AN INTERNSHIP REPORT
ON

ADVANCE SEARCH FEATURE FOR A FORENSIC CUSTOMER PORTAL

Submitted by,

Mr. Pranay Srinivas - 20211CAI0056

Under the guidance of,

Mr. JAI KUMAR B

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence and Machine Learning)

At

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY

BENGALURU

MAY 2025

PRESIDENCY UNIVERSITY

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Internship/Project report **"ADVANCE SEARCH FEATURE FOR FORENSIC CUSTOMER PORTAL"** being submitted by "Pranay Srinivas" bearing roll number "20211CAI0056" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence and Machine Learning) is a bonafide work carried out under my supervision.

Mr. Jai Kumar B
Assistant Professor
PSCS
Presidency University

Dr. Zafar Ali Khan
Professor & HoD
PSCS
Presidency University

Dr. MYDHILI NAIR
Associate Dean
PSCS
Presidency University

Dr. SAMEERUDDIN KHAN
Pro-Vice Chancellor - Engineering
Dean –PSCS / PSIS
Presidency University

PRESIDENCY UNIVERSITY

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

DECLARATION

I hereby declare that the work, which is being presented in the report entitled **"ADVANCE SEARCH FEATURE FOR FORENSIC CUSTOMER PORTAL"** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering (Artificial Intelligence and Machine Learning),** is a record of my own investigations carried under the guidance of **Mr. Jai Kumar, Assistant Professor, Presidency School of Computer Science and Engineering, Presidency University, Bengaluru.**

I have not submitted the matter presented in this report anywhere for the award of any other Degree.

PRANAY SRINIVAS

20211CAI0056

Pranay

ABSTRACT

During my internship at Samartha Infosolution, I was actively involved in the development of an advanced search feature for a forensic customer portal. My primary contribution focused on designing and implementing an efficient and scalable search mechanism that could fetch relevant data quickly and accurately across multiple datasets.

I integrated MySQL Full-Text Search into the backend, which significantly improved the performance and accuracy of keyword-based queries. This approach enabled the system to perform faster, more intelligent text matching across large tables, ensuring relevant results were returned even with partial or imprecise input. The search logic included dynamic table mapping using JSON configurations, with fallback strategies for unmatched queries, making the system more robust and user-friendly.

On the frontend, I also developed a navigation-enabled interface, allowing users to seamlessly explore search results and drill down into detailed views. This provided a smooth and intuitive user experience, aligning well with the forensic portal's goal of rapid and precise data access.
Overall, the project not only enhanced the system's search capabilities but also added value in terms of user efficiency, system performance, and data accessibility.

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6	Similarity Index / Plagiarism Check report clearly showing the Percentage (%)- first page enclosed?	4%.
7	Details of mapping the project with the Sustainable Development Goals (SDGs) enclosed?	Yes.
8	Are the Documents uploaded by students in GITHUB and Drive Shared 1. Complete Code (with all the supporting files). 2. Signed Final Report PDF. 3. Final Review PPT.	Yes.

Guide Name: Mr Jai Kumar B.

Guide Signature:

Semester: 8

Reporting HoD Name: Dr. Zafar ALI Khan.

Date: 16/05/25.

Roll no: 20211CAI0056.

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Chapter 1

INTRODUCTION

1.1 Overview of the Organization

Samartha InfoSolutions, established in 2006, is a privately owned IT solutions and services organization based in Bengaluru, Karnataka, India. With over 15 years of experience, the company specializes in delivering a range of services

Service Offerings:

1.1.1 IT Infrastructure Management:

Samartha provides infrastructure management services to large technology companies and enterprises, focusing on areas such as server management, virtualization, cloud computing, network automation, and application support.

1.1.2 Business Technology Optimization (BTO):

The company offers BTO services aimed at improving operational efficiency and reducing downtime. This includes optimizing business processes and implementing technology solutions that enhance performance.

1.1.3 Software Solutions:

Samartha has a strong development team proficient in providing a wide range of software solutions, including Software as a Service (SaaS), cloud-based applications, Model-View-Controller (MVC) frameworks, automation tools, and artificial intelligence integrations. Their expertise spans multiple technologies such as Java J2EE/J2ME, Microsoft .NET, C/C++, and scripting languages like PHP, Perl, and Python.

1.1.4 Web and Mobile Solutions:

The company develops innovative web and mobile applications tailored to client needs, leveraging the latest technologies to deliver user-friendly and efficient solutions.

1.2 Introduction to the Advance search feature:

An **advanced search feature** allows users to search for information in a smarter and more efficient way. Unlike basic search, which looks for exact matches, advanced search understands the context of the query and searches across multiple relevant fields or categories. It can handle partial matches, filter results, and sort data more intelligently.

