising crime rates, the **Vatara** Police Department initiated the implementation of a Criminal Face Detecting System (CFDS) to boost law enforcement efforts. The system, built upon a comprehensive database architecture as per integrates advanced facial recognition technology with real-time surveillance capabilities.

The system stores Criminal information about individuals with criminal records. Each **Criminal** is uniquely identified by their Criminal ID, including Customer Name, Date of Birth(DOB), Gender, Height, Nationality. Criminal's are detected by capturing image through CCTV. Each Image can be associated with multiple detections. **Image** has its unique Image ID, Image URL, Capture Date, and Image Location. Image's **Location** has two parts: City & Country. These images sourced from various surveillance feeds, provide crucial visual data for facial recognition analysis. The Facial Features contains details about the facial features extracted from images. **Facial Feature** extracted from captured images are stored for precise analysis and comparison. Each set of facial features is identified by a Feature ID, Skin Color, Hair Color, Facial Hair. Each Criminal can have multiple detections associated with them. But Each Detection is linked to one Criminal. The system stores **Detection records** instances where a criminal's face is successfully identified within a captured image. Each detection is assigned with an unique Detection ID, Detection Date, Detection Time.

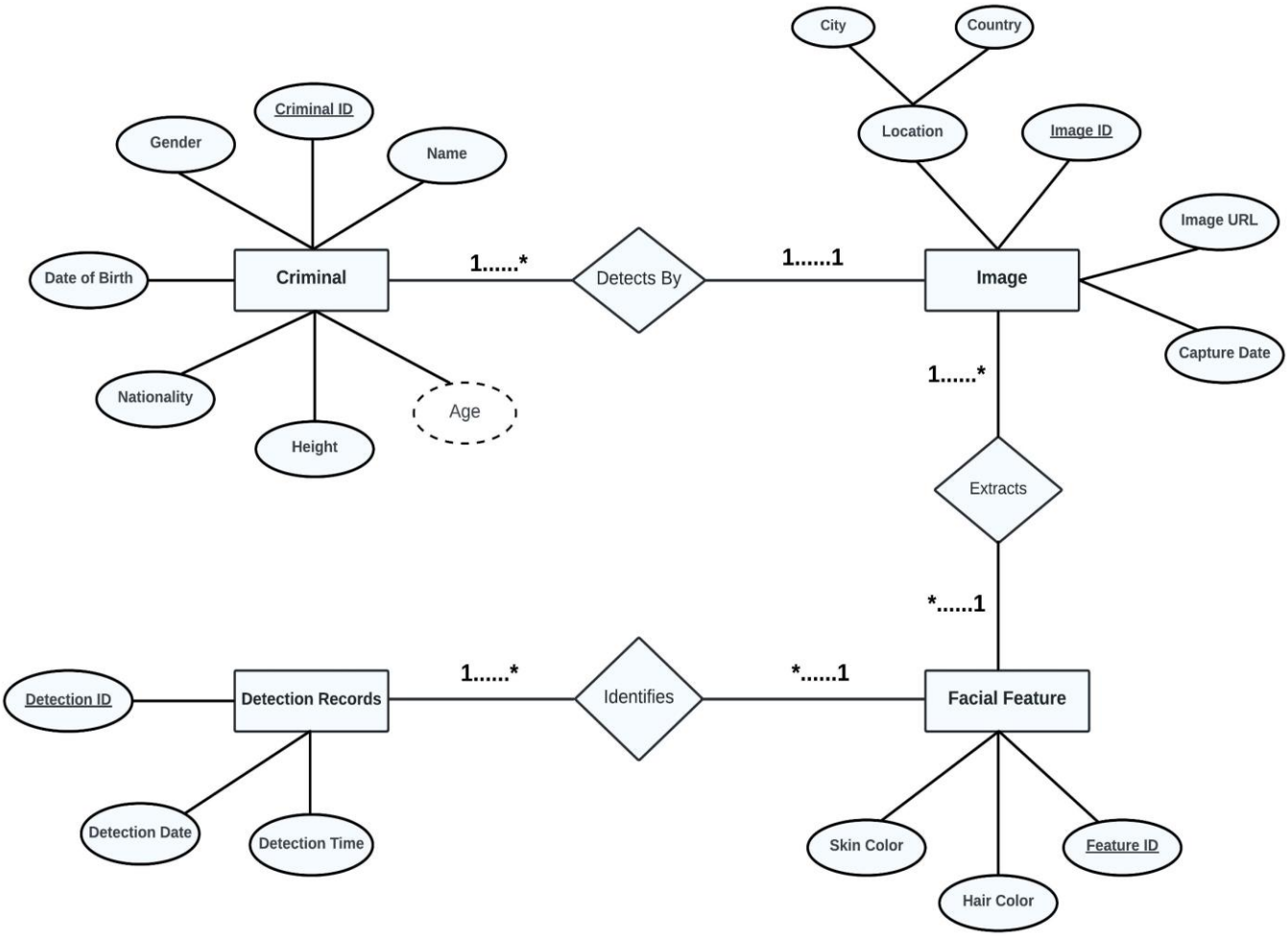
This case study provides a foundational structure for the Criminal Face Detecting System, outlining the entities involved and their relationships, facilitating efficient tracking and identification of criminals through facial recognition technology.

Case Study-02:

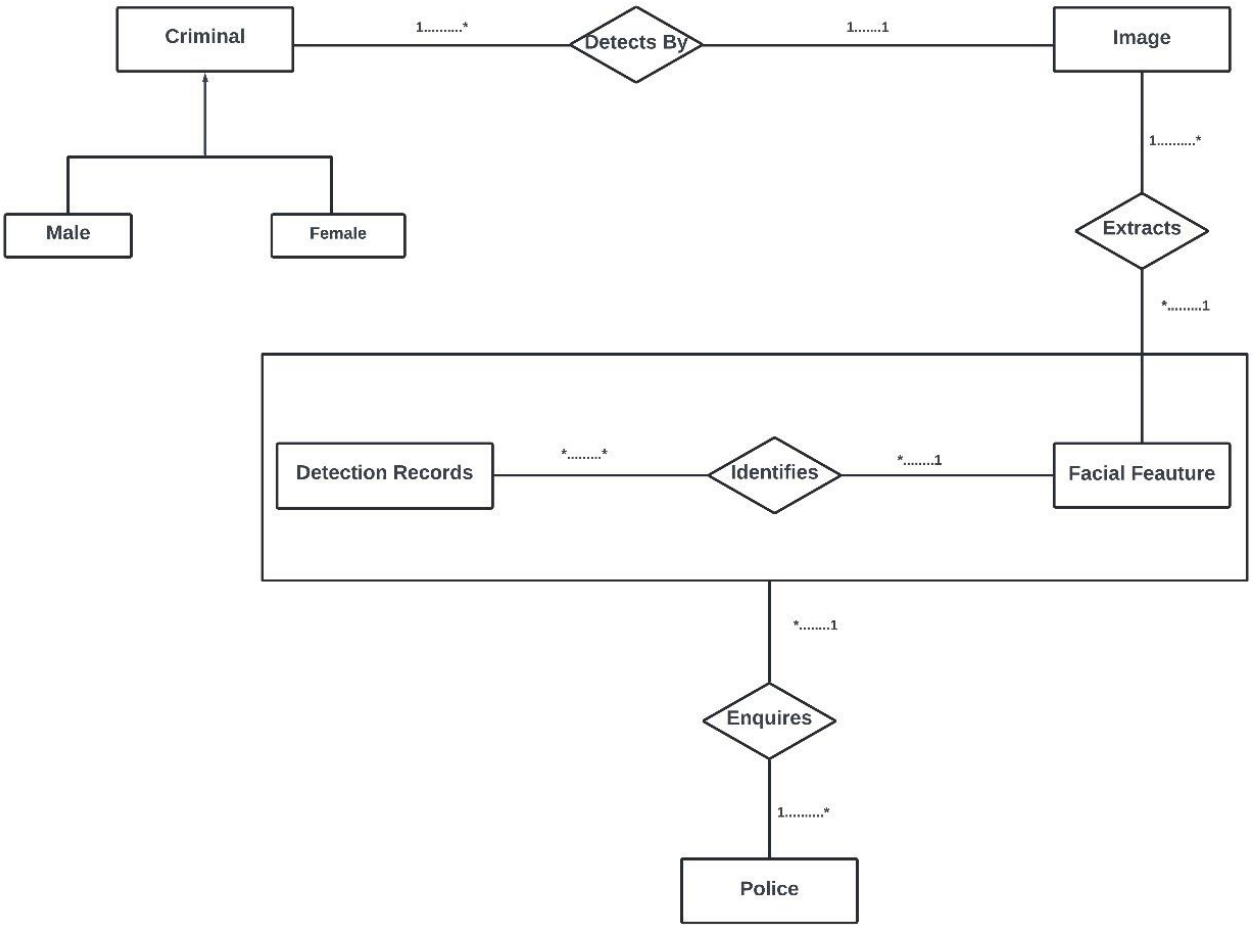
There were more crimes happening, the Vatara Police Department started using a system called the Criminal Face Detection System (CFDS) to help them catch criminals better. This system uses fancy technology to recognize people's faces and can watch things happening in real-time. It keeps information about people who have done crimes before. Criminal's are detected by capturing image through CCTV. The criminal can be separated by male and female. Each Image can be associated with multiple detections.These images sourced from various surveillance feeds, provide crucial visual data for facial recognition analysis. The Facial Features contains details about the facial features extracted from images. **Facial Feature** extracted from captured images are stored for precise analysis and comparison. Each Criminal can have multiple detections associated with them. But Each Detection is linked to one Criminal. The system stores **Detection records** instances where a criminal's face is successfully identified within a captured image. Police can enquire about **Detection Record** and **Facial Feature.**

