DISASTER MANAGEMENT SYSTEM

A PROJECT REPORT

Submitted by

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in partial fulfillment of requirements for the award of the course

CGB1201 - JAVA PROGRAMMING

In

COMPUTER SCIENCE AND ENGINEERING

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

NOVEMBER- 2024

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **"DISATER MANAGEMENT SYSTEM"** is the bonafide work of **ROHINI** D **(2303811710422131)** who carried out the project work during the academic year 2024 - 2025 under my supervision.

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DECLARATION

I declare that the project report on **“DISASTER MANAGEMENT SYSTEM”** is the result of original work done by us and best of our knowledge, similar work has not been submitted to **“ANNA UNIVERSITY CHENNAI”** for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfilment of the requirement of the completion of the course **CGB1201-JAVA PROGRAMMING.**

Signature

ROHINI D

Place: Samayapuram

Date:06/12/2024

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VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards

MISSION OF THE INSTITUTION

- Be a center of excellence for technical education in emerging technologies by exceeding the needs of the industry and society.
- Be an institute with world class research facilities
- Be an institute nurturing talent and enhancing the competency of students to transform them as all-round personality respecting moral and ethical values

VISION OF DEPARTMENT

To be a center of eminence in creating competent software professionals with research and innovative skills.

MISSION OF DEPARTMENT

M1: Industry Specific: To nurture students in working with various hardware and software platforms inclined with the best practices of industry.

M2: Research: To prepare students for research-oriented activities.

M3: Society: To empower students with the required skills to solve complex technological problems of society.

PROGRAM EDUCATIONAL OBJECTIVES

1. PEO1: Domain Knowledge

To produce graduates who have strong foundation of knowledge and skills in the field of Computer Science and Engineering.

2. PEO2: Employability Skills and Research

To produce graduates who are employable in industries/public sector/research organizations or work as an entrepreneur.

3. PEO3: Ethics and Values

To develop leadership skills and ethically collaborate with society to tackle real-world challenges.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Domain Knowledge

To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.

PSO 2: Quality Software

To apply software engineering principles and practices for developing quality software for scientific and business applications.

PSO 3: Innovation Ideas

To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems

PROGRAM OUTCOMES (POs)

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

ABSTRACT

A disaster management system is a comprehensive framework designed to mitigate, prepare for, respond to, and recover from natural or man-made disasters. It integrates advanced technologies, communication networks, and resource planning to effectively address emergencies such as floods, earthquakes, cyclones, and industrial accidents. The system emphasizes early warning mechanisms, real-time data analysis, and coordination among various agencies to minimize loss of life, property, and environmental impact. By fostering community awareness and resilience, the disaster management system ensures rapid response and efficient recovery while promoting sustainable development and reducing vulnerabilities to future hazards.

Disasters, whether natural or man-made, pose significant threats to human lives, infrastructure, and the environment. Effective disaster management systems are essential to mitigate these risks, minimize loss, and ensure rapid recovery. This paper explores the key components of disaster management, including preparedness, mitigation, response, and recovery, and examines the role of modern technologies such as Geographic Information Systems (GIS), Artificial Intelligence (AI), and the Internet of Things (IoT) in enhancing disaster resilience.

ABSTRACT WITH POs AND PSOs MAPPING

CO 5 : BUILD JAVA APPLICATIONS FOR SOLVING REAL-TIME PROBLEMS.

ABSTRACT	POs MAPPED	PSOs MAPPED
A disaster management system is a strategic and technological approach aimed at minimizing the impact of disasters on lives, property, and the environment. It encompasses key phases such as preparedness, response, recovery, and mitigation, leveraging tools like early warning systems, real-time monitoring, and data-driven decision-making. The system fosters collaboration between governments, emergency services, and communities to ensure a coordinated response during crises. By integrating advanced technologies and resource management, it enhances resilience, reduces vulnerabilities, and ensures efficient recovery, ultimately safeguarding communities and promoting sustainable disaster risk reduction.	**PO1 -3** **PO2 -3** **PO3 -3** **PO4 -3** **PO5 -3** **PO6 -3** **PO7 -3** **PO8 -3** **PO9 -3** **PO10 -3** **PO11-3** **PO12 -3**	**PSO1 -3** **PSO2 -3** **PSO3 -3**

Note: 1- Low, 2-Medium, 3- High

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1Objective

The primary objective of a disaster management system is to minimize the adverse impacts of disasters by ensuring preparedness, effective response, and swift recovery. It aims to protect lives, property, and critical infrastructure while fostering resilience within communities. The system seeks to enhance coordination among stakeholders, improve early warning mechanisms, and optimize the allocation of resources during emergencies. Additionally, it focuses on reducing vulnerabilities through mitigation strategies, promoting community awareness, and building capacity for disaster risk reduction. By addressing both immediate and long-term needs, the objective is to create a sustainable framework for managing and recovering from disasters efficiently.