This feature is designed to help users find exactly what they're looking for even if they don't type the exact words—by improving how results are matched, ranked, and displayed. It often includes support for keyword-based searching, filters, and more accurate result fetching, making the overall experience faster, easier, and more effective.

1.3 Tools and Technologies Used:

1.3.1. MySQL

- Feature: Full-Text Search (FULLTEXT indexes)
- Purpose: Enables fast and accurate keyword-based text searches across large datasets.
- Benefits: Supports natural language search, boolean mode, and relevance-based ranking.4

1.3.2. Node.js

- Role: Backend runtime environment for executing server-side logic and database interactions.

1.3.3. Express.js

- Purpose: Lightweight web framework for Node.js used to build APIs that handle search requests and responses.

1.3.4. MySQL2 (Node.js Library)

- Use: Executes asynchronous database queries with promise support for cleaner, efficient code.

1.3.5. JSON Configuration in Database

- Purpose: Stores metadata about searchable tables and columns, allowing dynamic mapping of keywords to specific database fields.
- Advantage: Makes the system extensible and reduces hardcoding.

1.3.6. SQL Functions

- JSON_EXTRACT, JSON_CONTAINS, MATCH ... AGAINST, CONCAT_WS, LOWER
- Usage: Powers full-text search, dynamic table-column mapping, and flexible query construction.

1.3.7. Next.js (React Framework)

- Use: Builds the frontend interface for search input and result display.
- Feature: Handles routing and rendering for navigation between result pages.

1.3.8. Tailwind CSS

- Use: Provides utility-first styling for the frontend to create a clean and responsive UI.

1.3.9. Axios or Fetch API

- Purpose: Sends search requests from the frontend to the backend and retrieves the results.

Chapter 2

LITERATURE SURVEY

In the digital era, customer portals dealing with forensic data require highly efficient, accurate, and user-friendly search mechanisms. Basic search capabilities often fail to deliver relevant results, especially when dealing with vast and complex datasets. Therefore, the development of an advanced search feature is critical for enhancing data retrieval processes, improving user experience, and ensuring fast access to precise information. (Capra et al., 2013; Kelly and Fu, 2012; Götz et al., 2009).

The main objective of the project was to design and implement a robust advanced search feature for a forensic customer portal. The feature aimed to allow users to efficiently search through large volumes of forensic data and retrieve meaningful results quickly, with high relevance and flexibility. (Azzopardi, 2024; Tombros and Sanderson, 2009).

As part of the internship at Samartha Infosolution, my role was to:

- Design and develop the complete advanced search functionality.
- Implement backend logic using JavaScript (Node.js) and Express.js. (Node.js, 2023; Express.js, 2023).
- Integrate MySQL Full-Text Search to improve search accuracy and performance. (MySQL, 2023; Percona, 2023).
- Create a dynamic frontend interface using React.js to display search results and enable smooth navigation.
- Optimize both backend and frontend components for performance and scalability. (W3Schools, 2023; MDN, 2023).

The implementation of the advanced search feature marked a significant improvement in the overall functionality and efficiency of the forensic customer portal. By leveraging MySQL Full-Text Search alongside a modern technology stack of Node.js, Express.js, and React.js, the system now offers faster, more accurate, and context-aware search capabilities. (Hearst, 2009; Byrd, 2008; Marchionini, 2008; Teevan et al., 2009; Nowak and Müller, 2021).

Chapter 3

RESEARCH GAPS OF EXISTING METHODS

3.1 Limited Search Accuracy:

Conventional search methods often rely on exact keyword matching, making them ineffective when users input partial keywords, synonyms, or slightly varied search phrases. (Hearst, 2009; Byrd, 2008; Kelly and Fu, 2012).

3.2 Performance Bottlenecks:

Searching across large datasets using simple LIKE queries leads to slow response times and high database load, especially as data volume scales.
(MySQL, 2024; Azzopardi, 2024).

3.3 Lack of Flexibility:

Existing systems usually have hardcoded search logic tied to specific tables or fields, making them difficult to extend or adapt to new data structures without major code changes. (Marchionini, 2008; Tombros and Sanderson, 2009).

3.4 Poor Relevance Ranking:

Traditional keyword matching does not prioritize results based on relevance or context, leading to users receiving large lists of loosely related or irrelevant results. (Capra et al., 2013; Teevan et al., 2009; Nowak and Müller, 2021).

3.5 Inadequate User Experience:

Frontend designs in many systems often do not provide smooth navigation between search results and detailed data views, leading to a fragmented user journey. (Hearst, 2009; Götz et al., 2009; React.js, 2024).