This story gives a basic plan for the Criminal Face Detecting System. It explains the different parts of the system and how they work together to find criminals using face recognition. By understanding this, it becomes easier to track and catch criminals

ER Diagram



ER Diagram-01: Criminal Face Detection System



ER Diagram-02: Criminal Face Detection System (with Specialization & Aggregation)

Normalization

‘Detects by’ relation:

UNF: Criminal_ID, name, date of birth(DOB), gender, height, nationality, age, location, city, country, image_id, image_url, capture date.

1NF: Criminal_ID, name, date of birth(DOB), gender, height, nationality, age, location, city, country, image_id, image_url, capture date.

2NF:

1) Criminal_ID (pk), name, date of birth(DOB), gender, height, nationality, age.

2) Image_ID (pk), image_url, capture date, city, country.

3) Criminal_ID (pk), Image_ID (fk).

3NF:

1) Criminal_ID (pk), name, date of birth(DOB), gender, height, nationality, age.

2) Image_ID (pk), image_url, capture date, city.

3) Criminal_ID (pk), Image_ID (fk).

4) City, country.

‘Extracts’ relation:

UNF: Location, city, country, image_id, image_url, capture date, feature_ID, hair color, skin color.

1NF: Location, city, country, image_id, image_url, capture date, feature_ID, hair color, skin color.

2NF:

1) Image_ID (pk), image_url, capture date, city, country.

2) Feature_ID (pk), hair color, skin color.

3) Image_ID (pk), Feature_ID(fk).

3NF:

1) Image_ID (pk), image_url, capture date, city.

2) Feature_ID (pk), hair color, skin color.

3) Image_ID (pk), Feature_ID(fk).

4) City, country.

‘Identifies’ relation:

UNF: Feature_ID, hair color, skin color, detection_ID, detection time, detection date.

1NF: Feature_ID, hair color, skin color, detection_ID, detection time, detection date.

2NF:

1) Feature_ID (pk), hair color, skin color.

2) Detection_ID (pk), detection time, detection date.

3) Feature_ID (pk), Detection_ID (fk).

3NF:

1) Feature_ID (pk), hair color, skin color.

2) Detection_ID (pk), detection time, detection date.

3) Feature_ID (pk), Detection_ID (fk).

Finalization

1) Criminal_ID (pk), Image_ID (fk), Name, Date_of_Birth, Gender, Height, Nationality, Age.

2) Image_ID (pk), Feature_ID(fk), Image_URL, Capture_Date, City.

3) Feature_ID (pk), Detection_ID(fk), Hair_Color, Skin_Color.

4) Detection_ID (pk), Detection_Time, Detection_Date.

5) City, Country.

Table Creation (DDL Operations)

StudentID1: 23-50947-1 Name: JOY, MD. HOSNE JAIM	StudentID4: SINA, MD. ABDULLA IBNA Name: 23-50331-1
StudentID2: 23-50982-1 Name: RAKIB, MD SANUAR ALAM	StudentID5: SHAHADOUT, MD. EFAT AL KHALID Name: 23-50823-1
StudentID3: BHUIYAN, KAMRUL HASAN Name: 23-50831-1	
CO4: Creating DML, DDL using Oracle and connection with ODBC/JDBC for existing JAVA application	
PO-e-2: Use modern engineering and IT tools for prediction and modeling of complex computer science and engineering problem	Marks

Table 'Criminal Information (Cr_Info)':

Autocommit Display 10

```
Create Table Cr_Info(
Criminal_ID number(20) NOT NULL Primary Key,
Image_ID number(20) NOT NULL,
Name varchar2(255) NOT NULL,
Height varchar2(20),
Gender varchar2(20) NOT NULL,
Date_Of_Birth date NOT NULL,
Age number(3) NOT NULL,
Nationality varchar2(255) NOT NULL,
CONSTRAINT Cr_Info_fk Foreign Key(Image_ID) References Img_Info(Image_ID)
);
DESC Cr_Info;
```

Results Explain Describe Saved SQL History

Object Type **TABLE** Object **CR_INFO**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CR_INFO	CRIMINAL_ID	Number	-	20	0	1	-	-	-
	IMAGE_ID	Number	-	20	0	-	-	-	-
	NAME	Varchar2	255	-	-	-	-	-	-
	HEIGHT	Varchar2	20	-	-	-	✓	-	-
	GENDER	Varchar2	20	-	-	-	-	-	-
	DATE_OF_BIRTH	Date	7	-	-	-	-	-	-
	AGE	Number	-	3	0	-	-	-	-
	NATIONALITY	Varchar2	255	-	-	-	-	-	-

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Table ‘Image Information (Img_Info)’:

Autocommit Display 10

```
Create Table Img_Info(
Image_ID number(20) NOT NULL Primary Key,
Feature_ID number(20) NOT NULL,
Image_URL varchar2(255) NOT NULL,
Capture_Date date NOT NULL,
City varchar2(255) NOT NULL,
Constraint Img_Info_fk Foreign Key(Feature_ID) References F_Info(Feature_ID)
);
DESC Img_Info;
```

Results Explain Describe Saved SQL History

Object Type **TABLE** Object **IMG_INFO**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
IMG_INFO	IMAGE_ID	Number	-	20	0	1	-	-	-
	FEATURE_ID	Number	-	20	0	-	-	-	-
	IMAGE_URL	Varchar2	255	-	-	-	-	-	-
	CAPTURE_DATE	Date	7	-	-	-	-	-	-
	CITY	Varchar2	255	-	-	-	-	-	-

1 - 5

Table ‘Feature Information (F_Info)’:

Autocommit Display 10

```
Create Table F_Info(
Feature_ID number(20) NOT NULL Primary Key,
Detection_ID number(20) NOT NULL,
Hair_Color varchar2(255),
Skin_Color varchar2(255),
Constraint F_Info_fk Foreign Key(Detection_ID) References D_Info(Detection_ID)
);
DESC F_Info;
```

