UrbanWave Assignment

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Introduction

The Urban Wave project is a mini social media platform implemented using MongoDB. This report demonstrates the creation of collections, the insertion of data, and the retrieval of information.

Phase 1

1.1 :Create Database and Collections

In this phase, we created the Urban wave database and three main collections: **users**, **posts**, and **followers**.

```
db.createCollection("users", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["username","fullName","email","age","interests",
         "location","screenTime","isActive","createdAt","lastSeen
         "],
      properties: {
        username: {
          bsonType: "string",
          description: "unique username 3-30 chars"
        },
        fullName: { bsonType: "string" },
        email: { bsonType: "string" },
        age: { bsonType: "int", minimum: 13, maximum: 100 },
        bio: { bsonType: ["string","null"], description: "max 150
            chars" },
        interests: { bsonType: "array", items: { bsonType: "
           string" } },
        location: {
          bsonType: "object",
          required: ["type","coordinates","city","state"],
          properties: {
            type: { enum: ["Point"] },
```

```
            coordinates: { bsonType: "array", minItems: 2,
               maxItems: 2 },
            city: { bsonType: "string" },
            state: { bsonType: "string" }
          }
        },
        screenTime: { bsonType: "int" },
        followersCount: { bsonType: "int" },
        followingCount: { bsonType: "int" },
        isActive: { bsonType: "bool" },
        createdAt: { bsonType: "date" },
        lastSeen: { bsonType: "date" }
      }
    }
  }
});
```

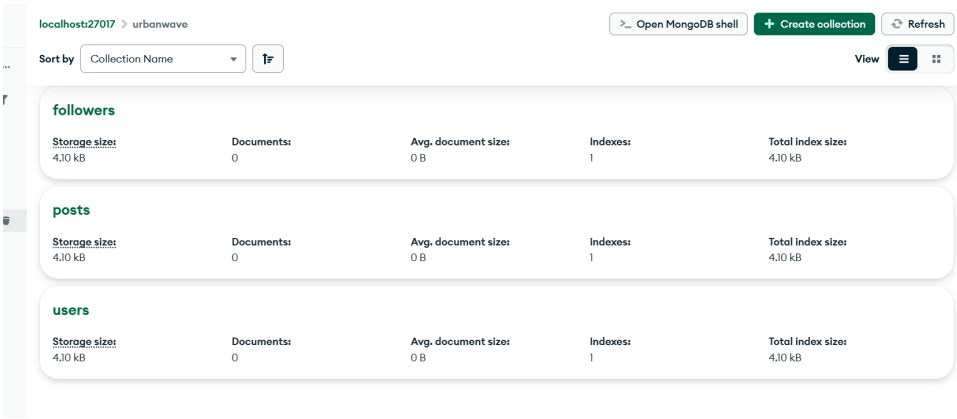
The above code is used to add collection:users.

```
db.createCollection("posts", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["userId","type","content","createdAt"],
      properties: {
        userId: { bsonType: "objectId" },
        type: { enum: ["post","reel"] },
        content: { bsonType: "string" }, // category
        caption: { bsonType: ["string","null"] },
        hashtags: { bsonType: ["array","null"], items: { bsonType
           : "string" } },
        location: {
          bsonType: ["object","null"],
          properties: {
            type: { enum: ["Point"] },
            coordinates: { bsonType: "array", minItems: 2,
               maxItems: 2 },
            city: { bsonType: "string" }
          }
        },
        likes: { bsonType: "int" },
        comments: { bsonType: "int" },
        shares: { bsonType: "int" },
        views: { bsonType: "int" }, // for reels
        createdAt: { bsonType: "date" }
      }
    }
  }
});
```

The above code is used to add collection:posts.

```
db.createCollection("followers", {
  validator: {
    $jsonSchema: {
      bsonType: "object",
      required: ["followerId","followingId","createdAt"],
      properties: {
        followerId: { bsonType: "objectId" },
        followingId: { bsonType: "objectId" },
        createdAt: { bsonType: "date" }
      }
    }
  }
});
```

The above code is used to add collection:followers.



The above figure shows the collections created using the three codes.

1.2 Inserting Data into Collections

In this section, we demonstrate how to insert data into the three main collections: users, posts, and followers.

1.2.1 Adding Users

```
const u1 = ObjectId("651111111111111111111111");
const u2 = ObjectId("652222222222222222222222");
const u3 = ObjectId("653333333333333333333333");
const u4 = ObjectId("654444444444444444444444");
const u5 = ObjectId("655555555555555555555555");
const u6 = ObjectId("656666666666666666666666");
```

