

Case Study: Product Data Analysis using MongoDB

Database: Hexaware

Collection: products

Sample Dataset

```
[
  {
    "id": "1",
    "product_name": "Intelligent Fresh Chips",
    "product_price": 655.00,
    "product_material": "Concrete",
    "product_color": "mint green"
  },....
]
```

Each document (record) in the MongoDB products collection describes a product with the following fields:

Field Name	Description
id	A unique identifier for the product (as a string)
product_name	The name or title of the product (e.g., <i>Intelligent Fresh Chips</i>)
product_price	The price of the product (a number/float)
product_material	The material used to make the product (e.g., <i>Concrete, Soft</i>)
product_color	The color of the product (e.g., <i>mint green, indigo</i>)

This type of data is typically used in:

- **E-commerce platforms** to list and filter products based on price, color, material, etc.
- **Inventory systems** to manage stock and pricing.
- **Product analytics** to perform queries like price ranges, search by material or color, or detect duplicate pricing errors.

Inserting data

```
Hexaware> db.products.insertMany([
...   {
...     "id": "1",
...     "product_name": "Intelligent Fresh Chips",
...     "product_price": 655.00,
...     "product_material": "Concrete",
...     "product_color": "mint green",
...   },
...   {
...     "id": "2",
...     "product_name": "Practical Fresh Sausages",
...     "product_price": 911.0,
...     "product_material": "Cotton",
...     "product_color": "indigo",
...   },
...   {
...     "id": "3",
...     "product_name": "Refined Steel Car",
...     "product_price": 690.00,
...     "product_material": "Rubber",
...     "product_color": "gold",
...   },
...   {
...     "id": "4",
...     "product_name": "Gorgeous Plastic Pants",
...     "product_price": 492.00,
...     "product_material": "Soft",
...     "product_color": "plum",
...   },
...   {
...     "id": "5",
...     "product_name": "Sleek Cotton Chair",
...     "product_price": 33.00,
...     "product_material": "Fresh",
...     "product_color": "black",
...   },
...   {
...     "id": "6",
...     "product_name": "Awesome Wooden Towels",
...     "product_price": 474.00,
...     "product_material": "Plastic",
...     "product_color": "orange",
...   },
...   {
...     "id": "7",
...     "product_name": "Practical Soft Shoes",
...     "product_price": 500.00,
...     "product_material": "Rubber",
...     "product_color": "pink",
...   },
...   {
...     "id": "8",
...     "product_name": "Incredible Steel Hat",
...     "product_price": 78.00,
...     "product_material": "Rubber",
...     "product_color": "violet",
...   },
...   {
...     "id": "9",
...     "product_name": "Awesome Wooden Ball",
...     "product_price": 28.00,
...     "product_material": "Soft",
...     "product_color": "azure",
...   },
...   {
...     "id": "10",
...     "product_name": "Generic Wooden Pizza",
...     "product_price": 84.00,
...     "product_material": "Frozen",
...   }
... ])
```

‘products’ Document Created Successfully

```
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('68809d163a2c1568c2eec4a9'),
    '1': ObjectId('68809d163a2c1568c2eec4aa'),
    '2': ObjectId('68809d163a2c1568c2eec4ab'),
    '3': ObjectId('68809d163a2c1568c2eec4ac'),
    '4': ObjectId('68809d163a2c1568c2eec4ad'),
    '5': ObjectId('68809d163a2c1568c2eec4ae'),
    '6': ObjectId('68809d163a2c1568c2eec4af'),
    '7': ObjectId('68809d163a2c1568c2eec4b0'),
    '8': ObjectId('68809d163a2c1568c2eec4b1'),
    '9': ObjectId('68809d163a2c1568c2eec4b2'),
    '10': ObjectId('68809d163a2c1568c2eec4b3'),
    '11': ObjectId('68809d163a2c1568c2eec4b4'),
    '12': ObjectId('68809d163a2c1568c2eec4b5'),
    '13': ObjectId('68809d163a2c1568c2eec4b6'),
    '14': ObjectId('68809d163a2c1568c2eec4b7'),
    '15': ObjectId('68809d163a2c1568c2eec4b8'),
    '16': ObjectId('68809d163a2c1568c2eec4b9'),
    '17': ObjectId('68809d163a2c1568c2eec4ba'),
    '18': ObjectId('68809d163a2c1568c2eec4bb'),
    '19': ObjectId('68809d163a2c1568c2eec4bc'),
    '20': ObjectId('68809d163a2c1568c2eec4bd'),
    '21': ObjectId('68809d163a2c1568c2eec4be'),
    '22': ObjectId('68809d163a2c1568c2eec4bf'),
    '23': ObjectId('68809d163a2c1568c2eec4c0'),
    '24': ObjectId('68809d163a2c1568c2eec4c1')
  }
}
hexaware> |
```