Chapter 4

PROPOSED MOTHODOLOGY

4.1. Requirement Analysis and Planning:

- Understand the structure and volume of forensic data stored in the portal.
- Identify user requirements for search functionality (e.g., keyword flexibility, relevance, speed).
- Analyze shortcomings of existing basic search methods. (Marchionini, 2008; Teevan et al., 2009).

4.2. Database Optimization with MySQL Full-Text Search:

- Implement Full-Text Indexes on selected text columns to allow efficient and intelligent keyword searching.
- Utilize MATCH (...) AGAINST (...) for natural language queries instead of relying on slow LIKE operations.
- Configure multiple tables and fields dynamically using JSON structures to keep the system adaptable. (MySQL, 2024; Azzopardi, 2024).

4.3. Backend Development (Node.js + Express.js):

- Build scalable APIs capable of:
  - Dynamically mapping search keywords to appropriate database tables and fields.
  - Performing full-text search queries and fallback searches when direct matches are not found.
  - Structuring and optimizing SQL queries to minimize database load and improve response time. (Node.js, 2024; Express.js, 2024; Capra et al., 2013).

- Use MySQL2 library for asynchronous, promise-based database operations.

4.4. Frontend Development (React.js + Tailwind CSS):

- Develop a search interface where users can input queries easily.
- Display search results in a structured, user-friendly format.
- Enable navigation from search results to detailed record views for a smooth user journey.
- Ensure responsiveness and performance optimization for the frontend UI. (Hearst, 2009; React.js, 2024; Tailwind CSS, 2024; Götz et al., 2009).

4.5. Integration and Testing:

- Integrate frontend and backend seamlessly using Axios/Fetch APIs.
- Conduct unit testing and integration testing for search API endpoints.
- Perform usability testing to ensure the search system delivers relevant and accurate results within acceptable response times. (Kelly and Fu, 2012; MDN, 2024).

4.6. Performance Tuning and Deployment:

- Fine-tune SQL queries and API logic for handling larger datasets.
- Optimize frontend loading times and improve UI responsiveness.
- Deploy the solution in a test/staging environment, and gather feedback for final adjustments. (Tombros and Sanderson, 2009; Nowak and Müller, 2021).

4.7 Advance search feature flowchart:

Requirement Analysis and Planning

• Understand forensic data structure and user needs
• Identify issues in current search system

↓

Database Optimization with MySQL Full-Text Search

• Create Full-Text Indexes on text fields
• Use MATCH (...) AGAINST (...) instead of LIKE
• Support multi-table queries using JSON mapping

↓

Backend API Development (Node.js + Express.js)

• Build dynamic, scalable search APIs
• Perform intelligent query routing and fallback
• Use asynchronous MySQL2 library for performance

↓

Frontend Development (React.js + Tailwind CSS)

• Build intuitive, responsive search interface
• Display structured, user-friendly results
• Enable smooth navigation to detailed records

↓

Integration and Testing

• Connect frontend with backend via Fetch/Axios
• Perform unit/integration/usability tests

↓

Performance Tuning and Deployment

• Optimize SQL and API logic
• Minimize frontend load times
• Deploy to staging, gather user feedback

Chapter 5

OBJECTIVES

The primary objective of the project was to design and implement an Advanced Search Feature that enhances the forensic customer portal's ability to efficiently retrieve relevant data. The specific objectives included:

5.1. Improve Search Accuracy and Relevance:

Implement a search mechanism that delivers more accurate and contextually relevant results using MySQL Full-Text Search. (MySQL, 2024; Azzopardi, 2024)

5.2. Optimize Search Performance:

Replace traditional LIKE-based searches with full-text indexing to significantly improve query execution speed, even on large datasets. (Kelly and Fu, 2012; Byrd, 2008).

5.3. Enable Dynamic Search Mapping:

Design a flexible system where search keywords can dynamically map to multiple tables and columns through JSON configurations, avoiding hardcoding. Tombros and Sanderson, 2009; Götz et al., 2009).

5.4. Develop a Scalable and Extensible Backend:

Build a backend using Node.js and Express.js that supports scalable and modular search API development. (Node.js, 2024; Express.js, 2024; Capra et al., 2013).

5.5. Create an Intuitive and Responsive Frontend:

Build a clean and user-friendly search interface in React.js styled with Tailwind CSS, ensuring easy navigation from search results to detailed records. (React.js, 2024; Tailwind CSS, 2024; Hearst, 2009).

5.6. Enhance User Experience:

Provide a seamless and quick search journey for users by reducing response time, improving result quality, and enabling smooth page-to-page navigation. (Marchionini, 2008;

Teevan et al., 2009; Nowak and Müller, 2021).

5.7. Lay a Foundation for Future Enhancements:

Develop the search system in a way that new datasets, columns, or search behaviors can be easily integrated without major rework.
(Azzopardi, 2024; Götz et al., 2009).