Results Explain Describe Saved SQL History

Object Type **TABLE** Object **F_INFO**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
F_INFO	FEATURE_ID	Number	-	20	0	1	-	-	-
	DETECTION_ID	Number	-	20	0	-	-	-	-
	HAIR_COLOR	Varchar2	255	-	-	-	✓	-	-
	SKIN_COLOR	Varchar2	255	-	-	-	✓	-	-

1 - 4

Table ‘Detection Information (D_Info)’:

Autocommit Display 10

```
Create Table D_Info(
Detection_ID number(20) NOT NULL Primary Key,
Detection_Time varchar2(100) NOT NULL,
Detection_Date date NOT NULL
);
DESC D_Info;
```

Results Explain Describe Saved SQL History

Object Type **TABLE** Object **D_INFO**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
D_INFO	DETECTION_ID	Number	-	20	0	1	-	-	-
	DETECTION_TIME	Varchar2	100	-	-	-	-	-	-
	DETECTION_DATE	Date	7	-	-	-	-	-	-

1 - 3

Table ‘Address’:

Autocommit Display 10

```
Create Table Address(
City varchar2(255) NOT NULL,
Country varchar2(255)
);
DESC Address;
```

Results Explain Describe Saved SQL History

Object Type **TABLE** Object **ADDRESS**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ADDRESS	CITY	Varchar2	255	-	-	-	-	-	-
	COUNTRY	Varchar2	255	-	-	-	✓	-	-

1 - 2

Inserted Values in the tables

Insert into 'Criminal Information':

Autocommit Display 10

```
Insert Into Cr_Info Values(775,2301,'NATHAN BOM','5.4','MALE','11-JAN-92',32,'BANGLADESHI');
Insert Into Cr_Info Values(774,2303,'KALAM',NULL,'MALE','03-DEC-79',45,'BANGLADESHI');
Insert Into Cr_Info Values(776,2306,'ROCKY','5.7','MALE','15-FEB-96',28,'BANGLADESHI');
Insert Into Cr_Info Values(770,2307,'RASEL','5.8','MALE','28-AUG-94',30,'BANGLADESHI');
Insert Into Cr_Info Values(779,2308,'SABILA','5.2','FEMALE','31-MAY-89',35,'BANGLADESHI');
Insert Into Cr_Info Values(771,2309,'KISHOR','5.0','MALE','11-NOV-92',32,'NEPALI');
Insert Into Cr_Info Values(780,2400,'ROCK','5.9','MALE','22-APR-91',33,'INDIAN');
Insert Into Cr_Info Values(797,2305,'IQBAL','5.8','MALE','09-JAN-97',27,'BANGLADESHI');
Insert Into Cr_Info Values(799,2304,'LOLITA',NULL,'FEMALE','24-DEC-91',33,'BANGLADESHI');
Insert Into Cr_Info Values(722,2302,'PAPIYA','5.3','FEMALE','03-JUN-83',41,'BANGLADESHI');
SELECT * FROM CR_INFO;
```

Results Explain Describe Saved SQL History

CRIMINAL_ID	IMAGE_ID	NAME	HEIGHT	GENDER	DATE_OF_BIRTH	AGE	NATIONALITY
775	2301	NATHAN BOM	5.4	MALE	11-JAN-92	32	BANGLADESHI
774	2303	KALAM	-	MALE	03-DEC-79	45	BANGLADESHI
776	2306	ROCKY	5.7	MALE	15-FEB-96	28	BANGLADESHI
770	2307	RASEL	5.8	MALE	28-AUG-94	30	BANGLADESHI
779	2308	SABILA	5.2	FEMALE	31-MAY-89	35	BANGLADESHI
771	2309	KISHOR	5.0	MALE	11-NOV-92	32	NEPALI
780	2400	ROCK	5.9	MALE	22-APR-91	33	INDIAN
797	2305	IQBAL	5.8	MALE	09-JAN-97	27	BANGLADESHI
799	2304	LOLITA	-	FEMALE	24-DEC-91	33	BANGLADESHI
722	2302	PAPIYA	5.3	FEMALE	03-JUN-83	41	BANGLADESHI

10 rows returned in 0.00 seconds CSV Export

Insert into ‘Image Information’:

Autocommit Display 10

```
Insert Into Img_Info Values(2301,5512,'https://ibb.co/9WNq0xP','31-MAR-2024','BANDARBAN');
Insert Into Img_Info Values(2303,3354,'https://ibb.co/LRmNMrB','08-FEB-24','DHAKA SOUTH');
Insert Into Img_Info Values(2306,2212,'https://ibb.co/tMCR9tr','15-JAN-24','CHATTOGRAM');
Insert Into Img_Info Values(2307,1012,'https://ibb.co/ZLsY5F3','19-FEB-24','KHULNA');
Insert Into Img_Info Values(2308,1124,'https://ibb.co/TkPQF84','31-JAN-24','SYLHET');
Insert Into Img_Info Values(2309,1515,'https://ibb.co/b7TRt4W','20-DEC-23','BORISHAL');
Insert Into Img_Info Values(2400,1622,'https://ibb.co/TvMgbFk','06-MAR-24','NOAKHALI');
Insert Into Img_Info Values(2305,1002,'https://ibb.co/4N1sGWm','22-APR-24','COX BAZAR');
Insert Into Img_Info Values(2304,4111,'https://ibb.co/PtfSg4J','27-NOV-23','DHAKA NORTH');
Insert Into Img_Info Values(2302,3310,'https://ibb.co/GT1p7T4','05-AUG-23','CUMMILLA');
SELECT * FROM IMG_INFO;
```

Results Explain Describe Saved SQL History

IMAGE_ID	FEATURE_ID	IMAGE_URL	CAPTURE_DATE	CITY
2301	5512	https://ibb.co/9WNq0xP	31-MAR-24	BANDARBAN
2303	3354	https://ibb.co/LRmNMrB	08-FEB-24	DHAKA SOUTH
2306	2212	https://ibb.co/tMCR9tr	15-JAN-24	CHATTOGRAM
2307	1012	https://ibb.co/ZLsY5F3	19-FEB-24	KHULNA
2308	1124	https://ibb.co/TkPQF84	31-JAN-24	SYLHET
2309	1515	https://ibb.co/b7TRt4W	20-DEC-23	BORISHAL
2400	1622	https://ibb.co/TvMgbFk	06-MAR-24	NOAKHALI
2305	1002	https://ibb.co/4N1sGWm	22-APR-24	COX BAZAR
2304	4111	https://ibb.co/PtfSg4J	27-NOV-23	DHAKA NORTH
2302	3310	https://ibb.co/GT1p7T4	05-AUG-23	CUMMILLA

10 rows returned in 0.02 seconds CSV Export

Insert into ‘Feature Information’:

Autocommit Display 10

```
Insert Into F_Info Values(5512,106,'BLACK','LIGHT BROWN');
Insert Into F_Info Values(3354,101,'GRAY','WHITE');
Insert Into F_Info Values(2212,107,'OMBRE',NULL);
Insert Into F_Info Values(1012,103,'COPPER','LIGHT BROWN');
Insert Into F_Info Values(1124,102,'BLACK','FAIR');
Insert Into F_Info Values(1515,105,NULL,'OLIVE');
Insert Into F_Info Values(1622,104,'BROWN','BROWN');
Insert Into F_Info Values(1002,109,'BLACK','WHITE');
Insert Into F_Info Values(4111,110,NULL,'MODERATE BROWN');
Insert Into F_Info Values(3310,108,'ASH','MEDIUM WHITE');
SELECT * FROM F_INFO;
```