1.2Overview

A disaster management system is a structured framework designed to address the challenges posed by natural and human-induced disasters. It encompasses four key phases: mitigation, preparedness, response, and recovery. By integrating advanced technologies, real-time monitoring, and early warning systems, it enables proactive measures to minimize risks and enhance resilience. The system ensures efficient coordination among governments, emergency services, and communities to facilitate timely and effective interventions. It also focuses on post-disaster recovery and rehabilitation, aiming to restore normalcy while reducing future vulnerabilities. Overall, it serves as a comprehensive solution for safeguarding lives, property, and the environment against the adverse effects of disasters.

1.3 Java Programming Concepts

Object-Oriented Programming (OOP):

- **Encapsulation:** Data such as city names, restaurant names, and cuisine types are encapsulated within classes and methods, ensuring they are protected from unauthorized access.
- **Abstraction:** The project abstracts complex logic (e.g., managing city and restaurant data) into methods like displayCity, addRestaurantToCity.
- **Polymorphism**: Action listeners in the GUI implement polymorphism by dynamically responding to various user actions like adding or removing cities.

Java GUI Programming:

- **Abstract Window Toolkit (AWT):** Components like TextField, Button, Label, and TextArea provide a simple graphical user interface. FlowLayout ensures a clean layout for arranging the components dynamically.
- **Event Handling**: Action listeners are implemented to handle user interactions, such as button clicks for displaying city data or adding restaurants.
- **Window Management**: A WindowAdapter is used to handle the window-closing event, ensuring proper termination of the application.

Exception Handling:

Handling edge cases such as Input errors (e.g., entering an empty or invalid city name). Preventing addition of more than the allowed number of restaurants in a city.

Collections Framework:

Map Interface: In a Disaster Management System, the Java Collection Framework plays a critical role in handling and organizing the large volumes of data required for effective disaster response.

Java Core Features:

- Multithreaded: Java supports multithreading, allowing simultaneous execution of tasks for better performance.
- Distributed: Java provides APIs like RMI and CORBA for developing distributed applications.

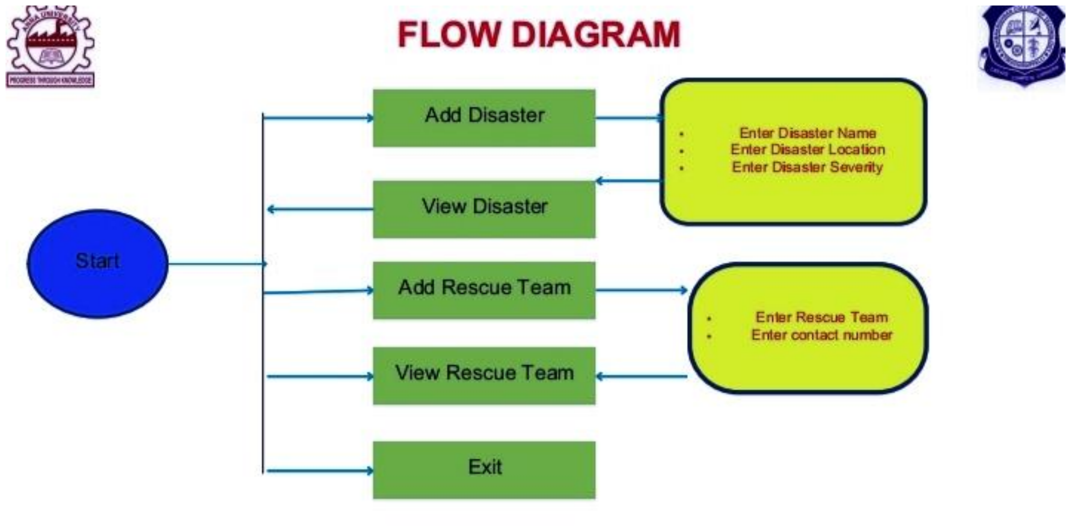
CHAPTER 2

PROJECT METHODOLOGY

2.1 Proposed Work

The proposed work focuses on developing a robust and efficient disaster management system that integrates modern technologies to enhance disaster preparedness, response, and recovery. This system will incorporate real-time monitoring, early warning mechanisms, and data analytics to predict and mitigate the impact of disasters. It will include a centralized platform for seamless coordination among stakeholders such as government agencies, emergency responders, and affected communities. The system will also provide tools for resource allocation, evacuation planning, and post-disaster recovery. By leveraging artificial intelligence, geospatial mapping, and IoT devices, the proposed work aims to minimize risks, save lives, and build resilient communities capable of effectively managing disasters.

2.2 Block Diagram



CHAPTER 3
MODULE DESCRIPTION

3.1 Add disaster

Disaster Management System, enabling efficient handling of disaster-related data for better preparedness, response, and recovery. It facilitates the organization of information such as affected areas, available resources, rescue tasks, and historical disaster records.

3.2 View disaster

It enables effective tracking of affected areas, resources, and tasks using structures like Lists, Sets, Maps, and Queues. This framework helps in prioritizing rescue operations, managing resources, and making data-driven decisions for timely disaster response and recovery.

