

Trail & Hiking Database

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About

A Trail and Hiking Database that is a comprehensive resource for outdoor enthusiasts, providing detailed information about hiking trails.

Overview

Trail Information:

- **Trail Name**
- **Location**
- **Distance**
- **Difficulty Level** (Easiest, Moderate, Moderately Strenuous, Strenuous, Very Strenuous)
- **Elevation Change**
- **Trail Type** (loop, out-and-back, or point-to-point)

Description and Features:

- **Trail Description**
- **Scenic Views**
- **Flora and Fauna**
- **Geological Features**

Amenities and Facilities:

- **Parking**
- **Restrooms**
- **Water Sources**
- **Picnic Areas**

Trail Conditions and Alerts:

- **Current Conditions**
- **Alerts and Closures**

User Reviews and Ratings:

- **User Ratings**
- **User Reviews**

Map:

- **Trail Map**
- **GPS Coordinates**

Safety Information:

- Trailhead Signage
- Emergency Contacts
- Wildlife Safety

User Contributions:

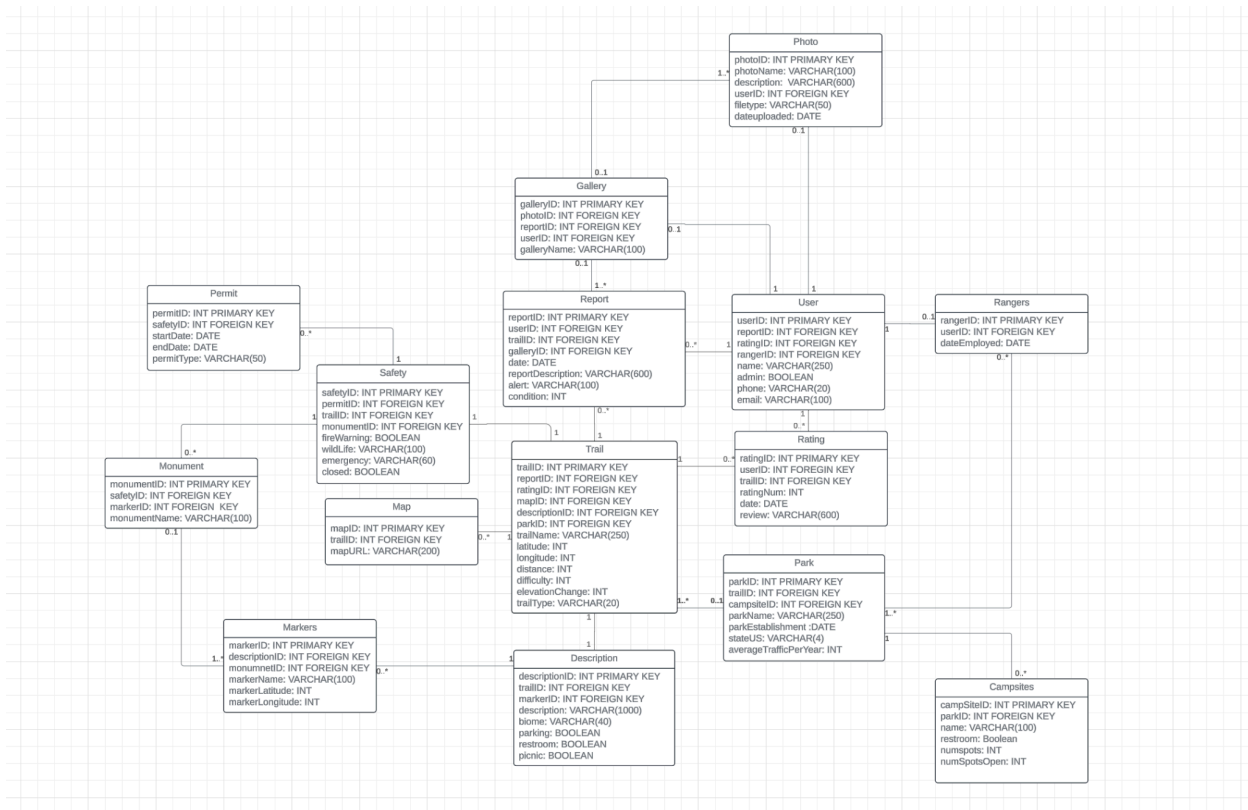
- Photo Gallery
- Trail Logs

Rules

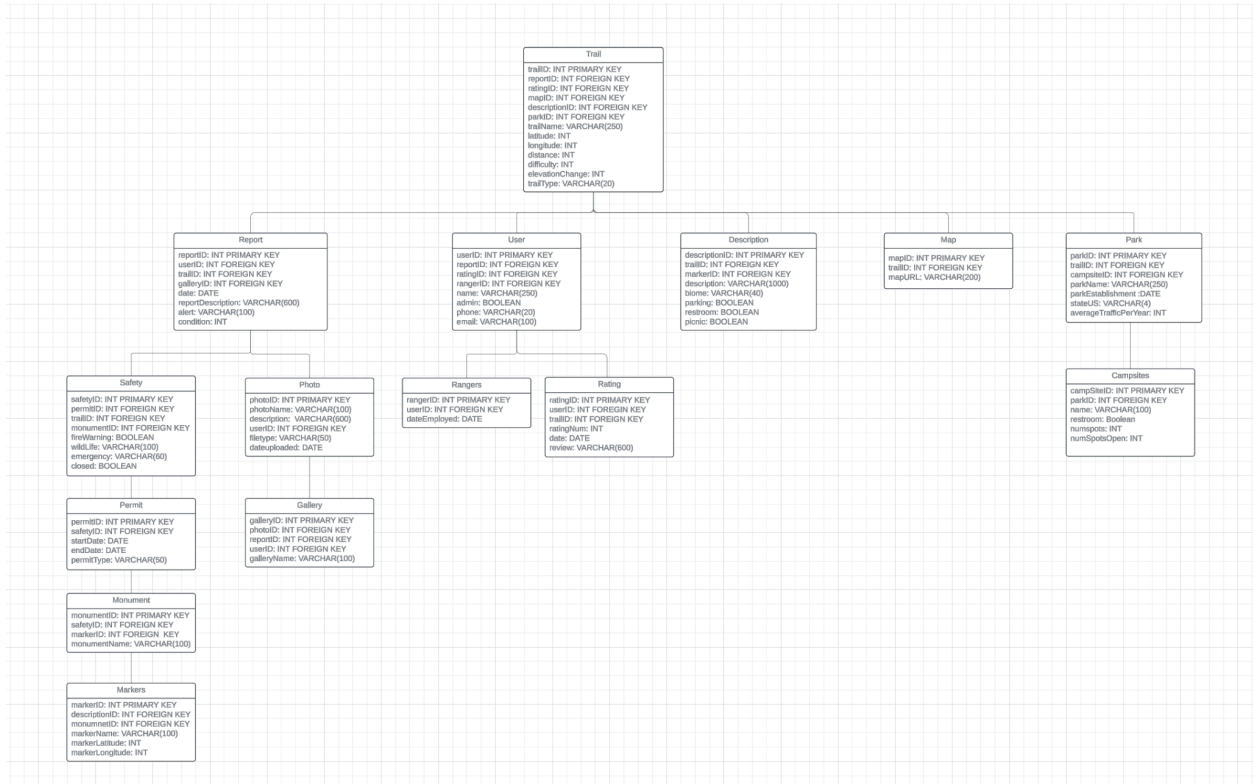
Nouns | Verbs

- Trail information which will have the name of the trail, location, distance, difficulty level based on elevation gain and distance, and a trail type
- Each trail will have an identification id and connected to it will be a description and features of the trail