Results Explain Describe Saved SQL History

FEATURE_ID	DETECTION_ID	HAIR_COLOR	SKIN_COLOR
5512	106	BLACK	LIGHT BROWN
3354	101	GRAY	WHITE
2212	107	OMBRE	-
1012	103	COPPER	LIGHT BROWN
1124	102	BLACK	FAIR
1515	105	-	OLIVE
1622	104	BROWN	BROWN
1002	109	BLACK	WHITE
4111	110	-	MODERATE BROWN
3310	108	ASH	MEDIUM WHITE

10 rows returned in 0.02 seconds CSV Export

Insert into 'Detection Information':

Autocommit Display 10

```
Insert Into D_Info Values(106,'01:28PM','05-APR-24');
Insert Into D_Info Values(101,'03:08PM','12-FEB-24');
Insert Into D_Info Values(107,'07:12PM','18-JAN-24');
Insert Into D_Info Values(103,'02:42PM','21-FEB-24');
Insert Into D_Info Values(102,'03:27AM','02-FEB-24');
Insert Into D_Info Values(105,'05:13PM','29-DEC-23');
Insert Into D_Info Values(104,'10:18AM','07-MAR-24');
Insert Into D_Info Values(109,'11:58PM','24-APR-24');
Insert Into D_Info Values(110,'01:28AM','30-NOV-23');
Insert Into D_Info Values(108,'09:32PM','11-AUG-23');
SELECT * FROM D_INFO;
```

Results Explain Describe Saved SQL History

DETECTION_ID	DETECTION_TIME	DETECTION_DATE
106	01:28PM	05-APR-24
101	03:08PM	12-FEB-24
107	07:12PM	18-JAN-24
103	02:42PM	21-FEB-24
102	03:27AM	02-FEB-24
105	05:13PM	29-DEC-23
104	10:18AM	07-MAR-24
109	11:58PM	24-APR-24
110	01:28AM	30-NOV-23
108	09:32PM	11-AUG-23

10 rows returned in 0.00 seconds CSV Export

Insert into 'Address':

Autocommit Display 10

```
Insert Into Address Values('BANDARBAN','BANGLADESH');
Insert Into Address Values('DHAKA SOUTH','BANGLADESH');
Insert Into Address Values('CHATTOGRAM',NULL);
Insert Into Address Values('KHULNA','BANGLADESH');
Insert Into Address Values('SYLHET','BANGLADESH');
Insert Into Address Values('BORISHAL',NULL);
Insert Into Address Values('NOAKHALI','BANGLADESH');
Insert Into Address Values('COX BAZAR',NULL);
Insert Into Address Values('DHAKA NORTH','BANGLADESH');
Insert Into Address Values('CUMMILLA','BANGLADESH');
SELECT * FROM ADDRESS;
```

Results Explain Describe Saved SQL History

CITY	COUNTRY
BANDARBAN	BANGLADESH
DHAKA SOUTH	BANGLADESH
CHATTOGRAM	-
KHULNA	BANGLADESH
SYLHET	BANGLADESH
BARISHAL	-
NOAKHALI	BANGLADESH
COX BAZAR	-
DHAKA NORTH	BANGLADESH
GAZIPUR	BANGLADESH

10 rows returned in 0.02 seconds CSV Export

Query Test in DB

a) Select CRIMINAL_ID,NAME,HEIGHT from CR_INFO where NATIONALITY ='BANGLADESHI';

Results | Explain | Describe | Saved SQL | History

CRIMINAL_ID	NAME	HEIGHT
775	NATHAN BOM	5.4
774	KALAM	-
776	ROCKY	5.7
770	RASEL	5.8
779	SABILA	5.2
797	IQBAL	5.8
799	LOLITA	-
722	PAPIYA	5.3

8 rows returned in 0.00 seconds CSV Export

Select NAME,GENDER,AGE from CR_INFO where name ='KALAM';

Results | Explain | Describe | Saved SQL | History

NAME	GENDER	AGE
KALAM	MALE	45

1 rows returned in 0.00 seconds CSV Export

Select NAME ||' '|| 'is' || ' ' || AGE|| ' ' || 'years old.' from CR_INFO;

Results | Explain | Describe | Saved SQL | History

NAME||''||'IS'||''||AGE||''||'YEARSOLD.'
RASEL is 30 years old.

1 rows returned in 0.00 seconds CSV Export

Select DISTINCT NATIONALITY from CR_INFO;

Results | Explain | Describe | Saved SQL | History

NATIONALITY
INDIAN
NEPALI
BANGLADESHI

3 rows returned in 0.00 seconds CSV Export

b) Select NAME,IMAGE_ID from CR_INFO where name LIKE('__S%');

Results Explain Describe Saved SQL History

NAME	IMAGE_ID
RASEL	2307
KISHOR	2309

2 rows returned in 0.00 seconds CSV Export

Select NAME,IMAGE_ID,DATE_OF_BIRTH from CR_INFO where name LIKE('%A');

Results Explain Describe Saved SQL History

NAME	IMAGE_ID	DATE_OF_BIRTH
SABILA	2308	31-MAY-89
LOLITA	2304	24-DEC-91
PAPIYA	2302	03-JUN-83

3 rows returned in 0.02 seconds CSV Export

c) Select NAME,AGE,HEIGHT from CR_INFO where age>35 AND height<5.5;

Results Explain Describe Saved SQL History

NAME	AGE	HEIGHT
PAPIYA	41	5.3

1 rows returned in 0.00 seconds CSV Export

Select NAME,IMAGE_ID,HEIGHT from CR_INFO where image_id<2308 OR height>5.9;

Results Explain Describe Saved SQL History

NAME	IMAGE_ID	HEIGHT
NATHAN BOM	2301	5.4
KALAM	2303	-
ROCKY	2306	5.7
RASEL	2307	5.8
IQBAL	2305	5.8
LOLITA	2304	-
PAPIYA	2302	5.3

7 rows returned in 0.02 seconds CSV Export

Select NAME from CR_INFO where gender <> 'MALE';

Results Explain Describe Saved SQL History

NAME
SABILA
LOLITA
PAPIYA

3 rows returned in 0.02 seconds CSV Export

d) Select * from CR_INFO Order by CRIMINAL_ID desc, IMAGE_ID asc;

Results Explain Describe Saved SQL History

CRIMINAL_ID	IMAGE_ID	NAME	HEIGHT	GENDER	DATE_OF_BIRTH	AGE	NATIONALITY
799	2304	LOLITA	-	FEMALE	24-DEC-91	33	BANGLADESHI
797	2305	IQBAL	5.8	MALE	09-JAN-97	27	BANGLADESHI
780	2400	ROCK	5.9	MALE	22-APR-91	33	INDIAN
779	2308	SABILA	5.2	FEMALE	31-MAY-89	35	BANGLADESHI
776	2306	ROCKY	5.7	MALE	15-FEB-96	28	BANGLADESHI
775	2301	NATHAN BOM	5.4	MALE	11-JAN-92	32	BANGLADESHI
774	2303	KALAM	-	MALE	03-DEC-79	45	BANGLADESHI
771	2309	KISHOR	5.0	MALE	11-NOV-92	32	NEPALI
770	2307	RASEL	5.8	MALE	28-AUG-94	30	BANGLADESHI
722	2302	PAPIYA	5.3	FEMALE	03-JUN-83	41	BANGLADESHI

10 rows returned in 0.02 seconds CSV Export

Select * from IMG_INFO Order by IMAGE_ID asc;

Results Explain Describe Saved SQL History

IMAGE_ID	FEATURE_ID	IMAGE_URL	CAPTURE_DATE	CITY
2301	5512	https://ibb.co/9WNq0xP	31-MAR-24	BANDARBAN
2302	3310	https://ibb.co/GT1p7T4	05-AUG-23	CUMMILLA
2303	3354	https://ibb.co/LRmNMrB	08-FEB-24	DHAKA SOUTH
2304	4111	https://ibb.co/PtfSg4J	27-NOV-23	DHAKA NORTH
2305	1002	https://ibb.co/4N1sGWm	22-APR-24	COX BAZAR
2306	2212	https://ibb.co/tMCR9tr	15-JAN-24	CHATTOGRAM
2307	1012	https://ibb.co/ZLsY5F3	19-FEB-24	KHULNA
2308	1124	https://ibb.co/TkPQF84	31-JAN-24	SYLHET
2309	1515	https://ibb.co/b7TRt4W	20-DEC-23	BORISHAL
2400	1622	https://ibb.co/TvMgbFk	06-MAR-24	NOAKHALI