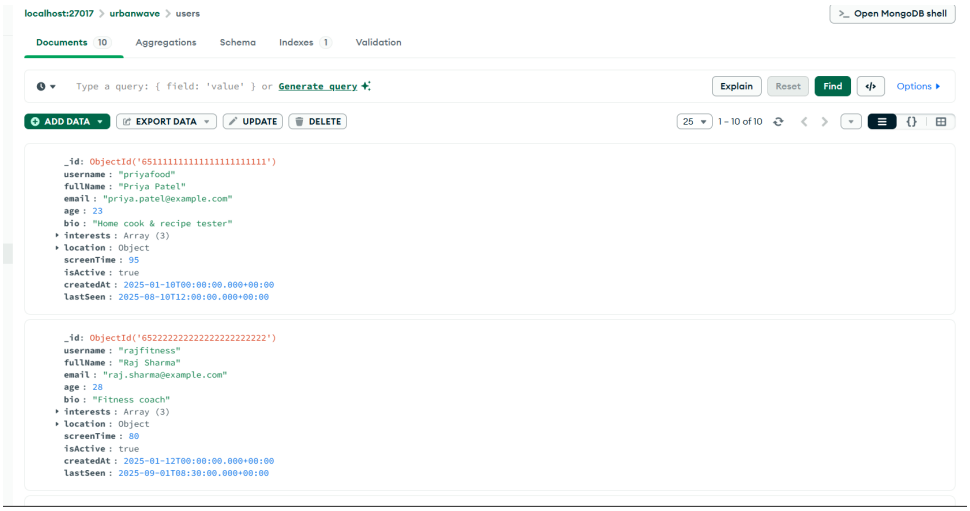
```
const u7 = ObjectId("657777777777777777777777");
const u8 = ObjectId("658888888888888888888888");
const u9 = ObjectId("659999999999999999999999");
const u10 = ObjectId("651010101010101010101010");

db.users.insertMany([
  {
    _id: u1,
    username: "priyafood",
    fullName: "Priya Patel",
    email: "priya.patel@example.com",
    age: 23,
    bio: "Home cook & recipe tester",
    interests: ["food","cooking","travel"],
    location: { type: "Point", coordinates: [73.2081, 22.3072],
       city: "Vadodara", state: "Gujarat" },
    screenTime: 95,
    isActive: true,
    createdAt: new Date("2025-01-10"),
    lastSeen: new Date("2025-08-10T12:00:00Z")
  },
  {
    _id: u2,
    username: "rajfitness",
    fullName: "Raj Sharma",
    email: "raj.sharma@example.com",
    age: 28,
    bio: "Fitness coach",
    interests: ["fitness","health","sports"],
    location: { type: "Point", coordinates: [70.7833, 22.3039],
       city: "Rajkot", state: "Gujarat" },
    screenTime: 80,
    isActive: true,
    createdAt: new Date("2025-01-12"),
    lastSeen: new Date("2025-09-01T08:30:00Z")
  },
  {
    _id: u3,
    username: "meeracomedy",
    fullName: "Meera Joshi",
    email: "meera.joshi@example.com",
    age: 22,
    bio: "Sketches & memes",
    interests: ["comedy","entertainment","memes"],
    location: { type: "Point", coordinates: [72.5714, 23.0225],
       city: "Ahmedabad", state: "Gujarat" },
    screenTime: 200,
    isActive: true,
    createdAt: new Date("2025-01-05"),
    lastSeen: new Date("2025-09-05T20:15:00Z")
  },
```

```
{
  _id: u4,
  username: "amittravel",
  fullName: "Amit Desai",
  email: "amit.desai@example.com",
  age: 30,
  bio: "Landscape photographer",
  interests: ["travel","photography","nature"],
  location: { type: "Point", coordinates: [72.8777, 21.1702],
     city: "Surat", state: "Gujarat" },
  screenTime: 110,
  isActive: true,
  createdAt: new Date("2025-01-20"),
  lastSeen: new Date("2025-09-07T09:00:00Z")
},
{
  _id: u5,
  username: "kavyaedu",
  fullName: "Kavya Modi",
  email: "kavya.modi@example.com",
  age: 26,
  bio: "EdTech content creator",
  interests: ["education","books","learning"],
  location: { type: "Point", coordinates: [71.1924, 22.2587],
     city: "Jamnagar", state: "Gujarat" },
  screenTime: 150,
  isActive: true,
  createdAt: new Date("2025-01-15"),
  lastSeen: new Date("2025-09-08T18:00:00Z")
},
{
  _id: u6,
  username: "devtech",
  fullName: "Dev Pandya",
  email: "dev.pandya@example.com",
  age: 24,
  bio: "Code tutorials & gadgets",
  interests: ["technology","coding","gadgets"],
  location: { type: "Point", coordinates: [70.4579, 21.5222],
     city: "Bhavnagar", state: "Gujarat" },
  screenTime: 180,
  isActive: true,
  createdAt: new Date("2025-01-18"),
  lastSeen: new Date("2025-09-06T16:40:00Z")
},
{
  _id: u7,
  username: "riyafashion",
  fullName: "Riya Thakkar",
  email: "riya.thakkar@example.com",
  age: 21,
```

```
    bio: "Fashion & lifestyle",
    interests: ["fashion","beauty","lifestyle"],
    location: { type: "Point", coordinates: [73.2081, 22.3072],
       city: "Vadodara", state: "Gujarat" },
    screenTime: 250,
    isActive: true,
    createdAt: new Date("2025-01-08"),
    lastSeen: new Date("2025-09-09T10:00:00Z")
  },
  {
    _id: u8,
    username: "jaymusic",
    fullName: "Jay Mehta",
    email: "jay.mehta@example.com",
    age: 27,
    bio: "Singer & guitarist",
    interests: ["music","singing","concerts"],
    location: { type: "Point", coordinates: [68.9685, 22.2442],
       city: "Dwarka", state: "Gujarat" },
    screenTime: 140,
    isActive: true,
    createdAt: new Date("2025-01-22"),
    lastSeen: new Date("2025-09-08T14:30:00Z")
  },
  {
    _id: u9,
    username: "anitahealth",
    fullName: "Anita Verma",
    email: "anita.verma@example.com",
    age: 29,
    bio: "Yoga instructor",
    interests: ["health","yoga","wellness"],
    location: { type: "Point", coordinates: [72.8777, 21.1702],
       city: "Surat", state: "Gujarat" },
    screenTime: 130,
    isActive: true,
    createdAt: new Date("2025-01-25"),
    lastSeen: new Date("2025-09-07T19:45:00Z")
  },
  {
    _id: u10,
    username: "samart",
    fullName: "Samir Shah",
    email: "samir.shah@example.com",
    age: 32,
    bio: "Digital artist & illustrator",
    interests: ["art","design","creativity"],
    location: { type: "Point", coordinates: [72.5714, 23.0225],
       city: "Ahmedabad", state: "Gujarat" },
    screenTime: 170,
    isActive: true,
```

```
    createdAt: new Date("2025-01-30"),
    lastSeen: new Date("2025-09-09T09:00:00Z")
  }
]);
```

Explanation: This code is used to insert data of 10 users into users collection.



From the above code inserted, the figure shows the output of 2 users out of data taken of 10 people.

1.2.2 Reacted Posts

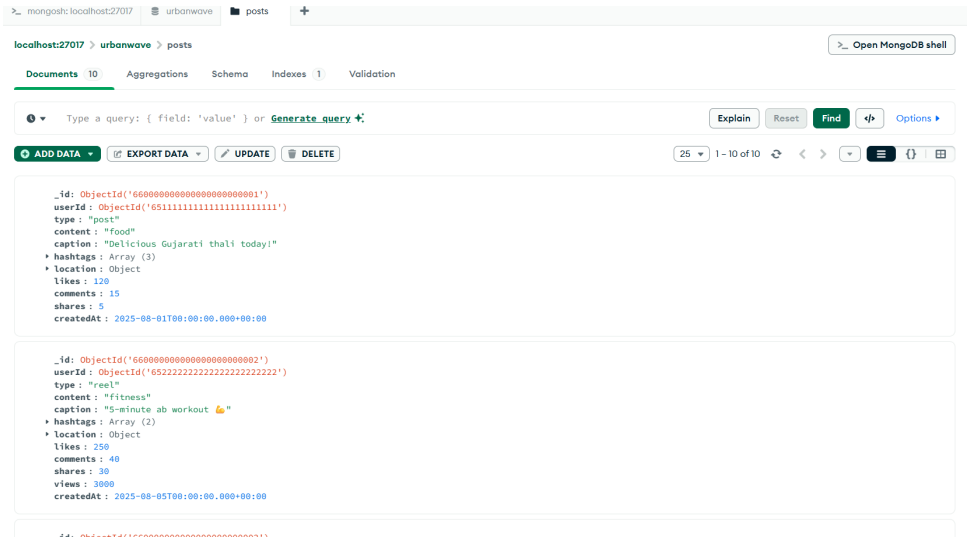
```
const p1 = ObjectId("660000000000000000000001");
const p2 = ObjectId("660000000000000000000002");
const p3 = ObjectId("660000000000000000000003");
const p4 = ObjectId("660000000000000000000004");
const p5 = ObjectId("660000000000000000000005");
const p6 = ObjectId("660000000000000000000006");
const p7 = ObjectId("660000000000000000000007");
const p8 = ObjectId("660000000000000000000008");
const p9 = ObjectId("660000000000000000000009");
const p10 = ObjectId("660000000000000000000010");

db.posts.insertMany([
  {
    _id: p1,
    userId: u1,
    type: "post",
    content: "food",
    caption: "Delicious Gujarati thali today!",
    hashtags: ["#foodie","#gujarat","#thali"],
    location: { type: "Point", coordinates: [73.2081, 22.3072],
       city: "Vadodara" },
    likes: 120,
```

```
    comments: 15,
    shares: 5,
    createdAt: new Date("2025-08-01")
  },
  {
    _id: p2,
    userId: u2,
    type: "reel",
    content: "fitness",
    caption: "5-minute ab workout       ",
    hashtags: ["#fitness","#workout"],
    location: { type: "Point", coordinates: [70.7833, 22.3039],
       city: "Rajkot" },
    likes: 250,
    comments: 40,
    shares: 30,
    views: 3000,
    createdAt: new Date("2025-08-05")
  },
  {
    _id: p3,
    userId: u3,
    type: "reel",
    content: "comedy",
    caption: "Types of relatives during weddings       ",
    hashtags: ["#comedy","#memes"],
    location: { type: "Point", coordinates: [72.5714, 23.0225],
       city: "Ahmedabad" },
    likes: 1500,
    comments: 300,
    shares: 120,
    views: 12000,
    createdAt: new Date("2025-08-10")
  },
  {
    _id: p4,
    userId: u4,
    type: "post",
    content: "travel",
    caption: "Sunset at Dumas beach       ",
    hashtags: ["#travel","#sunset","#beach"],
    location: { type: "Point", coordinates: [72.8777, 21.1702],
       city: "Surat" },
    likes: 600,
    comments: 80,
    shares: 40,
    createdAt: new Date("2025-08-12")
  },
  {
    _id: p5,
    userId: u5,
```

```
    type: "reel",
    content: "education",
    caption: "3 quick tips for exam prep       ",
    hashtags: ["#study","#learning"],
    location: { type: "Point", coordinates: [71.1924, 22.2587],
       city: "Jamnagar" },
    likes: 220,
    comments: 25,
    shares: 12,
    views: 2500,
    createdAt: new Date("2025-08-15")
  },
  {
    _id: p6,
    userId: u6,
    type: "post",
    content: "technology",
    caption: "Unboxing the latest gadget       ",
    hashtags: ["#tech","#gadgets"],
    location: { type: "Point", coordinates: [70.4579, 21.5222],
       city: "Bhavnagar" },
    likes: 340,
    comments: 50,
    shares: 18,
    createdAt: new Date("2025-08-18")
  },
  {
    _id: p7,
    userId: u7,
    type: "reel",
    content: "fashion",
    caption: "Navratri outfit ideas    ",
    hashtags: ["#fashion","#style"],
    location: { type: "Point", coordinates: [73.2081, 22.3072],
       city: "Vadodara" },
    likes: 900,
    comments: 100,
    shares: 60,
    views: 7000,
    createdAt: new Date("2025-08-20")
  },
  {
    _id: p8,
    userId: u8,
    type: "post",
    content: "music",
    caption: "Live performance at Dwarka fest       ",
    hashtags: ["#music","#concert"],
    location: { type: "Point", coordinates: [68.9685, 22.2442],
       city: "Dwarka" },
    likes: 500,
```

```
    comments: 70,
    shares: 25,
    createdAt: new Date("2025-08-22")
  },
  {
    _id: p9,
    userId: u9,
    type: "reel",
    content: "health",
    caption: "Morning yoga flow                ",
    hashtags: ["#yoga","#health"],
    location: { type: "Point", coordinates: [72.8777, 21.1702],
       city: "Surat" },
    likes: 400,
    comments: 60,
    shares: 20,
    views: 3500,
    createdAt: new Date("2025-08-25")
  },
  {
    _id: p10,
    userId: u10,
    type: "post",
    content: "art",
    caption: "New digital painting completed       ",
    hashtags: ["#art","#digital"],
    location: { type: "Point", coordinates: [72.5714, 23.0225],
       city: "Ahmedabad" },
    likes: 720,
    comments: 90,
    shares: 35,
    createdAt: new Date("2025-08-28")
  }
]);
```