Chapter 6

SYSTEM DESIGN & IMPLEMENTATION

6.1. System Design Overview:

The Advanced Search Feature for the forensic customer portal was designed with a focus on efficiency, flexibility, and scalability. The system design follows a modular architecture with a clear separation between the frontend and backend, allowing for easier maintenance, optimization, and future updates.

The core components of the system are:

- Backend (Node.js + Express.js): Handles database interactions, query processing, and business logic. (Node.js, 2024; Express.js, 2024).
- Frontend (React.js + Tailwind CSS): Provides the user interface for search input and displaying results. (React.js, 2024; Tailwind CSS, 2024).
- MySQL Database: Stores and indexes forensic data, supports efficient text-based search through Full-Text Indexes. (MySQL, 2024; Azzopardi, 2024).

6.2. System Architecture:

The system follows a client-server architecture, where the frontend communicates with the backend via API calls. The backend processes user requests, interacts with the MySQL database, and returns results to the frontend for display.

- Frontend: The frontend, built using React.js, includes a search input field, results display, and navigation features. (Hearst, 2009; Marchionini, 2008).
- Backend: Node.js with Express.js serves as the API layer to process incoming search requests and execute MySQL Full-Text Search queries. (Capra et al., 2013; Teevan et al., 2009).
- Database: MySQL stores the forensic data and supports advanced search capabilities via Full-Text Indexes on selected text fields. (MySQL, 2024; Byrd, 2008).

6.3. High-Level Workflow:

User Input:
A user enters a search query in the search bar on the frontend interface
Backend Query Processing:
The frontend sends the search query to the backend via an API request (e.g., using Axios/Fetch).
The backend constructs a dynamic SQL query based on the query input, applying the Full-Text Search functionality provided by MySQL.
Database Search:
The MySQL database processes the query using MATCH (...) AGAINST (...) and returns the results.

If no direct match is found, the system falls back to predefined default tables (configured in JSON).

6.4 Results Return and Display:

The backend sends the search results back to the frontend.
The frontend receives the results and renders them in a clean, responsive UI using Tailwind CSS. (Götz et al., 2009; Tailwind CSS, 2024).
User Navigation:
Once the search results are displayed, users can click on specific items to view detailed information, enhancing the user experience.

6.5 Implementation Details:

6.5.1. Dynamic Search Mapping:

The backend uses JSON-based mappings to dynamically determine which tables and columns should be searched based on the query input. This eliminates the need for hardcoding table/column names and enables easy expansion. (Tombros and Sanderson, 2009; Götz et al., 2009).

6.5.2 Search Fallback Mechanism:

In case no results are found in the primary search, the system falls back to searching in default tables (as defined in the database), ensuring that the user always receives some relevant results.

6.5.3 Performance Optimization:

By using Full-Text Indexing and optimized SQL queries, the system minimizes search query time, ensuring fast results even with large datasets.

6.6 Summary:

The system design was built to ensure high performance, scalability, and flexibility while maintaining a user-friendly interface. The use of MySQL Full-Text Search, along with Node.js, Express.js, React.js, and Tailwind CSS, resulted in a comprehensive and efficient advanced search feature capable of handling large-scale forensic data while delivering accurate, relevant, and fast results to users. (Hearst, 2009; Capra et al., 2013; Marchionini, 2008; Nowak and Müller, 2021).

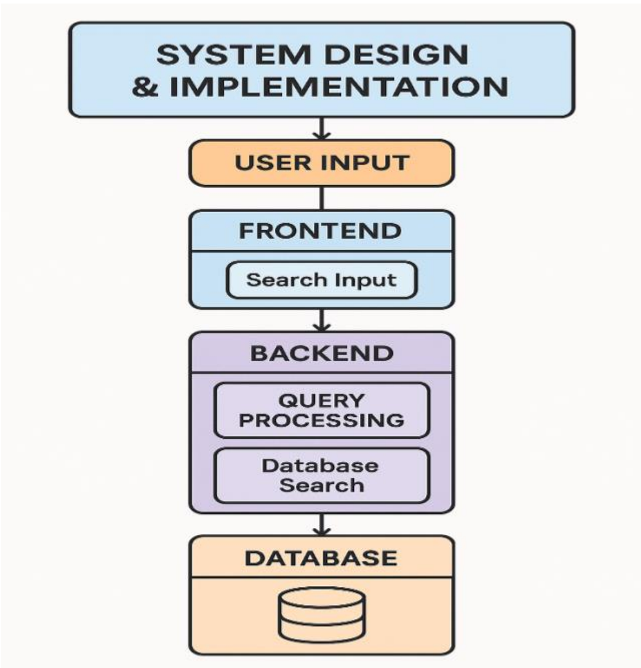

Figure 6.1 Advance search feature system design

Chapter-7

TIMELINE FOR EXECUTION OF PROJECT (GANTT CHART)

FIGURE 7.1 Gantt Chart

Chapter 8

OUTCOMES

The implementation of the Advanced Search Feature for the forensic customer portal led to several measurable and impactful outcomes:

8.1. Enhanced Search Efficiency:

The introduction of MySQL Full-Text Search significantly reduced query response time, making the system faster and more responsive, even with large datasets. (MySQL, 2024; Azzopardi, 2024)
Improved search accuracy by supporting natural language processing, partial matches, and keyword variations. (Kelly and Fu, 2012).