10 rows returned in 0.03 seconds CSV Export

e) Select INITCAP(name),LOWER(gender) from CR_INFO;

Results | Explain | Describe | Saved SQL | History

INITCAP(NAME)	LOWER(GENDER)
Nathan Bom	male
Kalam	male
Rocky	male
Rasel	male
Sabila	female
Kishor	male
Rock	male
Iqbal	male
Lolita	female
Papiya	female

10 rows returned in 0.00 seconds CSV Export

Select CRIMINAL_ID, NAME, GENDER FROM CR_INFO WHERE LOWER (NAME) = 'kalam';

Results | Explain | Describe | Saved SQL | History

CRIMINAL_ID	NAME	GENDER
774	KALAM	MALE

1 rows returned in 0.00 seconds CSV Export

f) Select NAME, CONCAT(name, age), LENGTH(name), INSTR(Name, 'A') from Cr_Info;

Results | Explain | Describe | Saved SQL | History

NAME	CONCAT(NAME,AGE)	LENGTH(NAME)	INSTR(NAME,'A')
NATHAN BOM	NATHAN BOM32	10	2
KALAM	KALAM45	5	2
ROCKY	ROCKY28	5	0
RASEL	RASEL30	5	2
SABILA	SABILA35	6	2
KISHOR	KISHOR32	6	0
ROCK	ROCK33	4	0
IQBAL	IQBAL27	5	4
LOLITA	LOLITA33	6	6
PAPIYA	PAPIYA41	6	2

10 rows returned in 0.03 seconds CSV Export

Select CITY, CAPTURE_DATE, CONCAT(Capture_Date, City), LENGTH(City), INSTR(City, 'H') from IMG_INFO;

Results Explain Describe Saved SQL History

CITY	CAPTURE_DATE	CONCAT(CAPTURE_DATE,CITY)	LENGTH(CITY)	INSTR(CITY,'H')
BANDARBAN	31-MAR-24	31-MAR-24BANDARBAN	9	0
DHAKA SOUTH	08-FEB-24	08-FEB-24DHAKA SOUTH	11	2
CHATTOGRAM	15-JAN-24	15-JAN-24CHATTOGRAM	10	2
KHULNA	19-FEB-24	19-FEB-24KHULNA	6	2
SYLHET	31-JAN-24	31-JAN-24SYLHET	6	4
BORISHAL	20-DEC-23	20-DEC-23BORISHAL	8	6
NOAKHALI	06-MAR-24	06-MAR-24NOAKHALI	8	5
COX BAZAR	22-APR-24	22-APR-24COX BAZAR	9	0
DHAKA NORTH	27-NOV-23	27-NOV-23DHAKA NORTH	11	2
CUMMILLA	05-AUG-23	05-AUG-23CUMMILLA	8	0

10 rows returned in 0.00 seconds CSV Export

g) Select ADD_MONTHS ('11-JAN-92', 2) from CR_INFO;

Results Explain Describe Saved SQL History

ADD_MONTHS('11-JAN-92',2)
11-MAR-92
11-MAR-92
11-MAR-92
11-MAR-92
11-MAR-92
11-MAR-92
11-MAR-92
11-MAR-92
11-MAR-92
11-MAR-92

10 rows returned in 0.01 seconds CSV Export

Select NEXT_DAY('11-JAN-92', 'SATURDAY') from CR_INFO;

Results Explain Describe Saved SQL History

NEXT_DAY('11-JAN-92','SATURDAY')
18-JAN-92
18-JAN-92
18-JAN-92
18-JAN-92
18-JAN-92
18-JAN-92
18-JAN-92
18-JAN-92
18-JAN-92
18-JAN-92

10 rows returned in 0.00 seconds CSV Export

h) Select name,age,DECODE(name,'ROCKY',age*1.05,'RASEL',age*1.03,'SABILA',age*1.04,age)REVISED_AGE from CR_INFO;

Results | Explain | Describe | Saved SQL | History

NAME	AGE	REVISED_AGE
NATHAN BOM	32	32
KALAM	45	45
ROCKY	28	29.4
RASEL	30	30.9
SABILA	35	36.4
KISHOR	32	32
ROCK	33	33
IQBAL	27	27
LOLITA	33	33
PAPIYA	41	41

10 rows returned in 0.01 seconds CSV Export

i) Select MIN(AGE) from CR_INFO;

Results | Explain | Describe | Saved SQL | History

MIN(AGE)
27

1 rows returned in 0.00 seconds CSV Export

Select MAX(AGE) from CR_INFO;

Results | Explain | Describe | Saved SQL | History

MAX(AGE)
45

1 rows returned in 0.00 seconds CSV Export

Select GENDER, AVG(HEIGHT) from CR_INFO group by GENDER;

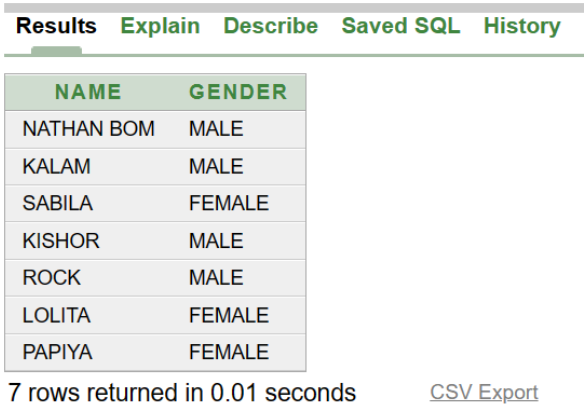
Results | Explain | Describe | Saved SQL | History

GENDER	AVG(HEIGHT)
MALE	5.6
FEMALE	5.25

2 rows returned in 0.00 seconds CSV Export

Single Row Sub-Query:

Select NAME,GENDER from Cr_Info WHERE age > (Select AGE from Cr_Info WHERE Criminal_ID = 770);

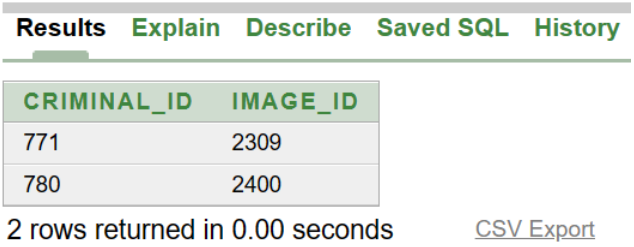


Results Explain Describe Saved SQL History

NAME	GENDER
NATHAN BOM	MALE
KALAM	MALE
SABILA	FEMALE
KISHOR	MALE
ROCK	MALE
LOLITA	FEMALE
PAPIYA	FEMALE

7 rows returned in 0.01 seconds CSV Export

Select Criminal_ID, Image_ID from Cr_Info WHERE Nationality != (Select Nationality from Cr_Info WHERE Criminal_ID = 775);



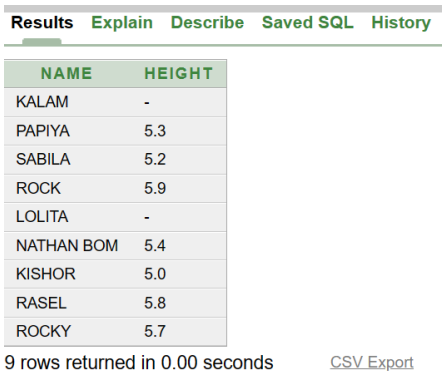
Results Explain Describe Saved SQL History