Explanation:This code is used to add the posts these users have reacted to.



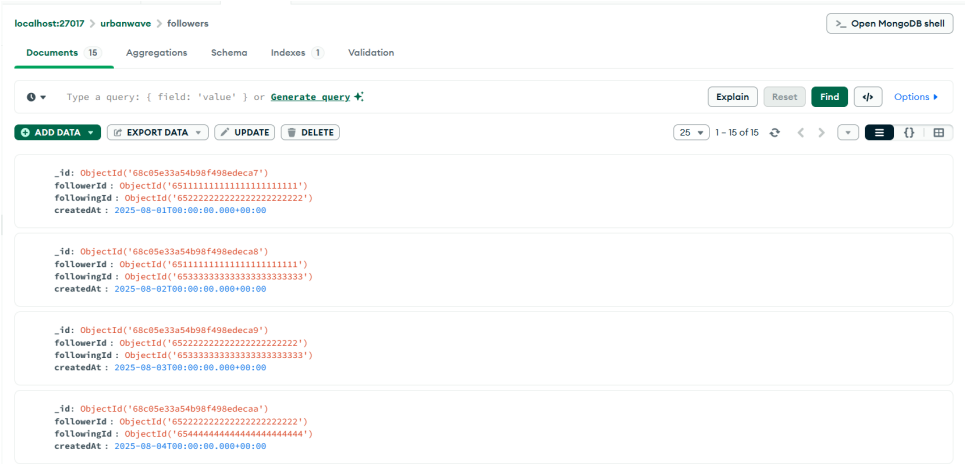
From the above code inserted, the figure shows the output of 2 posts reacted out of data taken of 10 people.

1.2.3 Followers Relationship

```
db.followers.insertMany([
  { followerId: u1, followingId: u2, createdAt: new Date("
     2025-08-01") },
  { followerId: u1, followingId: u3, createdAt: new Date("
     2025-08-02") },
  { followerId: u2, followingId: u3, createdAt: new Date("
     2025-08-03") },
  { followerId: u2, followingId: u4, createdAt: new Date("
     2025-08-04") },
  { followerId: u3, followingId: u1, createdAt: new Date("
     2025-08-05") },
  { followerId: u3, followingId: u5, createdAt: new Date("
     2025-08-06") },
  { followerId: u4, followingId: u6, createdAt: new Date("
     2025-08-07") },
  { followerId: u4, followingId: u7, createdAt: new Date("
     2025-08-08") },
  { followerId: u5, followingId: u2, createdAt: new Date("
     2025-08-09") },
  { followerId: u5, followingId: u8, createdAt: new Date("
     2025-08-10") },
  { followerId: u6, followingId: u9, createdAt: new Date("
     2025-08-11") },
  { followerId: u7, followingId: u10, createdAt: new Date("
     2025-08-12") },
  { followerId: u8, followingId: u1, createdAt: new Date("
     2025-08-13") },
  { followerId: u9, followingId: u4, createdAt: new Date("
     2025-08-14") },
```

```
  { followerId: u10, followingId: u3, createdAt: new Date("
      2025-08-15") }
]);
```

Explanation:This code is used to add the follower relationship such as who has started following whom.



From the above code inserted, the figure shows activity of 4 users who started following other users.

Phase 2

Task 2.1: CRUD Operations

This section contains the MongoDB queries for performing CRUD operations as required in the assignment.

1. Find all users from a specific city

```
db.users.find({ "location.city": "Rajkot" }).pretty();
```

```
>_MONGOSH
  _id: ObjectId('652222222222222222222222'),
  username: 'rajfitness',
  fullName: 'Raj Sharma',
  email: 'raj.sharma@example.com',
  age: 28,
  bio: 'Fitness coach',
  interests: [
    'fitness',
    'health',
    'sports'
  ],
  location: {
    type: 'Point',
    coordinates: [
      70.7833,
      22.3039
    ],
    city: 'Rajkot',
    state: 'Gujarat'
  },
  screenTime: 80,
  isActive: true,
  createdAt: 2025-01-12T00:00:00.000Z,
  lastSeen: 2025-09-01T08:30:00.000Z
}
```

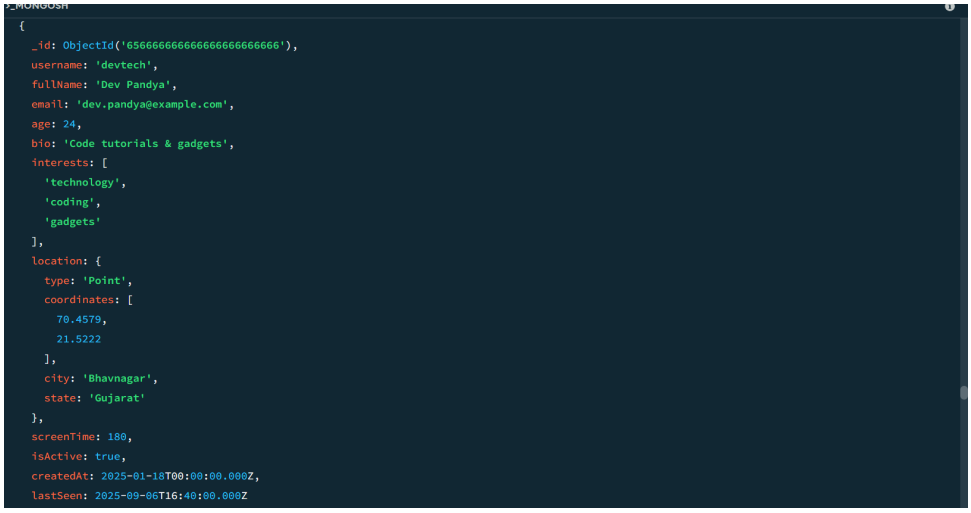
From the above code inserted, the figure shows the user from "Rajkot".