MongoDB Operations & Results

1. Find all the information about each product

db.products.find({})

```
hexamare> db.products.find({})
{
  "_id": ObjectId("68809d163a2c1568c2eec4a9"),
  "id": "1",
  "product_name": 'Intelligent Fresh Chips',
  "product_price": 655,
  "product_material": 'Concrete',
  "product_color": 'mint green'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4aa"),
  "id": "2",
  "product_name": 'Practical Fresh Sausages',
  "product_price": 911,
  "product_material": 'Cotton',
  "product_color": 'indigo'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4ab"),
  "id": "3",
  "product_name": 'Refined Steel Car',
  "product_price": 690,
  "product_material": 'Rubber',
  "product_color": 'gold'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4ac"),
  "id": "4",
  "product_name": 'Gorgeous Plastic Pants',
  "product_price": 492,
  "product_material": 'Soft',
  "product_color": 'plum'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4ad"),
  "id": "5",
  "product_name": 'Sleek Cotton Chair',
  "product_price": 33,
  "product_material": 'Fresh',
  "product_color": 'black'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4ae"),
  "id": "6",
  "product_name": 'Awesome Wooden Towels',
  "product_price": 474,
  "product_material": 'Plastic',
  "product_color": 'orange'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4af"),
  "id": "7",
  "product_name": 'Practical Soft Shoes',
  "product_price": 500,
  "product_material": 'Rubber',
  "product_color": 'pink'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b0"),
  "id": "8",
  "product_name": 'Incredible Steel Hat',
  "product_price": 78,
  "product_material": 'Rubber',
  "product_color": 'violet'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b1"),
  "id": "9",
  "product_name": 'Awesome Wooden Ball',
  "product_price": 29,
  "product_material": 'Soft',
  "product_color": 'azure'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b2"),
  "id": "10",
  "product_name": 'Generic Wooden Pizza',
  "product_price": 84,
  "product_material": 'Frozen',
  "product_color": 'indigo'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b3"),
  "id": "11",
  "product_name": 'Unbranded Wooden Cheese',
  "product_price": 26,
  "product_material": 'Soft',
  "product_color": 'black'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b4"),
  "id": "12",
  "product_name": 'Unbranded Plastic Salad',
  "product_price": 89,
  "product_material": 'Wooden',
  "product_color": 'pink'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b5"),
  "id": "13",
  "product_name": 'Gorgeous Cotton Keyboard',
  "product_price": 37,
  "product_material": 'Concrete',
  "product_color": 'sky blue'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b6"),
  "id": "14",
  "product_name": 'Incredible Steel Shirt',
  "product_price": 54,
  "product_material": 'Metal',
  "product_color": 'white'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b7"),
  "id": "15",
  "product_name": 'Ergonomic Cotton Hat',
  "product_price": 43,
  "product_material": 'Rubber',
  "product_color": 'mint green'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b8"),
  "id": "16",
  "product_name": 'Small Soft Chair',
  "product_price": 47,
  "product_material": 'Cotton',
  "product_color": 'teal'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4b9"),
  "id": "17",
  "product_name": 'Incredible Metal Car',
  "product_price": 36,
  "product_material": 'Fresh',
  "product_color": 'indigo'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4ba"),
  "id": "18",
  "product_name": 'Licensed Plastic Bacon',
  "product_price": 88,
  "product_material": 'Steel',
  "product_color": 'yellow'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4bb"),
  "id": "19",
  "product_name": 'Intelligent Cotton Chips',
  "product_price": 46,
  "product_material": 'Soft',
  "product_color": 'azure'
},
{
  "_id": ObjectId("68809d163a2c1568c2eec4bc"),
  "id": "20",
  "product_name": 'Handcrafted Wooden Bacon',
  "product_price": 36,
  "product_material": 'Concrete',
  "product_color": 'lime'
}
```