CRIMINAL_ID	IMAGE_ID
771	2309
780	2400

2 rows returned in 0.00 seconds CSV Export

Multiple Row Sub-Query:

Select NAME,HEIGHT from Cr_Info WHERE age > ANY (Select AGE from Cr_Info Group By Age);



Results Explain Describe Saved SQL History

NAME	HEIGHT
KALAM	-
PAPIYA	5.3
SABILA	5.2
ROCK	5.9
LOLITA	-
NATHAN BOM	5.4
KISHOR	5.0
RASEL	5.8
ROCKY	5.7

9 rows returned in 0.00 seconds CSV Export

Select IMAGE_ID, NAME, AGE, GENDER from Cr_Info WHERE HEIGHT < ANY (Select AVG(HEIGHT) from Cr_Info Group By HEIGHT);

Results Explain Describe Saved SQL History

IMAGE_ID	NAME	AGE	GENDER
2309	KISHOR	32	MALE
2308	SABILA	35	FEMALE
2302	PAPIYA	41	FEMALE
2301	NATHAN BOM	32	MALE
2306	ROCKY	28	MALE
2307	RASEL	30	MALE
2305	IQBAL	27	MALE

7 rows returned in 0.00 seconds CSV Export

Equi Join:

Select CR_INFO.Criminal_ID, CR_INFO.NAME, IMG_INFO.IMAGE_URL, IMG_INFO.City from IMG_INFO, CR_INFO Where CR_INFO.IMAGE_ID = IMG_INFO.Image_ID;

Results Explain Describe Saved SQL History

CRIMINAL_ID	NAME	IMAGE_URL	CITY
775	NATHAN BOM	https://ibb.co/9WNq0xP	BANDARBAN
774	KALAM	https://ibb.co/LRmNMrB	DHAKA SOUTH
776	ROCKY	https://ibb.co/tMCR9tr	CHATTOGRAM
770	RASEL	https://ibb.co/ZLsY5F3	KHULNA
779	SABILA	https://ibb.co/TkPQF84	SYLHET
771	KISHOR	https://ibb.co/b7TRt4W	BORISHAL
780	ROCK	https://ibb.co/TvMgbFk	NOAKHALI
797	IQBAL	https://ibb.co/4N1sGWm	COX BAZAR
799	LOLITA	https://ibb.co/PtfSg4J	DHAKA NORTH
722	PAPIYA	https://ibb.co/GT1p7T4	CUMMILLA

10 rows returned in 0.00 seconds CSV Export

Non Equi Join:

Select dd.DETECTION_ID, fi.HAIR_COLOR, fi.SKIN_COLOR from D_INFO dd, F_INFO fi where dd.DETECTION_ID in fi.DETECTION_ID;

Results Explain Describe Saved SQL History

DETECTION_ID	HAIR_COLOR	SKIN_COLOR
106	BLACK	LIGHT BROWN
101	GRAY	WHITE
107	OMBRE	-
103	COPPER	LIGHT BROWN
102	BLACK	FAIR
105	-	OLIVE
104	BROWN	BROWN
109	BLACK	WHITE
110	-	MODERATE BROWN
108	ASH	MEDIUM WHITE

10 rows returned in 0.00 seconds CSV Export

Outer Join:

Select b.DETECTION_ID from D_Info a, F_Info b where a.DETECTION_ID (+) = b.FEATURE_ID;

Results Explain Describe Saved SQL History

DETECTION_ID
106
101
107
103
102
105
104
109
110
108

10 rows returned in 0.00 seconds CSV Export

Self Join:

Select a.NAME ||' is '|| b.NATIONALITY "NATIONALITY" from Cr_Info a, Cr_Info b WHERE a.CRIMINAL_ID <> b.IMAGE_ID;

v

Results Explain Describe Saved SQL History

NATIONALITY
NATHAN BOM is BANGLADESHI
KALAM is BANGLADESHI
ROCKY is BANGLADESHI
RASEL is BANGLADESHI
SABILA is BANGLADESHI
KISHOR is BANGLADESHI
ROCK is BANGLADESHI
IQBAL is BANGLADESHI
LOLITA is BANGLADESHI
PAPIYA is BANGLADESHI
More than 10 rows available. Increase rows selector to view more rows.

10 rows returned in 0.00 seconds CSV Export

SIMPLE VIEW:

CREATE VIEW BangladeshCriminals AS SELECT CRIMINAL_ID, NAME, HEIGHT FROM CR_INFO WHERE NATIONALITY = 'BANGLADESHI';

```
CREATE VIEW BangladeshCriminals AS
SELECT CRIMINAL_ID, NAME, HEIGHT FROM
CR_INFO WHERE NATIONALITY = 'BANGLADESHI';
```

Results Explain Describe Saved SQL History

View created.

0.02 seconds

```
Select * from BangladeshCriminals;
```

Results | Explain | Describe | Saved SQL | History

CRIMINAL_ID	NAME	HEIGHT
775	NATHAN BOM	5.4
774	KALAM	-
776	ROCKY	5.7
770	RASEL	5.8
779	SABILA	5.2
797	IQBAL	5.8
799	LOLITA	-
722	PAPIYA	5.3

8 rows returned in 0.00 seconds CSV Export

COMPLEX VIEW:

CREATE VIEW DetailInfo AS SELECT c.Criminal_ID, c.Name, i.Image_ID FROM Cr_Info c, Img_Info i where c.Image_ID = i.Image_ID;

```
CREATE VIEW DetailInfo AS SELECT c.Criminal_ID,
c.Name, i.Image_ID FROM Cr_Info c, Img_Info i where
c.Image_ID = i.Image_ID;
```

Results | Explain | Describe | Saved SQL | History

```
View created.
```

0.00 seconds

```
Select * from DetailInfo;
```

Results | Explain | Describe | Saved SQL | History

CRIMINAL_ID	NAME	IMAGE_ID
775	NATHAN BOM	2301
774	KALAM	2303
776	ROCKY	2306
770	RASEL	2307
779	SABILA	2308
771	KISHOR	2309
780	ROCK	2400
797	IQBAL	2305
799	LOLITA	2304
722	PAPIYA	2302

10 rows returned in 0.00 seconds CSV Export

Successful Data-Base connection

Steps for connecting the database with JAVA through JDBC :

- Acquired the necessary **Connector**/ **JAR file** for connecting Java with MySQL from **MySQL**'s official website.
- Visited "https://dev.mysql.com/downloads/connector/j/" and selected the appropriate version for the project.
- We have installed "**Xampp**" for necessary need because its a free and open-source cross-platform web server solution stack package developed by Apache Friends.
- Ensured a smooth start by downloading **MySQL** Shell from the MySQL website.
- Followed the installation instructions for my system to set up MySQL Shell properly.
- Implemented the database structure in MySQL Shell using concise SQL commands.
- Maintained a script with DDL statements for reference during the setup.
- Organized project components in **IntelliJ IDEA** for seamless integration.
- Utilized "**Project Structure**" settings to neatly combine Java code, resources, and external elements.
- Enhanced connection capabilities by adding the appropriate library to the project.
- Selected a Connector **JAR** file known for its effectiveness in connecting Java and MySQL.
- Initiated by registering the MySQL JDBC driver to enable Java code to communicate with the MySQL database effectively.
- Established a secure connection to the MySQL database, providing a pathway for Java code to interact with the data.
- Executed SQL queries effectively using the statement object, resulting in a Result Set containing the required data from the database.
- Ensured proper resource management by closing the connection after completing necessary operations, preventing unnecessary resource usage.