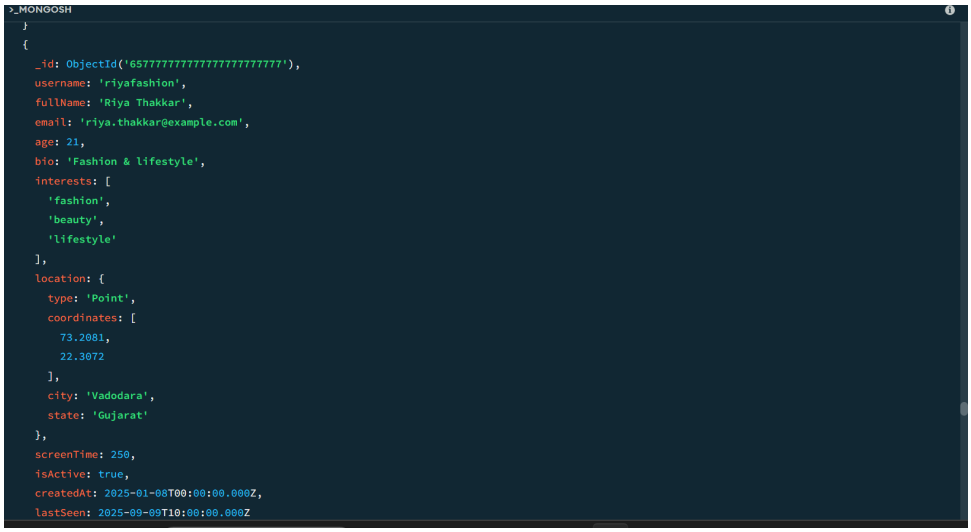
2. Find users younger than 25 years

```
db.users.find({ age: { $lt: 25 } }).pretty();
```

```
{
  _id: ObjectId('651111111111111111111111'),
  username: 'priyafood',
  fullName: 'Priya Patel',
  email: 'priya.patel@example.com',
  age: 23,
  bio: 'Home cook & recipe tester',
  interests: [
    'food',
    'cooking',
    'travel'
  ],
  location: {
    type: 'Point',
    coordinates: [
      73.2081,
      22.3072
    ],
    city: 'Vadodara',
    state: 'Gujarat'
  },
  screenTime: 95,
  isActive: true,
  createdAt: 2025-01-10T00:00:00.000Z,
  lastSeen: 2025-08-10T12:00:00.000Z
```

```
{
  _id: ObjectId('653333333333333333333333'),
  username: 'meeracomedy',
  fullName: 'Meera Joshi',
  email: 'meera.joshi@example.com',
  age: 22,
  bio: 'Sketches & memes',
  interests: [
    'comedy',
    'entertainment',
    'memes'
  ],
  location: {
    type: 'Point',
    coordinates: [
      72.5714,
      23.0225
    ],
    city: 'Ahmedabad',
    state: 'Gujarat'
  },
  screenTime: 200,
  isActive: true,
  createdAt: 2025-01-05T00:00:00.000Z,
  lastSeen: 2025-09-05T20:15:00.000Z
```

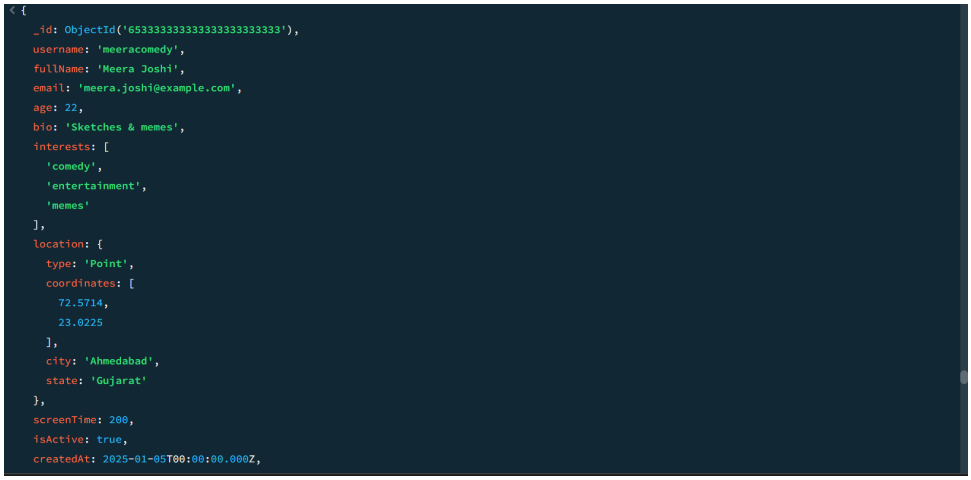




From the above code inserted, the figures shows all the users that are under age 25.

3. Find users with screen time greater than 150 minutes

```
db.users.find({ screenTime: { $gt: 150 } }).pretty();
```



```
>_MONGOSH
{
  _id: ObjectId('656666666666666666666666'),
  username: 'devtech',
  fullName: 'Dev Pandya',
  email: 'dev.pandya@example.com',
  age: 24,
  bio: 'Code tutorials & gadgets',
  interests: [
    'technology',
    'coding',
    'gadgets'
  ],
  location: {
    type: 'Point',
    coordinates: [
      70.4579,
      21.5222
    ],
    city: 'Bhavnagar',
    state: 'Gujarat'
  },
  screenTime: 180,
  isActive: true,
  createdAt: 2025-01-18T00:00:00.000Z,
  lastSeen: 2025-09-06T16:40:00.000Z
}
```

```
{
  _id: ObjectId('657777777777777777777777'),
  username: 'riyafashion',
  fullName: 'Riya Thakkar',
  email: 'riya.thakkar@example.com',
  age: 21,
  bio: 'Fashion & lifestyle',
  interests: [
    'fashion',
    'beauty',
    'lifestyle'
  ],
  location: {
    type: 'Point',
    coordinates: [
      73.2081,
      22.3072
    ],
    city: 'Vadodara',
    state: 'Gujarat'
  },
  screenTime: 250,
  isActive: true,
  createdAt: 2025-01-08T00:00:00.000Z,
  lastSeen: 2025-09-09T10:00:00.000Z
```

```
{
  _id: ObjectId('651010101010101010101010'),
  username: 'samart',
  fullName: 'Samir Shah',
  email: 'samir.shah@example.com',
  age: 32,
  bio: 'Digital artist & illustrator',
  interests: [
    'art',
    'design',
    'creativity'
  ],
  location: {
    type: 'Point',
    coordinates: [
      72.5714,
      23.0225
    ],
    city: 'Ahmedabad',
    state: 'Gujarat'
  },
  screenTime: 170,
  isActive: true,
  createdAt: 2025-01-30T00:00:00.000Z,
  lastSeen: 2025-09-09T09:00:00.000Z
```

From the above code inserted, the figures shows all the users which have screen time greater than 150 minutes .