- Connected to the description and features will be information about amenities and facilities such as bathroom, water, parking and picnic
- There will also be trail conditions and alerts that are updated in real time in order for hikers to stay safe
- User reviews with both user information, review, and rating associated with each
- Users able to write and submit reports of safety or about trail
- Safety information provided for each trail can be linked to condition and alerts
- Add and edit trails
- Administrative accounts
- Map link and relative GPS coordinate area
- Trails must have name, location, distance, difficulty and type
- Users can update trail condition with data associated
- Safety alerts only by admin accounts
- GPS start and end points

UML Diagram



Logical Model



Main Collection JSON

```

{

  "User": {

    "userID": "string",

    "reportID": "string",

    "ratingID": "string",

    "rangerID": "string",

    "name": "string",

    "admin": "boolean",

    "phone": "string",

    "email": "string"
  }
}
  
```

},

"Report": {

"reportID": "string",

"userID": "string",

"trailID": "string",

"galleryID": "string",

"date": "string",

"reportDescription": "string",

"alert": "boolean",

"condition": "string"

},

"Gallery": {

"galleryID": "string",

"photoID": "string",

"galleryName": "string"

},

"Photo": {

"photoID": "string",

"photoName": "string",

"description": "string",

"fileType": "string",

"dateUploaded": "string"