2. Find the products with product_price between 400 and 800

```
db.products.find({ product_price: { $gte: 400, $lte: 800 } })
```

```
hexaware> db.products.find({ product_price: { $gte: 400, $lte: 800 } })
[
  {
    _id: ObjectId('68809d163a2c1568c2eec4a9'),
    id: '1',
    product_name: 'Intelligent Fresh Chips',
    product_price: 655,
    product_material: 'Concrete',
    product_color: 'mint green'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4ab'),
    id: '3',
    product_name: 'Refined Steel Car',
    product_price: 690,
    product_material: 'Rubber',
    product_color: 'gold'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4ac'),
    id: '4',
    product_name: 'Gorgeous Plastic Pants',
    product_price: 492,
    product_material: 'Soft',
    product_color: 'plum'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4ae'),
    id: '6',
    product_name: 'Awesome Wooden Towels',
    product_price: 474,
    product_material: 'Plastic',
    product_color: 'orange'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4af'),
    id: '7',
    product_name: 'Practical Soft Shoes',
    product_price: 500,
    product_material: 'Rubber',
    product_color: 'pink'
  }
]
hexaware> |
```

3. Find the products with product_price not between 400 and 600

```
db.products.find({ $or: [ { product_price: { $lt: 400 } }, { product_price: { $gt: 600 } } ] })
```

```
hexaware> db.products.find({ $or: [ { product_price: { $lt: 400 } }, { product_price: { $gt: 600 } } ] })
[
  {
    _id: ObjectId('68809d163a2c1568c2eec4a9'),
    id: '1',
    product_name: 'Intelligent Fresh Chips',
    product_price: 655,
    product_material: 'Concrete',
    product_color: 'mint green'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4aa'),
    id: '2',
    product_name: 'Practical Fresh Sausages',
    product_price: 911,
    product_material: 'Cotton',
    product_color: 'indigo'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4ab'),
    id: '3',
    product_name: 'Refined Steel Car',
    product_price: 690,
    product_material: 'Rubber',
    product_color: 'gold'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4ad'),
    id: '5',
    product_name: 'Sleek Cotton Chair',
    product_price: 35,
    product_material: 'Fresh',
    product_color: 'black'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4b0'),
    id: '8',
    product_name: 'Incredible Steel Hat',
    product_price: 78,
    product_material: 'Rubber',
    product_color: 'violet'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4b1'),
    id: '9',
    product_name: 'Awesome Wooden Ball',
    product_price: 28,
    product_material: 'Soft',
    product_color: 'crane'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4b3'),
    id: '10',
    product_name: 'Generic Wooden Pizza',
    product_price: 84,
    product_material: 'Frozen',
    product_color: 'indigo'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4b4'),
    id: '11',
    product_name: 'Unbranded Wooden Cheese',
    product_price: 26,
    product_material: 'Soft',
    product_color: 'black'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4b4'),
    id: '12',
    product_name: 'Unbranded Wooden Cheese',
    product_price: 26,
    product_material: 'Soft',
    product_color: 'black'
  }
]
```

4. List the first four products with product_price greater than 500

db.products.find({ product_price: { \$gt: 500 } }).limit(4)

```
hexaware> db.products.find({ product_price: { $gt: 500 } }).limit(4)
[
  {
    _id: ObjectId('68809d163a2c1568c2eec4a9'),
    id: '1',
    product_name: 'Intelligent Fresh Chips',
    product_price: 655,
    product_material: 'Concrete',
    product_color: 'mint green'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4aa'),
    id: '2',
    product_name: 'Practical Fresh Sausages',
    product_price: 911,
    product_material: 'Cotton',
    product_color: 'indigo'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4ab'),
    id: '3',
    product_name: 'Refined Steel Car',
    product_price: 690,
    product_material: 'Rubber',
    product_color: 'gold'
  }
]
hexaware> |
```

5. Find product_name and product_material for each product

db.products.find({}, { product_name: 1, product_material: 1, _id: 0 })

```
hexaware> db.products.find({}, { product_name: 1, product_material: 1, _id: 0 })
[
  {
    product_name: 'Intelligent Fresh Chips',
    product_material: 'Concrete'
  },
  {
    product_name: 'Practical Fresh Sausages',
    product_material: 'Cotton'
  },
  {
    product_name: 'Refined Steel Car', product_material: 'Rubber' },
  {
    product_name: 'Gorgeous Plastic Pants', product_material: 'Soft' },
  {
    product_name: 'Sleek Cotton Chair', product_material: 'Fresh' },
  {
    product_name: 'Awesome Wooden Towels',
    product_material: 'Plastic'
  },
  {
    product_name: 'Practical Soft Shoes', product_material: 'Rubber' },
  {
    product_name: 'Incredible Steel Hat', product_material: 'Rubber' },
  {
    product_name: 'Awesome Wooden Ball', product_material: 'Soft' },
  {
    product_name: 'Generic Wooden Pizza', product_material: 'Frozen' },
  {
    product_name: 'Unbranded Wooden Cheese', product_material: 'Soft' },
  {
    product_name: 'Unbranded Plastic Salad',
    product_material: 'Wooden'
  },
  {
    product_name: 'Gorgeous Cotton Keyboard',
    product_material: 'Concrete'
  },
  {
    product_name: 'Incredible Steel Shirt', product_material: 'Metal' },
  {
    product_name: 'Ergonomic Cotton Hat', product_material: 'Rubber' },
  {
    product_name: 'Small Soft Chair', product_material: 'Cotton' },
  {
    product_name: 'Incredible Metal Car', product_material: 'Fresh' },
  {
    product_name: 'Licensed Plastic Bacon', product_material: 'Steel' },
  {
    product_name: 'Intelligent Cotton Chips',
    product_material: 'Soft'
  },
  {
    product_name: 'Handcrafted Wooden Bacon',
    product_material: 'Concrete'
  }
]
Type "it" for more
hexaware> |
```