4. Update a user's bio and interests

```
db.users.updateOne(
  { username: "kavyaedu" },
  { $set: { bio: "Educational content creator and book lover" } }
);
```

```
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```

From the above code inserted, the figure shows that user Kavya Modi's bio and interests have been updated.

5. Delete posts older than a specific date

```
db.posts.deleteMany({ createdAt: { $lt: new Date("2025-08-10") }
   });
```

```
> db.posts.deleteMany({ createdAt: { $lt: new Date("2025-08-10") } });
{
  acknowledged: true,
  deletedCount: 2
}
```

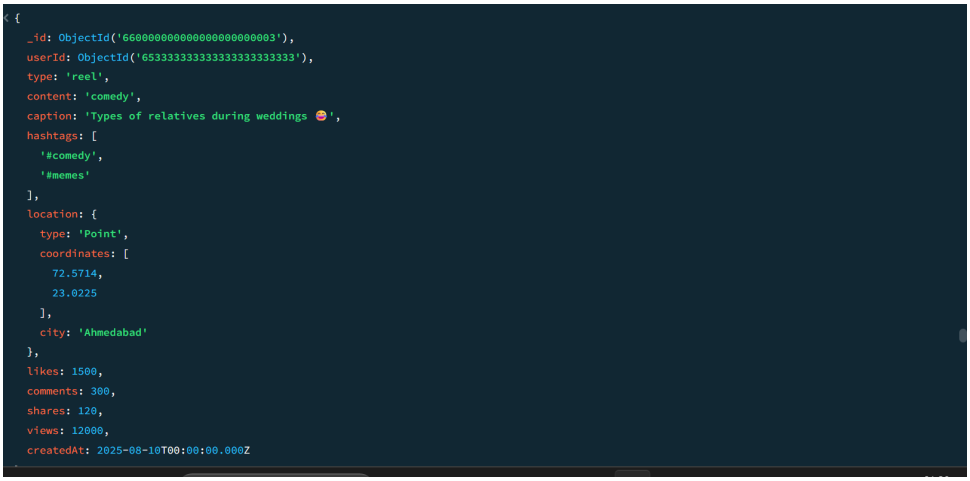
From the above code inserted, the figure shows the deleted posts older than a specfic date.

Task 2.2: Data Filtering and Sorting

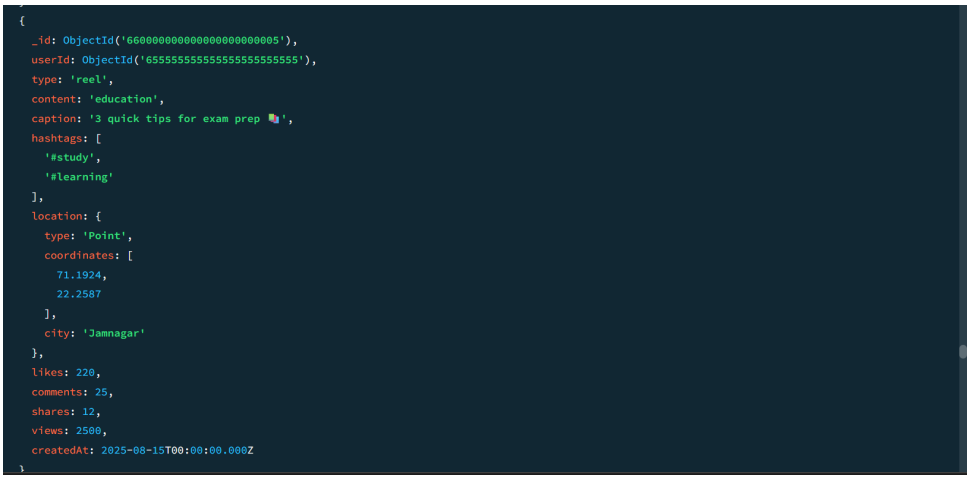
This section contains aggregation queries for data analysis on the UrbanWave platform.

1. Find posts of type "reel" with more than 100 likes

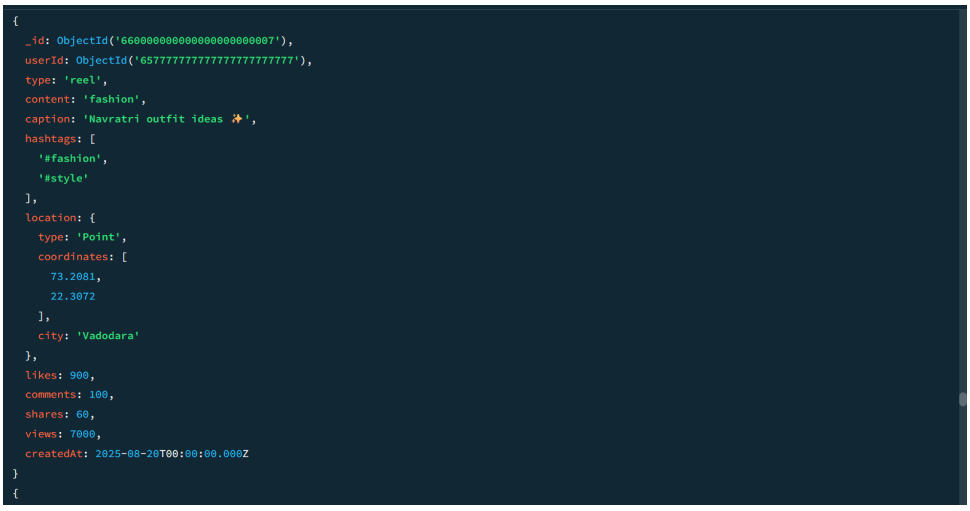
```
db.posts.find({
  type: "reel",
  likes: { $gt: 100 }
}).pretty();
```



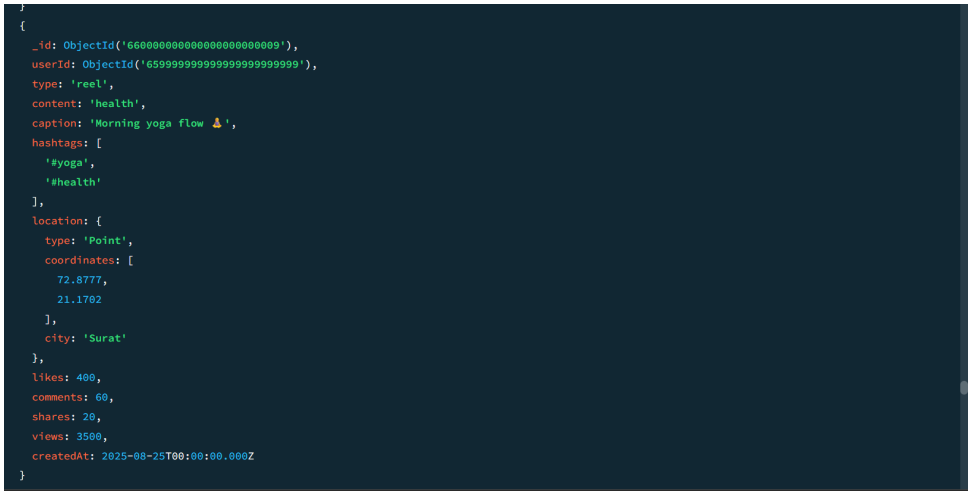
```
{
  _id: ObjectId('660000000000000000000003'),
  userId: ObjectId('653333333333333333333333'),
  type: 'reel',
  content: 'comedy',
  caption: 'Types of relatives during weddings 😂',
  hashtags: [
    '#comedy',
    '#memes'
  ],
  location: {
    type: 'Point',
    coordinates: [
      72.5714,
      23.0225
    ],
    city: 'Ahmedabad'
  },
  likes: 1500,
  comments: 300,
  shares: 120,
  views: 12000,
  createdAt: 2025-08-10T00:00:00.000Z
```