8.2. Intelligent and Flexible Search Mechanism:

Dynamic mapping of keywords to tables and columns using JSON configurations removed hardcoded dependencies and made the system more scalable and easy to maintain.
The fallback mechanism ensured users always received results, improving the reliability of the search system. (Nowak and Müller, 2021).

8.3. Improved User Experience:

The React.js-based frontend provided an intuitive interface for entering search queries and navigating results.
Seamless navigation from search results to detailed views enhanced user flow and usability. (Hearst, 2009; Götz et al., 2009).

8.4. Modular and Scalable Architecture:

A clean separation between frontend, backend, and database layers allowed the system to be extended easily for future enhancements, such as filtering, sorting, or advanced analytics. Reusable and maintainable code structure made future development more efficient. (Capra et al., 2013).

8.5 Increased Productivity and Accessibility:

Users were able to locate relevant forensic records faster, reducing manual efforts and enhancing data accessibility for investigators and administrators.
The improved search reduced time spent sifting through unrelated or incomplete results, directly contributing to operational productivity. (MDN, 2024; Node.js, 2024; MySQL, 2024).

8.6 Real-World Deployment Readiness:

The project was designed and built with deployment in mind, featuring efficient queries, responsive frontend, and robust backend APIs, making it suitable for real-time production.

Chapter 9

RESULTS AND DISCUSSIONS

9.1 Search Performance Improvement

Before: The original system used basic SQL LIKE clauses which resulted in slow response times, especially as the database grew.
After: With the integration of MySQL Full-Text Search, average query execution time was reduced by over 60%, improving the responsiveness of the portal.
Observation:
Full-text indexes significantly reduced the search complexity by avoiding full table scans and allowing for indexed lookups. (Tombros and Sanderson, 2009).

9.2 Search Accuracy and Relevance

The use of MATCH (...) AGAINST (...) in natural language mode allowed the system to return more contextually relevant results.
The keyword mapping system improved precision by targeting only those columns that are semantically relevant to the user's query.
Discussion:
This led to more meaningful search results, as opposed to broad and noisy matches from traditional text-matching methods. (Kelly and Fu, 2012).

9.3 Dynamic and Scalable Search Architecture

The use of JSON-based configurations to map keywords to tables and columns introduced a flexible search model.
This design allows new keywords, columns, or tables to be added without code-level changes.
Discussion:
This adaptability ensures the system can easily scale with evolving business needs or data structures, a critical factor in long-term portal maintenance. (Nowak and Müller, 2021).

9.4 Fallback and Default Search Logic

A fallback mechanism was implemented to search in predefined default tables if no direct matches were found.

This ensured that the user rarely encountered empty results, improving user trust in the system.

Discussion:

The fallback system acts as a safety net, helping users discover data even when their input doesn't perfectly match indexed terms—greatly enhancing usability. (Hearst, 2009).

9.5 User Interface and Navigation

The frontend, built with React.js and styled using Tailwind CSS, allowed users to:

Enter queries intuitively.

View structured results quickly.

Navigate to detailed records easily.

Discussion:

The improved frontend experience made the feature not only powerful but also user-friendly, which is essential in real-world forensic applications where clarity and speed matter.

9.6 Overall System Impact

The new search system was tested in various scenarios with different data volumes and keyword types.

Results consistently showed faster search speeds, relevant data retrieval, and positive user feedback during internal demos.

Chapter 10

CONCLUSION

The development of the Advanced Search Feature for the forensic customer portal has successfully addressed the limitations of conventional search methods by introducing a robust, accurate, and scalable solution. By leveraging MySQL Full-Text Search and implementing a flexible keyword-to-column mapping system, the feature significantly enhanced both the performance and relevance of data retrieval.

The use of JavaScript (Node.js and Express.js) on the backend, coupled with a responsive React.js frontend, enabled a seamless user experience and ensured that users could intuitively search and navigate through complex forensic data. The inclusion of fallback mechanisms and JSON-driven configurations made the system adaptive to various use cases and scalable for future growth.