Here are the MySQL tables, codes & outputs of each group members:

Member-01: JOY, MD. HOSNE JAIM

Table

IMAGE_ID	FEATURE_ID	IMAGE_URL	CAPTURE_DATE	CITY
2301	5512	https://ibb.co/9WNq0xP	2024-03-31	BANDARBAN
2303	3354	https://ibb.co/LRmNMrB	2024-02-08	DHAKA SOUTH
2306	2212	https://ibb.co/tMCR9tr	2024-01-15	CHATTOGRAM
2307	1012	https://ibb.co/ZLsY5F3	2024-02-19	KHULNA
2308	1124	https://ibb.co/TkPQF84	2024-01-31	SYLHET

Code

CriminalFaceDetectionSystem.java

```java
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
public class CriminalFaceDetectionSystem
{
    public static void main(String[] args) {
        try {
            Class.forName( className: "com.mysql.cj.jdbc.Driver");
            Connection conn = DriverManager.getConnection( url: "jdbc:mysql://localhost:3306/criminal face detection system",
                    user: "root",  password: "");
            System.out.println("Table-02 Connected Successfully");
            Statement st = conn.createStatement();
            ResultSet rs = st.executeQuery( sql: "select * from Img_Info");
            System.out.println("_____");
            System.out.println("Image_ID"+"   Feature_ID"+"   Image_URL"+"                Capture_Date"+"   City");
            System.out.println("_____");
            while (rs.next())
            {
                System.out.println(
                                    rs.getString( columnIndex: 1)
                                   +"       " + rs.getInt( columnIndex: 2)
                                   +"          " + rs.getString( columnIndex: 3)
                                   +"     " + rs.getString( columnIndex: 4)
                                   +"     " + rs.getString( columnIndex: 5));
            }System.out.println("_____");
            conn.close();
            }
        catch (Exception s){System.out.println(s);}}}
```

Version Control | TODO | Problems | Terminal | Services | Profiler

Output:

```
"C:\Program Files\Java\jdk1.8.0_172\bin\java.exe" ...
Table-02 Connected Successfully

--------------------------------------------------------------------------------
Image_ID   Feature_ID   Image_URL                Capture_Date   City

--------------------------------------------------------------------------------
2301       5512         https://ibb.co/9WNq0xP   2024-03-31    BANDARBAN
2303       3354         https://ibb.co/LRmNMrB   2024-02-08    DHAKA SOUTH
2306       2212         https://ibb.co/tMCR9tr   2024-01-15    CHATTOGRAM
2307       1012         https://ibb.co/ZLsY5F3   2024-02-19    KHULNA
2308       1124         https://ibb.co/TkPQF84   2024-01-31    SYLHET

--------------------------------------------------------------------------------

Process finished with exit code 0
```

Member-02: RAKIB, MD SANUAR ALAM

Table

CRIMINAL_ID	IMAGE_ID	NAME	HEIGHT	GENDER	DATE_OF_BIRTH	AGE	NATIONALITY
775	2301	NATHAN BOM	5.4	MALE	1992-01-11	32	BANGLADESHI
774	2303	KALAM	0	MALE	1979-12-03	45	BANGLADESHI
776	2306	ROCKY	5.7	MALE	1996-02-15	28	BANGLADESHI
770	2307	RASEL	5.8	MALE	1994-08-28	30	BANGLADESHI
779	2308	SABILA	5.2	FEMALE	1989-05-31	35	BANGLADESHI

Code

CriminalFaceDetectionSystem.java

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
public class CriminalFaceDetectionSystem
{
    public static void main(String[] args) {
        try {
            Class.forName( className: "com.mysql.cj.jdbc.Driver");
            Connection conn = DriverManager.getConnection( url: "jdbc:mysql://localhost:3306/cfds",
                    user: "root", password: "");
            System.out.println("Table-01 Connected Successfully");
            Statement st = conn.createStatement();
            ResultSet rs = st.executeQuery( sql: "select * from CR_INFO");
            //System.out.println("_____");
            //System.out.println(+++++"    AGE "+"      NATIONALITY");
            System.out.println("_____");
            while (rs.next())
            { System.out.println("CRIMINAL_ID -" + rs.getInt ( columnIndex: 1)
                                +"   IMAGE_ID  -" +  rs.getInt( columnIndex: 2)
                                +"   NAME : " +  rs.getString( columnIndex: 3)
                                +"     HEIGHT -" +  rs.getFloat( columnIndex: 4)
                                +"     GENDER : " +  rs.getString( columnIndex: 5)
                                +"      DATE_OF_BIRTH    :  " +  rs.getString( columnIndex: 6)
                                +"       AGE  -" +  rs.getInt( columnIndex: 7)
                                +"       NATIONALITY  :  " + rs.getString( columnIndex: 8));
            }System.out.println("_____");
            conn.close();
        }
        catch (Exception s){System.out.println(s);}}}
```

Output

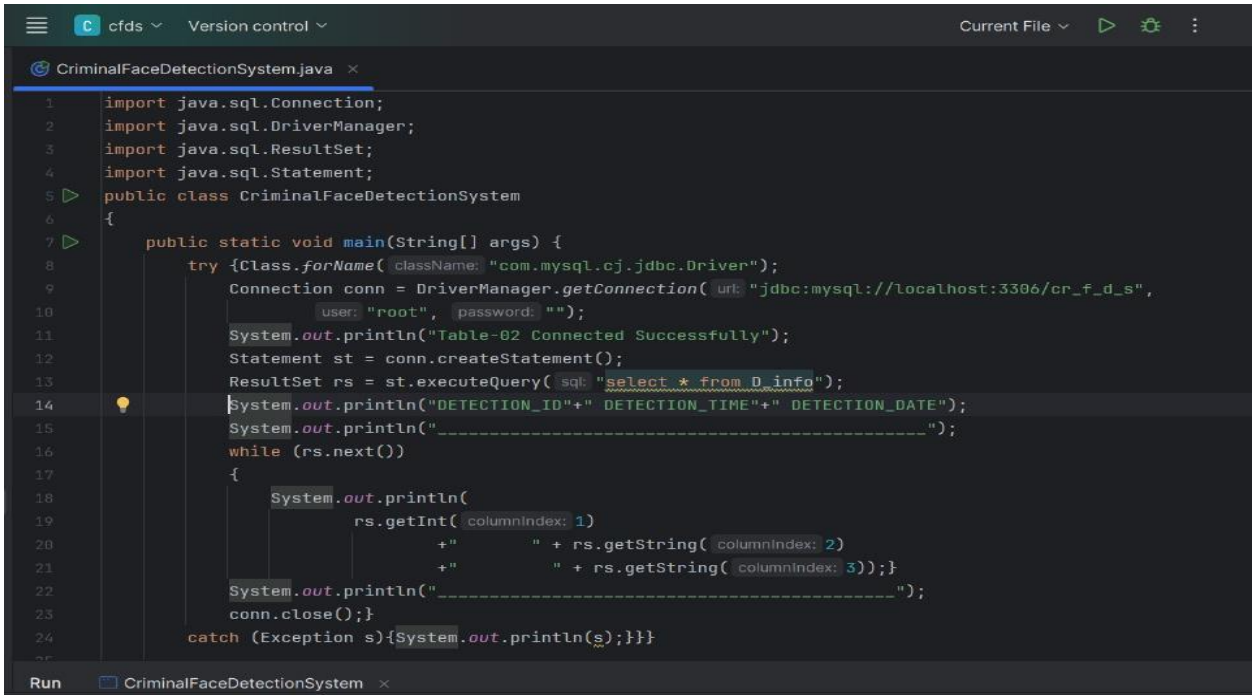
```
C:\Users\MSI\.jdks\openjdk-22.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA 2024.1.1\lib\idea_rt.jar=53335:C:\Program Files\JetBrains\IntelliJ IDEA 2024
Table-01 Connected Successfully
-----------------------------------------------------------------------------------------------------------------------------------------------------------
CRIMINAL_ID -775   IMAGE_ID  -2301   NAME : NATHAN BOM     HEIGHT -5.4     GENDER : MALE      DATE_OF_BIRTH    :  1992-01-11       AGE  -32       NATIONALITY  :  BANGLADESHI
CRIMINAL_ID -774   IMAGE_ID  -2303   NAME : KALAM     HEIGHT -0.0     GENDER : MALE      DATE_OF_BIRTH    :  1979-12-03       AGE  -45       NATIONALITY  :  BANGLADESHI
CRIMINAL_ID -776   IMAGE_ID  -2306   NAME : ROCKY     HEIGHT -5.7     GENDER : MALE      DATE_OF_BIRTH    :  1996-02-15       AGE  -28       NATIONALITY  :  BANGLADESHI
CRIMINAL_ID -770   IMAGE_ID  -2307   NAME : RASEL     HEIGHT -5.8     GENDER : MALE      DATE_OF_BIRTH    :  1994-08-28       AGE  -30       NATIONALITY  :  BANGLADESHI
CRIMINAL_ID -779   IMAGE_ID  -2308   NAME : SABILA     HEIGHT -5.2     GENDER : FEMALE      DATE_OF_BIRTH    :  1989-05-31       AGE  -35       NATIONALITY  :  BANGLADESHI
-----------------------------------------------------------------------------------------------------------------------------------------------------------