```
{
  _id: ObjectId('660000000000000000000005'),
  userId: ObjectId('655555555555555555555555'),
  type: 'reel',
  content: 'education',
  caption: '3 quick tips for exam prep 📚',
  hashtags: [
    '#study',
    '#learning'
  ],
  location: {
    type: 'Point',
    coordinates: [
      71.1924,
      22.2587
    ],
    city: 'Jamnagar'
  },
  likes: 220,
  comments: 25,
  shares: 12,
  views: 2500,
  createdAt: 2025-08-15T00:00:00.000Z
}
```



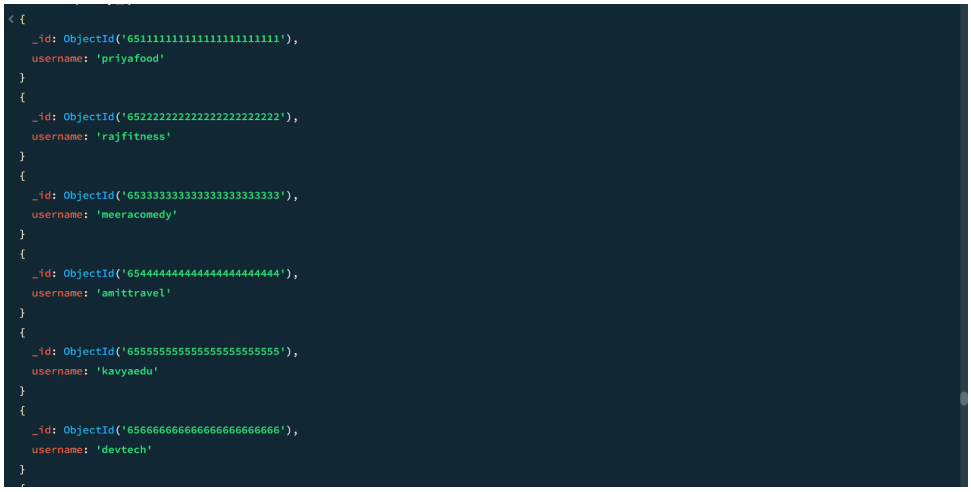
```
{
  _id: ObjectId('660000000000000000000007'),
  userId: ObjectId('657777777777777777777777'),
  type: 'reel',
  content: 'fashion',
  caption: 'Navratri outfit ideas ✨',
  hashtags: [
    '#fashion',
    '#style'
  ],
  location: {
    type: 'Point',
    coordinates: [
      73.2081,
      22.3072
    ],
    city: 'Vadodara'
  },
  likes: 900,
  comments: 100,
  shares: 60,
  views: 7000,
  createdAt: 2025-08-20T00:00:00.000Z
}
{
```

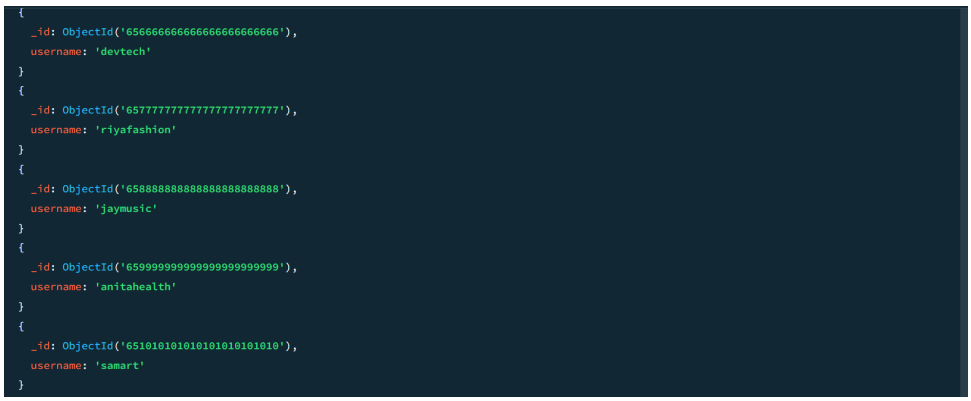


From the above code inserted, the figure shows reels with more than 100 likes.

2. Sort users by followers count (descending)

```
db.users.find({}, { username: 1, followersCount: 1 })
        .sort({ followersCount: -1 })
        .pretty();
```

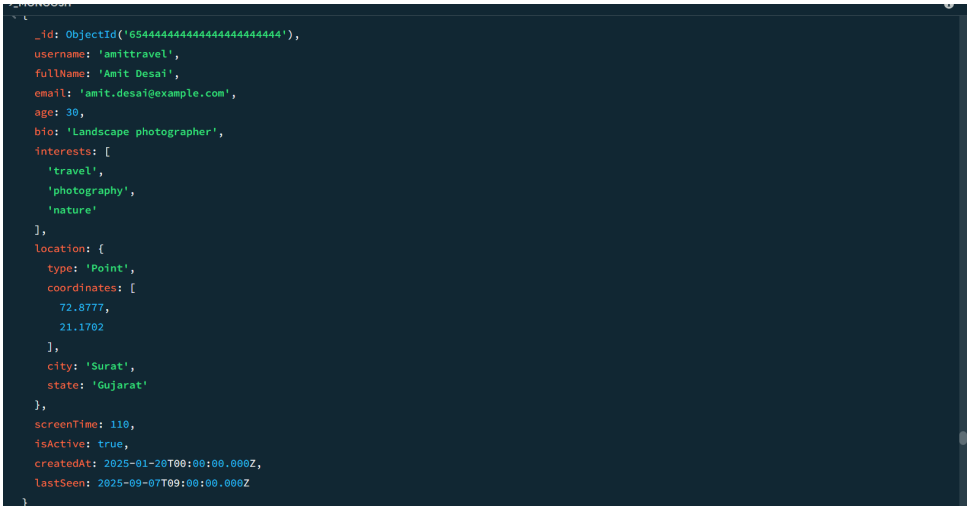




From the above code inserted, the figures shows all the users sorted in decensending order.

3.Find users with specific interests (e.g., ”travel” and ”photography”)

```
db.users.find({ interests: { $all: ["travel", "photography"] } })
    .pretty();
```



From the above code inserted, the figure shows user,Amit Desai who is interested in travel and photography.

4.Get posts from the last 30 days

```
const thirtyDaysAgo = new Date();
thirtyDaysAgo.setDate(thirtyDaysAgo.getDate() - 30);

db.posts.find({ createdAt: { $gte: thirtyDaysAgo } }).pretty();
```

From the above code inserted, all the figures show posts created 30 days ago.

5. Find inactive users