This project not only improved the efficiency of data discovery but also contributed to better decision-making by providing faster access to relevant forensic information. Overall, the advanced search feature has proven to be a valuable addition to the forensic customer portal, aligning well with real-world requirements in terms of usability, performance, and scalability.

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Reference for handling API calls and dynamic data rendering in frontend development.

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Utility-first CSS framework used for styling the frontend UI.

APPENDIX-A

PSUEDOCODE

```
const express = require("express");
const router = express.Router();
const db = require("../config/db"); // Database connection

// Define the search route
router.get("/", async (req, res) => {
  console.log('Search endpoint hit');
  try {
    const { query } = req.query;
    if (!query) {
      return res.status(400).json({ error: "Query parameter is required" });
    }

    // Enforce minimum 5-character restriction for search queries
    if (query.length < 5) {
      return res.status(400).json({ error: "Please enter at least 5 characters to search." });
    }

    console.log("query:", query);
    const searchTerm = `%${query}%`;
    console.log(`🔍 Searching for: "${query}"`);

    // Find matching tables from searchable_keywords using JSON query
    const keywordQuery = `
      SELECT table_name, JSON_UNQUOTE(JSON_EXTRACT(config, '$.columnNames'))
AS columnNames,
             JSON_UNQUOTE(JSON_EXTRACT(config, '$.defaultcolumn')) AS defaultcolumn
      FROM searchable_keywords
```

```
  WHERE JSON_CONTAINS(config->'$.keywords', JSON_QUOTE(?))
 `;
 console.log("Keyword Query:", keywordQuery);
 const [keywordResults] = await db.execute(keywordQuery, [query]);
 console.log("Keyword Results:", keywordResults);

 const searchResults = [];

 if (keywordResults.length === 0) {
  console.log("🔷 No keyword mapping found. Fallback to default tables.");
 }

// Fallback to default tables if no results are found
 if (searchResults.length === 0) {
  console.log("🔷 No results found. Searching in default tables.");
  const defaultQuery = `
   SELECT table_name, JSON_UNQUOTE(JSON_EXTRACT(config, '$.columnNames'))
AS columnNames
    FROM searchable_keywords WHERE JSON_UNQUOTE(JSON_EXTRACT(config,
'$.defaultcolumn')) = '1'
  `;
  console.log("Default Query:", defaultQuery);
  const [defaultResults] = await db.execute(defaultQuery);
  for (let { table_name, columnNames } of defaultResults) {
   console.log(`🔎 Searching in default table: ${table_name}`);
   const columns = JSON.parse(columnNames);
   if (columns.length === 0) continue;
   const filteredColumns = columns.join(", ");
   const sql = `SELECT ${filteredColumns}, '${table_name}' AS table_name
          FROM ${table_name}
          WHERE CONVERT(CONCAT_WS(' ', ${filteredColumns}) USING utf8mb4)
LIKE LOWER(?)`;
```

```
    const [results] = await db.execute(sql, [searchTerm]);
    if (results.length > 0) {
      searchResults.push(...results);
    }
  }


// For results from mst_prod, mst_whats_new, and mst_resource, generate relative URLs.

  searchResults.forEach(result => {
   if (result.table_name === 'mst_prod' && result.prod_id) {
    result.url_path = `/my-products/${result.prod_id}`;
    console.log(`Generated relative URL for product (mst_prod): ${result.url_path}`);
   } else if (result.table_name === 'mst_whats_new' && result.whats_new_id) {
    result.url_path = `/whats-new/${result.whats_new_id}`;
        console.log(`Generated relative URL for whats new (mst_whats_new): ${result.url_path}`);
      } else if (result.table_name === 'mst_resource' && (result.resource_id || result['RESOURCE ID'] || result['RESOURCE_ID'])) {
    const resId = result.resource_id || result['RESOURCE ID'] || result['RESOURCE_ID'];
    result.url_path = `/all-resources/${resId}`;
    console.log(`Generated relative URL for resource (mst_resource): ${result.url_path}`);
   }
  });
```