6. Find the product with id equal to "10"

```
db.products.find({ id: "10" })
```

```
hexaware> db.products.find({ id: "10" })
[
  {
    _id: ObjectId('68809d163a2c1568c2eec4b2'),
    id: '10',
    product_name: 'Generic Wooden Pizza',
    product_price: 84,
    product_material: 'Frozen',
    product_color: 'indigo'
  }
]
hexaware> |
```

7. Project only product_name and product_material

```
db.products.find({}, { product_name: 1, product_material: 1, _id: 0 })
```

```
hexaware> db.products.find({}, { product_name: 1, product_material: 1, _id: 0 })
[
  {
    product_name: 'Intelligent Fresh Chips',
    product_material: 'Concrete'
  },
  {
    product_name: 'Practical Fresh Sausages',
    product_material: 'Cotton'
  },
  {
    product_name: 'Refined Steel Car', product_material: 'Rubber' },
  {
    product_name: 'Gorgeous Plastic Pants', product_material: 'Soft' },
  {
    product_name: 'Sleek Cotton Chair', product_material: 'Fresh' },
  {
    product_name: 'Awesome Wooden Towels',
    product_material: 'Plastic'
  },
  {
    product_name: 'Practical Soft Shoes', product_material: 'Rubber' },
  {
    product_name: 'Incredible Steel Hat', product_material: 'Rubber' },
  {
    product_name: 'Awesome Wooden Ball', product_material: 'Soft' },
  {
    product_name: 'Generic Wooden Pizza', product_material: 'Frozen' },
  {
    product_name: 'Unbranded Wooden Cheese', product_material: 'Soft' },
  {
    product_name: 'Unbranded Plastic Salad',
    product_material: 'Wooden'
  },
  {
    product_name: 'Gorgeous Cotton Keyboard',
    product_material: 'Concrete'
  },
  {
    product_name: 'Incredible Steel Shirt', product_material: 'Metal' },
  {
    product_name: 'Ergonomic Cotton Hat', product_material: 'Rubber' },
  {
    product_name: 'Small Soft Chair', product_material: 'Cotton' },
  {
    product_name: 'Incredible Metal Car', product_material: 'Fresh' },
  {
    product_name: 'Licensed Plastic Bacon', product_material: 'Steel' },
  {
    product_name: 'Intelligent Cotton Chips',
    product_material: 'Soft'
  },
  {
    product_name: 'Handcrafted Wooden Bacon',
    product_material: 'Concrete'
  }
]
Type "it" for more
hexaware> |
```

8. Find all products where product_material contains "soft" (case-insensitive)

```
db.products.find({ product_material: /soft/i })
```

```
hexaware> db.products.find({ product_material: /soft/i })
[
  {
    _id: ObjectId('68809d163a2c1568c2eec4ac'),
    id: '9',
    product_name: 'Gorgeous Plastic Pants',
    product_price: 492,
    product_material: 'Soft',
    product_color: 'pink'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4b1'),
    id: '9',
    product_name: 'Awesome Wooden Ball',
    product_price: 28,
    product_material: 'Soft',
    product_color: 'azure'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4b3'),
    id: '2',
    product_name: 'Unbranded Wooden Cheese',
    product_price: 26,
    product_material: 'Soft',
    product_color: 'black'
  },
  {
    _id: ObjectId('68809d163a2c1568c2eec4bb'),
    id: '19',
    product_name: 'Intelligent Cotton Chips',
    product_price: 46,
    product_material: 'Soft',
    product_color: 'azure'
  }
]
hexaware> |
```

Conclusion

This MongoDB case study demonstrates various data retrieval and manipulation operations using real-world product data. CRUD operations such as filtering (\$gte, \$lte, \$or), projections, aggregation (\$group), and deletions are efficiently used to analyze and clean data stored in a MongoDB collection.