Process finished with exit code 0
```

Member-03: BHUIYAN, KAMRUL HASAN

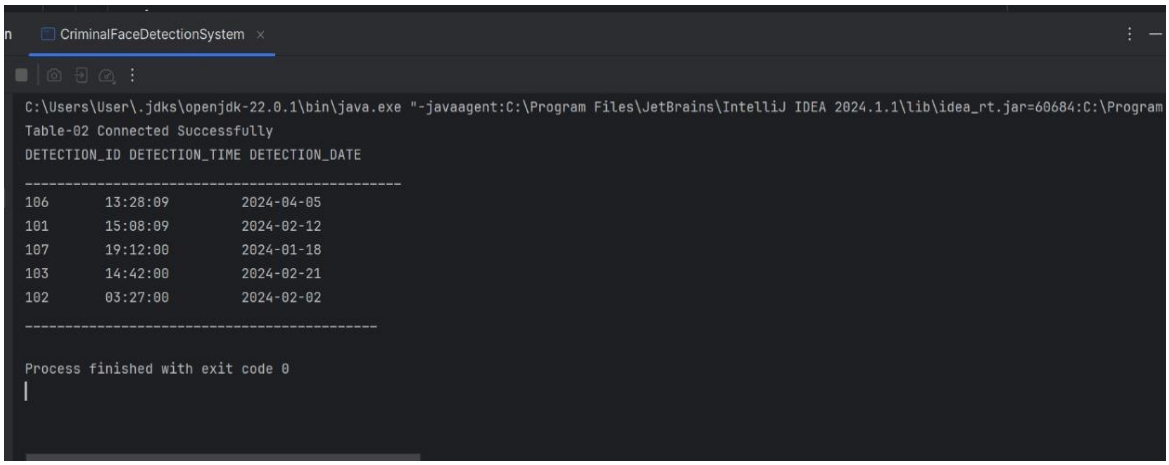
Table

DETECTION_ID ▲ 1	DETECTION_DATE	DETECTION_TIME
101	2024-02-12	15:08:09
102	2024-02-02	03:27:00
103	2024-02-21	14:42:00
106	2024-04-05	13:28:09
107	2024-01-18	19:12:00

Code



Output



Member-04: SINA, MD ABDULLA IBNA

Table

City	Country
BANDARBAN	BANGLADESH
DHAKA SOUTH	BANGLADESH
CHATTOGRAM	
KHULNA	BANGLADESH
SYLHET	BANGLADESH

Code

CriminalFaceDetectionSystem.java

```java
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
public class CriminalFaceDetectionSystem
{
    public static void main(String[] args) {
        try {
            Class.forName( className: "com.mysql.cj.jdbc.Driver");
            Connection conn = DriverManager.getConnection( url: "jdbc:mysql://localhost:3306/C_F_D_S",
                    user: "root", password: "");
            System.out.println("Table-05 Connected Successfully");
            Statement st = conn.createStatement();
            ResultSet rs = st.executeQuery( sql: "select * from Address");
            System.out.println("_____");
            System.out.println("CITY"+"            COUNTRY");
            System.out.println("_____");
            while (rs.next())
            {
                System.out.println(
                        rs.getString( columnIndex: 1)
                             +"       "  + rs.getString( columnIndex: 2));
            }System.out.println("_____");
            conn.close();
        }
        catch (Exception s){System.out.println(s);}}}
```

Output

CriminalFaceDetectionSystem

```
"C:\Program Files\Java\jdk1.8.0_172\bin\java.exe" ...
Table-05 Connected Successfully

-----------------------------------
CITY            COUNTRY

-----------------------------------
BANDARBAN       BANGLADESH
DHAKA SOUTH       BANGLADESH
CHATTOGRAM
KHULNA       BANGLADESH
SYLHET       BANGLADESH

-------------------------

Process finished with exit code 0
```

Member-05: SHAHADOUT, MD. EFAT AL KHALID

Table

FEATURED_ID	DETECTION_ID	HAIR_COLOUR	SKIN_COLOUR
5512	106	BLACK	LIGHT BROWN
3354	101	GRAY	WHITE
2212	107	OMBRE	
1012	103	COPPER	LIGHT BROWN
1124	102	BLACK	FAIR

Code

CriminalFaceDetectionSystem.java

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
public class CriminalFaceDetectionSystem
{
    public static void main(String[] args) {
        try {Class.forName( className: "com.mysql.cj.jdbc.Driver");
            Connection conn = DriverManager.getConnection( url: "jdbc:mysql://localhost:3306/c_f_d_s2",
                    user: "root", password: "");
            System.out.println(" Connected Successfully");
            Statement st = conn.createStatement();
            ResultSet rs = st.executeQuery( sql: "select * from F_INFO");
            System.out.println("DETECTION_ID"+" DETECTION_TIME"+" DETECTION_DATE");
            System.out.println("_____");
            while (rs.next())
            {
                System.out.println(
                        rs.getInt( columnIndex: 1)
                                +"       " + rs.getInt( columnIndex: 2)
                                +"       " + rs.getString( columnIndex: 3)
                                +"         " + rs.getString( columnIndex: 4));}
            System.out.println("_____");
            conn.close();}
        catch (Exception s){System.out.println(s);}}}
```

ds › src › CriminalFaceDetectionSystem › <Injected SQL file>

Output

```
C:\Users\User\.jdks\openjdk-22.0.1\bin\java.exe "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA
 Connected Successfully
DETECTION_ID DETECTION_TIME DETECTION_DATE

------------------------------------------------
5512        106        BLACK          LIGHT BROWN
3354        101        GRAY          WHITE
2212        107        OMBRE
1012        103        COPPER          LIGHT BROWN
1124        102        BLACK          FAIR
------------------------------------------------

Process finished with exit code 0
```

Conclusion

In conclusion, the development of the Criminal Face Detection System represents a significant advancement in the field of law enforcement and public safety. Through the utilization of state-of-the-art facial recognition technology, this system aims to enhance the efficiency and accuracy of identifying individuals involved in criminal activities. By harnessing the power of artificial intelligence and machine learning algorithms, the system can analyze vast amounts of facial data with remarkable speed and precision. This capability enables law enforcement agencies to swiftly identify suspects, locate missing persons, and prevent crimes before they occur.

Moreover, the implementation of the Criminal Face Detection System contributes to fostering a safer and more secure society. By assisting law enforcement in apprehending criminals and deterring illicit activities, the system serves as a deterrent to potential offenders and enhances overall public safety.

In summary, the Criminal Face Detection System represents a powerful tool in the fight against crime, offering law enforcement agencies a valuable resource to enhance their investigative capabilities and safeguard communities. Through responsible deployment and ongoing refinement, this system has the potential to make significant strides in improving public safety and upholding the rule of law.