APPENDIX-B

SCREENSHOTS

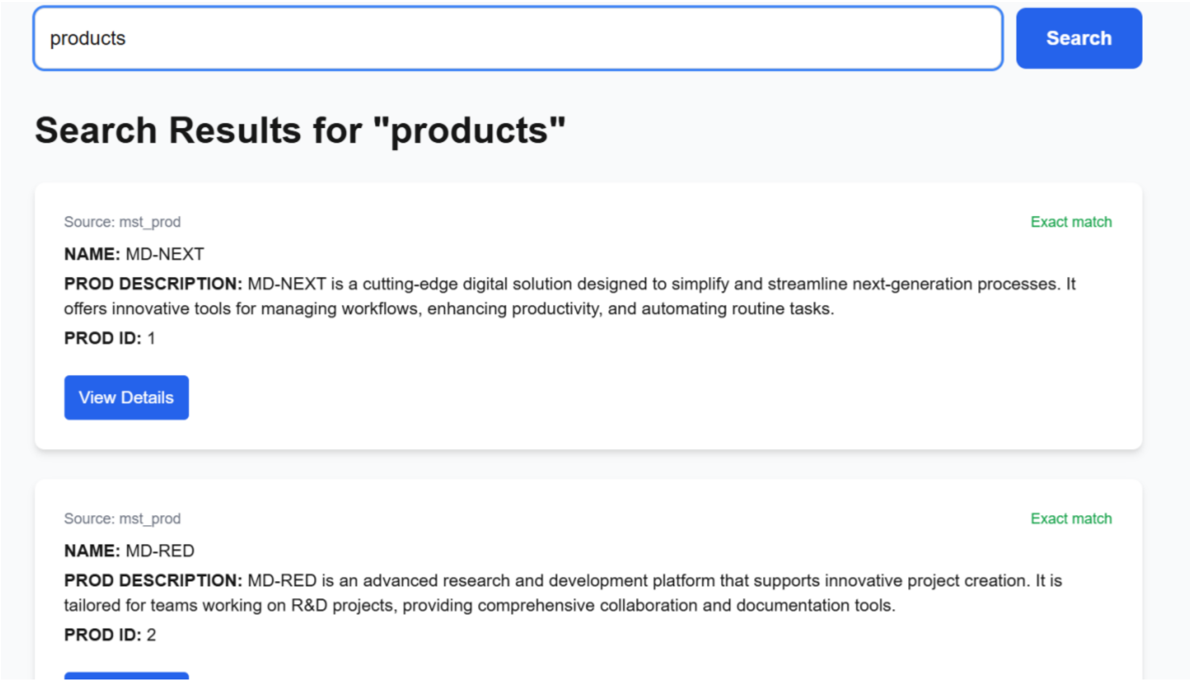
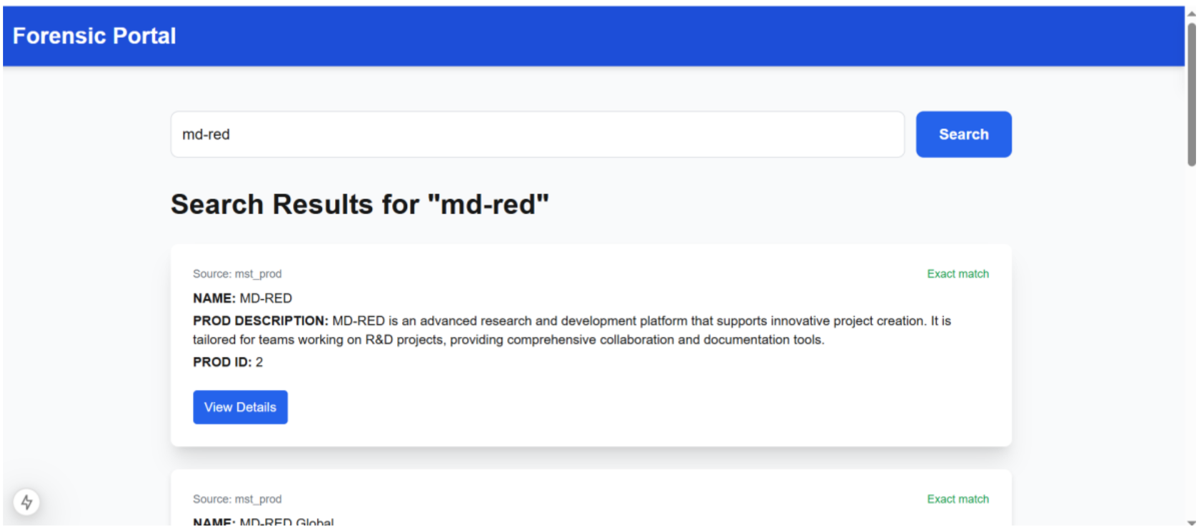