```
db.users.find({ isActive: false }).pretty();
```

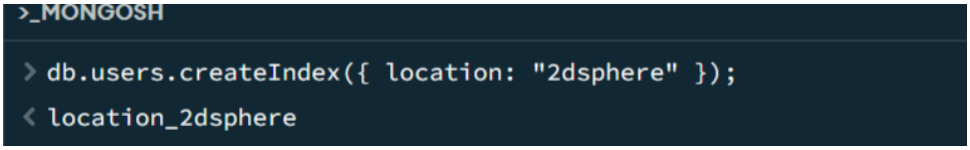
Since there are no inactive users there was no output for this code.

Phase 3

Task 3.1:Location-Based Queries

1.Create a 2dsphere index on user locations

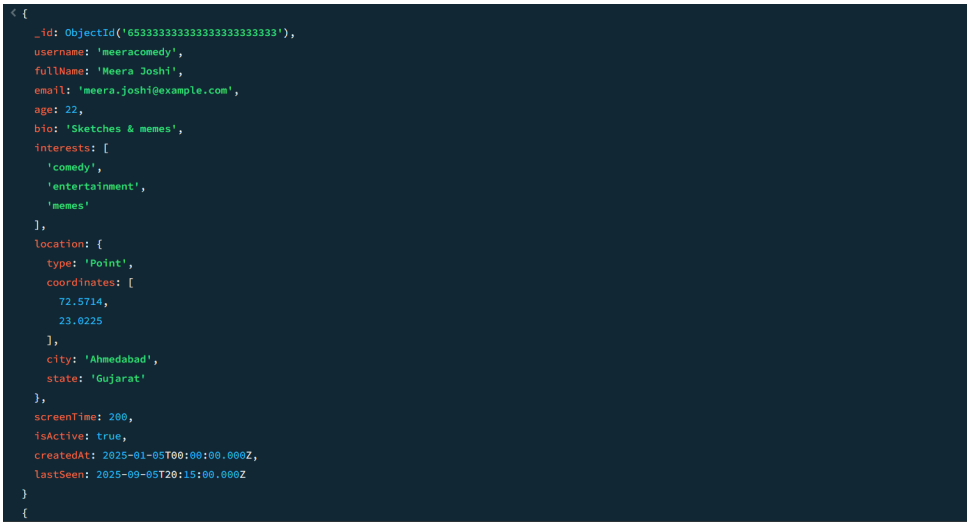
```
db.users.createIndex({ location: "2dsphere" });
```



From the above code inserted, the figure shows ouput of above code.

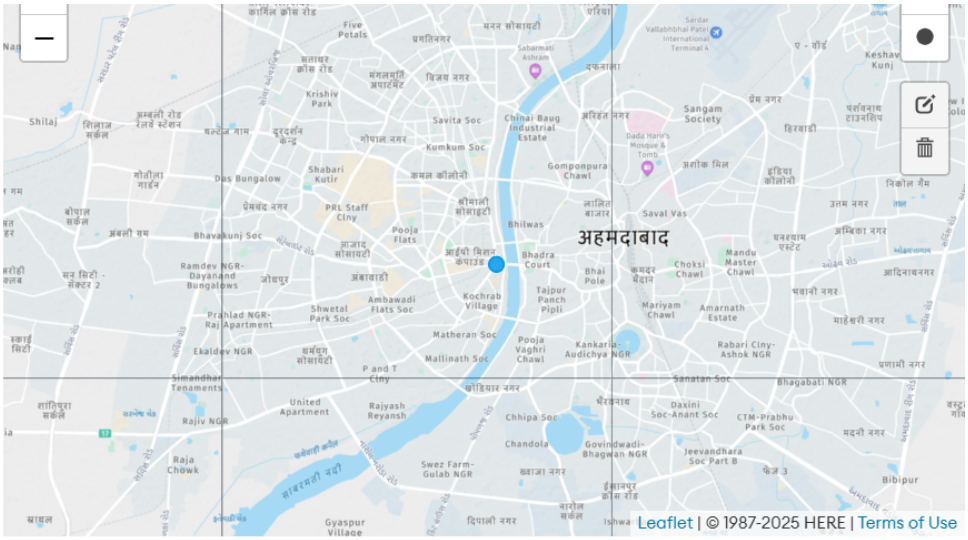
2.Find users within 100km radius of Ahmedabad

```
{ 'location.coordinates': { '$geoWithin': { '$centerSphere':
   [[72.5714, 23.0225], 100/6378.1] } } }
```



```
>_MONGOSH
}
{
  _id: ObjectId('651010101010101010101010'),
  username: 'samart',
  fullName: 'Samir Shah',
  email: 'samir.shah@example.com',
  age: 32,
  bio: 'Digital artist & illustrator',
  interests: [
    'art',
    'design',
    'creativity'
  ],
  location: {
    type: 'Point',
    coordinates: [
      72.5714,
      23.0225
    ],
    city: 'Ahmedabad',
    state: 'Gujarat'
  },
  screenTime: 170,
  isActive: true,
  createdAt: 2025-01-30T00:00:00.000Z,
  lastSeen: 2025-09-09T09:00:00.000Z
}
```

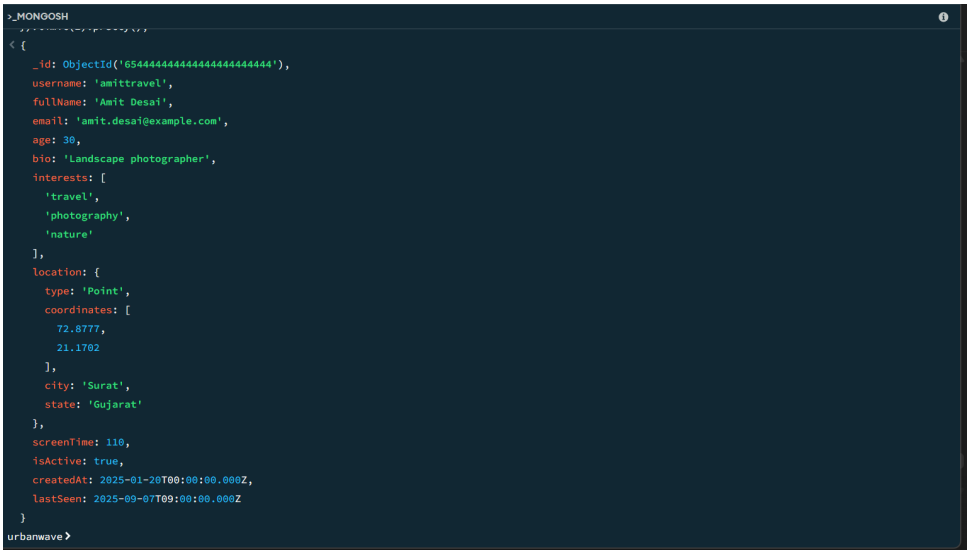
From the above code inserted, the figure shows 2 users within 100km of Ahmedabad,that is Meera Joshi and Samir Shah.



The map displays user located 100 km within Ahmedabad.

3. Find the nearest user to a given coordinate