},

```
"Trail": {  
  "trailID": "string",  
  "reportID": "string",  
  "ratingID": "string",  
  "mapID": "string",  
  "parkID": "string",  
  "trailName": "string",  
  "latitude": "number",  
  "longitude": "number",  
  "distance": "number",  
  "difficulty": "string",  
  "elevationChange": "number",  
  "trailType": "string"
```

```
},
```

```
"Rating": {  
  "ratingID": "string",  
  "userID": "string",  
  "trailID": "string",  
  "ratingNum": "number",  
  "date": "string",  
  "review": "string"
```

```
},
```

```
"Map": {
```

```
"mapID": "string",  
"mapURL": "string"  
},  
"Safety": {  
  "safetyID": "string",  
  "permitID": "string",  
  "trailID": "string",  
  "monumentID": "string",  
  "fireWarning": "boolean",  
  "emergency": "boolean",  
  "wildLife": "boolean",  
  "closed": "boolean"  
},  
"Permit": {  
  "permitID": "string",  
  "safetyID": "string",  
  "startDate": "string",  
  "endDate": "string",  
  "permitType": "string"  
},  
"Monument": {  
  "monumentID": "string",  
  "safetyID": "string",
```

```
"markerID": "string",  
"monumentName": "string"  
},  
"Markers": {  
  "markerID": "string",  
  "descriptionID": "string",  
  "markerName": "string",  
  "markerLatitude": "number",  
  "markerLongitude": "number"  
},  
"Description": {  
  "descriptionID": "string",  
  "trailID": "string",  
  "parkID": "string",  
  "description": "string",  
  "biome": "string",  
  "parking": "string",  
  "restroom": "boolean",  
  "picnic": "boolean"  
},  
"Park": {  
  "parkID": "string",  
  "parkName": "string",
```



```
    "parkEstablishmentDate": "string",
    "stateUS": "string",
    "averageTrafficPerYear": "number"
  },
  "Campsites": {
    "campsiteID": "string",
    "name": "string",
    "restroom": "boolean",
    "numSpots": "number",
    "numSpotsOpen": "number"
  },
  "Rangers": {
    "rangerID": "string",
    "userID": "string",
    "dateEmployed": "string"
  },
  "WorksAt": {
    "rangerID": "string",
    "parkID": "string"
  }
}
```

Database Queries:

```
-- 1. Retrieve a list of trail names, descriptions, and URL to online map and filter

[

  {

    "$lookup": {

      "from": "Description",

      "localField": "trailID",

      "foreignField": "trailID",

      "as": "description"

    }

  },

  {

    "$unwind": "$description"

  },

  {

    "$lookup": {
```

```
    "from": "Map",

    "localField": "trailID",

    "foreignField": "trailID",

    "as": "map"

  }

},

{

  "$match": {

    "$or": [

      { "description.biome": "Forest" },

      { "description.biome": "Mountain" }

    ]

  }

},

{

  "$project": {

    "trailName": 1,

    "description": "$description.description",

    "mapURL": "$map.mapURL",

    "_id": 0

  }

}
```

```
]

-- 2. Retrieves all safety info on trails for specific user

[

  {

    "$lookup": {

      "from": "Trail",

      "localField": "trailID",

      "foreignField": "trailID",

      "as": "trail"

    }

  },

  {

    "$match": {

      "userID": "specificUserID"

    }

  },

  {

    "$count": "safetyCountForUser"

  }

]
```

```
-- 3. Update boolean value for safety
```

```
[  
  
  {  
  
    "$match": {  
  
      "safetyID": "specificSafetyID"  
  
    }  
  
  },  
  
  {  
  
    "$set": {  
  
      "emergency": false  
  
    }  
  
  }  
  
]
```

```
-- 4. Retrieve trails with a difficulty level above 2 and a distance greater than 5 or  
greater elevation change than 500
```

```
[
  {
    "$match": {
      "$and": [
        { "distance": { "$gt": 5 } },
        { "elevationChange": { "$gt": 500 } },
        { "difficulty": { "$gt": 2 } }
      ]
    }
  }
]
```

-- 5. Retrieve names of administrators with reports dating back to beginning of 2023 and the descriptions as well as trail names

```
[
  {
    "$lookup": {
      "from": "Report",
      "localField": "userID",
      "foreignField": "userID",
      "as": "reports"
    }
  }
]
```

```
},

{

  "$sunwind": "$reports"

},

{

  "$lookup": {

    "from": "Trail",

    "localField": "reports.trailID",

    "foreignField": "trailID",

    "as": "trail"

  }

},

{

  "$match": {

    "$and": [

      { "reports.date": { "$gt": "2023-01-01" } },

      { "admin": true }

    ]

  }

},

{

  "$project": {
```

```
"name": 1,  
  
"reportDescription": "$reports.reportDescription",  
  
"trailName": "$trail.trailName",  
  
"_id": 0  
  
}  
  
}  
  
]
```