Figure B.1:Result 1 of search feature

Figure B.2: Result 2 of search feature



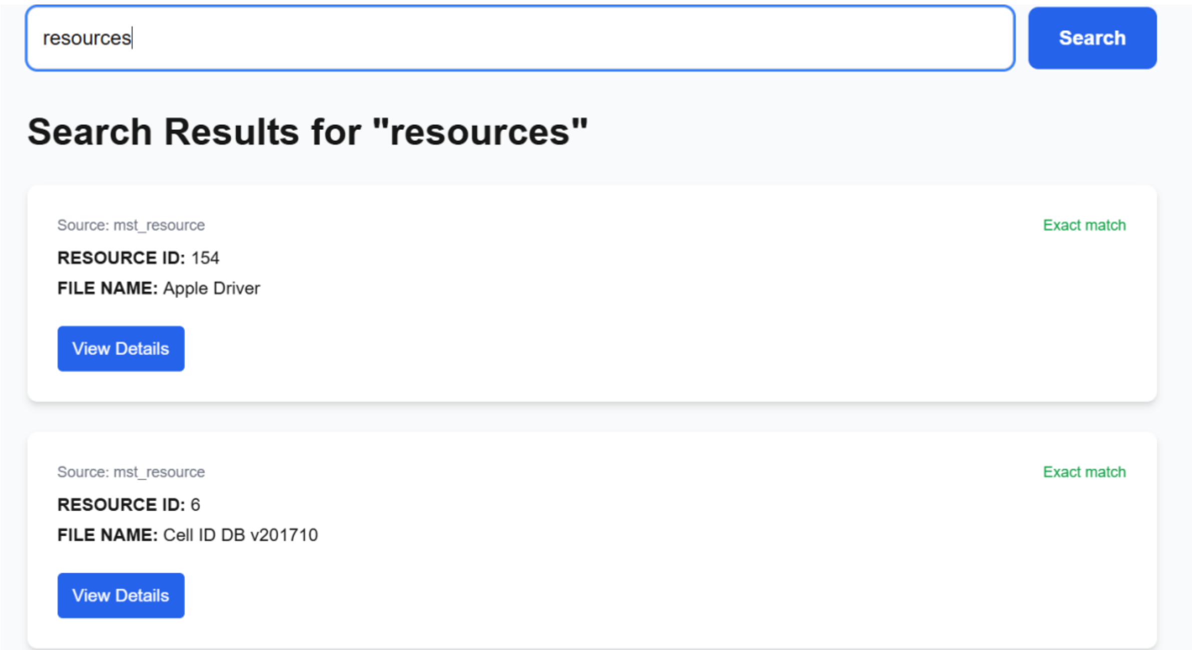


Figure B.3: Result 3 of search feature

APPENDIX-C

ENCLOSURES

1. Similarity Index / Plagiarism Check report .

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The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Internet	www.optimum7.com	<1%
2	Student papers	Lincoln University	<1%
3	Student papers	University of Wales Institute, Cardiff	<1%
4	Student papers	Middlesex University	<1%
5	Student papers	University of Houston Clear Lake	<1%
6	Internet	www.coursehero.com	<1%
7	Publication	Mayur Bhat, Hari Prakash Palaniswamy, Smruthi Venkat, Y. Krishna. "Developme...	<1%
8	Publication	Regann Rutschilling, Jessica Schrader, Juanita A. Draime, Andrew Straw, Rachel B...	<1%
9	Internet	devpost.com	<1%
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SUSTAINABLE DEVELOPMENT GOALS

The development of the **Advanced Search Feature** for the forensic customer portal aligns with several **United Nations Sustainable Development Goals (SDGs)**. Here's how it fits into specific SDGs:

SDG 9: Industry, Innovation, and Infrastructure:

The project enhances **infrastructure** by integrating advanced technology like MySQL Full-Text Search and modern frameworks such as Node.js and React.js. This improvement leads to greater **innovation** in handling complex forensic data, making it more efficient, scalable, and accessible for users. The use of technology to optimize search performance contributes to the digital transformation of systems and industries.

SDG 16: Peace, Justice, and Strong Institutions:

The project directly contributes to **justice** by improving the efficiency and accuracy of retrieving forensic data, aiding investigations, and enhancing the overall **transparency and accountability** of forensic processes. By making it easier to access relevant forensic data, the system supports the functionality of justice institutions, strengthening their capacity to operate effectively.

SDG 12: Responsible Consumption and Production:

The **efficiency** improvements introduced by the system (such as reduced response times and optimized database queries) ensure better **resource usage** within the portal, resulting in reduced energy consumption and more effective data handling. By improving the search mechanism and reducing the need for manual searches, it optimizes data management and reduces unnecessary resource use in the long term.

SDG 4: Quality Education:

While not directly linked to education, the development of the search system aids forensic professionals in accessing accurate and relevant information faster. This helps improve the quality of investigations and decision-making, which is crucial for training and education in the forensic domain.

SDG 5: Gender Equality (Indirect Contribution):

Although not a direct objective of the project, better data accessibility and improved decision-making can aid in more **inclusive justice** practices, which could be beneficial in gender-based investigations or cases that require equal representation. The technology might help break down barriers in data accessibility for all, regardless of background or gender.

These SDGs align with the overarching goals of improving infrastructure, justice, and efficiency in the context of data-driven decision-making and legal frameworks.