```
{
  "location": {
    "$geoWithin": {
      "$centerSphere": [[72.8311, 21.1702], 100 / 6378.1]
    }
  }
}
```

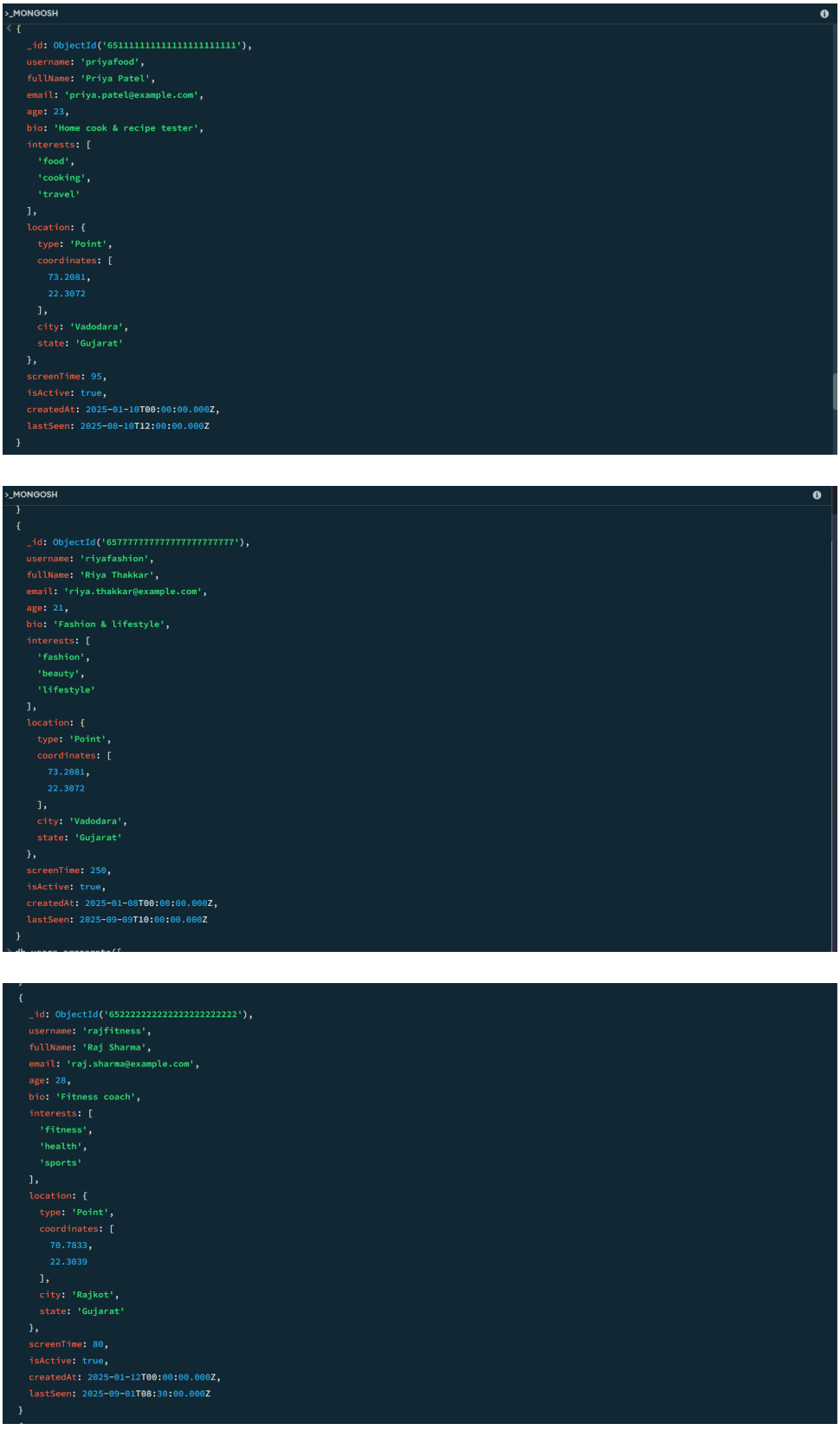


From the above code inserted, the figure shows the user from nearest coordinate chosen which was surat.

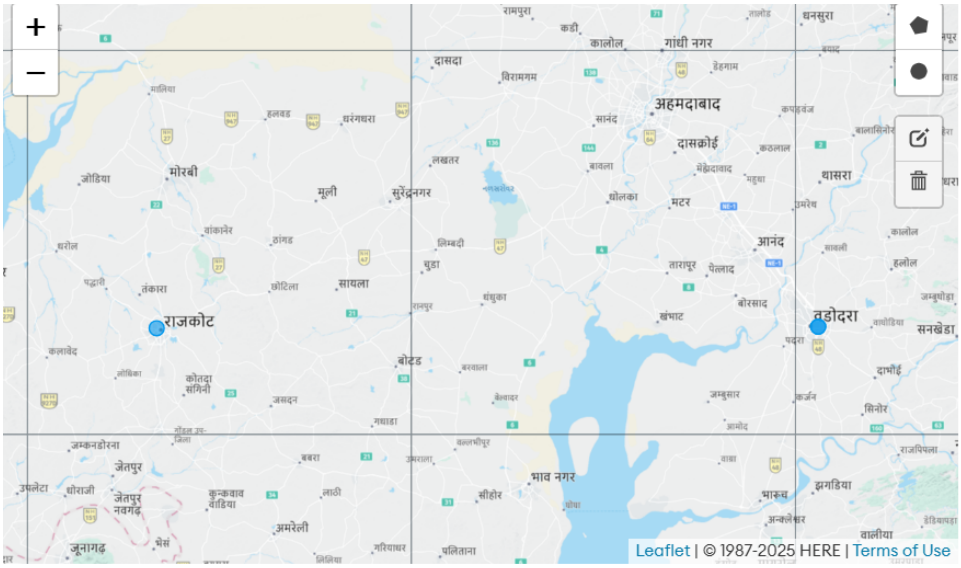
The map displays location of Anita Verma located in Surat.

4.Get users from multiple cities using *inoperator*

```
{
  "location.city": { "$in": ["Rajkot", "Vadodara"] }
};
```



From the above code inserted, the figure shows 3 different users from Rajkot and Vadodara.



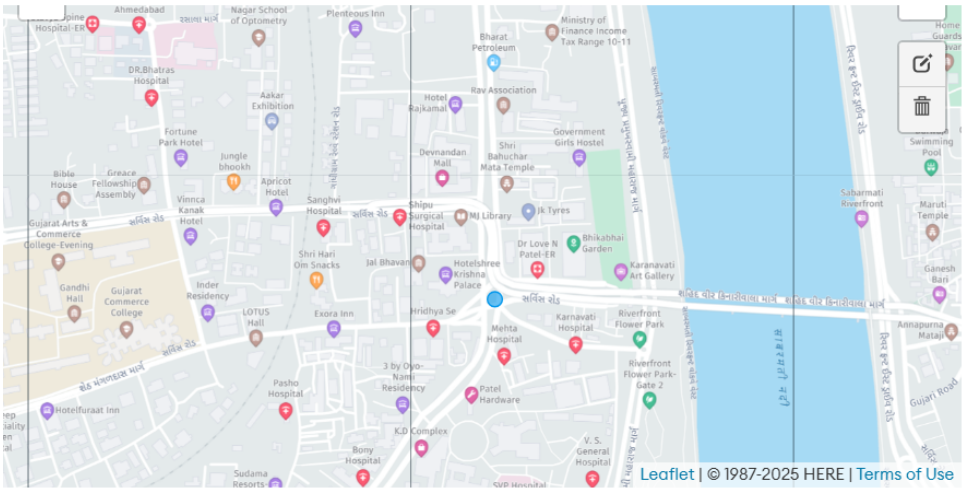
The map displays location of 2 users in 2 different cities.

5.Calculate distance between two users

```
{
  "location": {
    "$geoWithin": {
      "$centerSphere": [
        [72.5714, 23.0225],    // Riyas location
        50 / 6378.1            // radius = 50 km
      ]
    }
  },
  "username": "samart"
}
```

```
>_MONGOSH
  _id: ObjectId('651010101010101010101010'),
  username: 'samart',
  fullName: 'Samir Shah',
  email: 'samir.shah@example.com',
  age: 32,
  bio: 'Digital artist & illustrator',
  interests: [
    'art',
    'design',
    'creativity'
  ],
  location: {
    type: 'Point',
    coordinates: [
      72.5714,
      23.0225
    ],
    city: 'Ahmedabad',
    state: 'Gujarat'
  },
  screenTime: 170,
  isActive: true,
  createdAt: 2025-01-30T00:00:00.000Z,
  lastSeen: 2025-09-09T09:00:00.000Z
}
```

From the above code inserted, the figure shows 2 users Riya Thakkar and Samir Shah, where distance between their location is calculated which is 50 km.



This map shows the distance calculated between 2 users.Here Riya Thakkar's location is constant and Samir Shah's location is displayed

Conclusion

In this assignment, I explored MongoDB Operations like sorting, data filtering and geospatial features.I could find nearby users, check distances, and see them on a map.I understood the difference between the Json and GeoJson. Overall this project has helped me extensively by practical application of knowledge.