3.3 Add description

It enables the storage, retrieval, and manipulation of information such as affected regions, available resources, and rescue operations efficiently. By utilizing data structures like Lists, Sets, Maps, and Queues, it helps streamline disaster response, resource allocation, and decision-making in real-time.

3.4 View description

It allows for the seamless tracking of affected areas, resources, and rescue operations using data structures like Lists, Sets, Maps, and Queues. This framework supports real-time decision-making, prioritization of tasks, and effective resource allocation during disaster.

3.5 Exit

This phase also includes debriefing and improving preparedness plans based on lessons learned, ensuring better responses to future disasters. The exit phase signifies the stabilization of affected areas, restoration of infrastructure, and the return of displaced communities to normal life.

CHAPTER 4

CONCLUSION & FUTURE SCOPE

4.1 CONCLUSION

In conclusion, a. Disaster Management System is essential for minimizing the impact of disasters on lives, property, and infrastructure. By integrating advanced technologies, real-time data analysis, and effective coordination, the system ensures rapid and organized response, efficient resource allocation, and timely recovery. The use of frameworks like the Java Collection Framework enhances the system's ability to manage and process large volumes of data, supporting informed decision-making and prioritization. Ultimately, a well-structured disaster management system not only mitigates immediate disaster effects but also builds long-term resilience, ensuring better preparedness for future emergencies.

4.2 FUTURE SCOPE

The future scope of Disaster Management Systems lies in the integration of emerging technologies such as Artificial Intelligence (AI), Machine Learning (ML),Big Data, and Internet of Things (IoT) to enhance predictive analytics and real-time decision-making. These technologies can improve early warning systems, optimize resource allocation, and enable more efficient communication during disasters. Additionally, advancements in cloud computing can facilitate scalable and accessible platforms for disaster response and recovery. The incorporation of. drones and.robots for search and rescue operations, coupled with more sophisticated data modeling, will further revolutionize the way disasters are managed. As climate change increases the frequency and severity of natural disasters, future systems will need to be more adaptable, proactive, and resilient, fostering better global cooperation and community-based disaster preparedness.

APPENDIX A

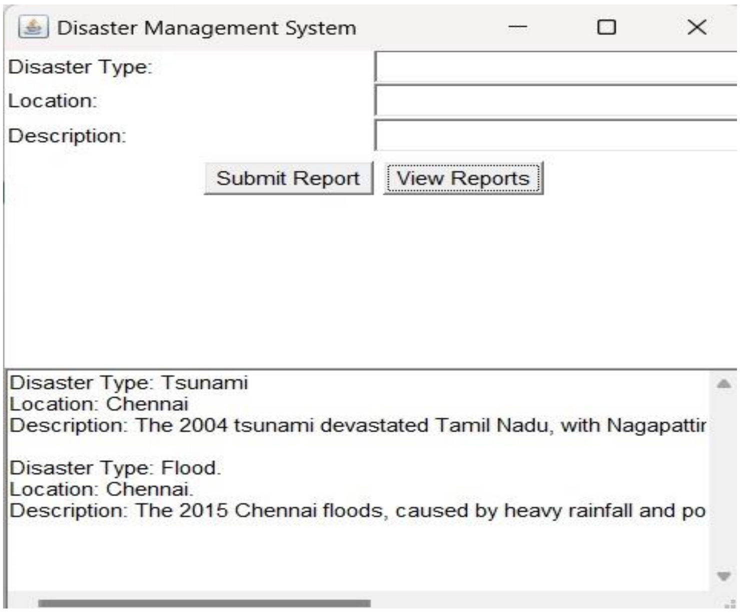
(SOURCE CODE)

```
import java.awt.*;
import java.awt.event.*;
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
import java.util.*;

public class DisasterManagementSystem extends Frame implements ActionListener {

    private Label lblDisasterType, lblLocation, lblDescription;
    private TextField txtDisasterType, txtLocation, txtDescription;
    private Button btnSubmit, btnViewReports;
    private TextArea txtReports;

    private ArrayList<Disaster> disasters = new ArrayList<>();

    public DisasterManagementSystem() {
        super("Disaster Management System");

        setLayout(new BorderLayout());

        Panel panel = new Panel();
        panel.setLayout(new GridLayout(3, 2));

        lblDisasterType = new Label("Disaster Type:");
        txtDisasterType = new TextField();
        panel.add(lblDisasterType);
        panel.add(txtDisasterType);

        lblLocation = new Label("Location:");
        txtLocation = new TextField();
        panel.add(lblLocation);
        panel.add(txtLocation);

        lblDescription = new Label("Description:");
        txtDescription = new TextField();
        panel.add(lblDescription);
        panel.add(txtDescription);

        add(panel, BorderLayout.NORTH);

        Panel buttonPanel = new Panel();
        btnSubmit = new Button("Submit Report");
        btnSubmit.addActionListener(this);
        buttonPanel.add(btnSubmit);

        btnViewReports = new Button("View Reports");
        btnViewReports.addActionListener(this);
        buttonPanel.add(btnViewReports);

        add(buttonPanel, BorderLayout.CENTER);

        txtReports = new TextArea(10, 20);
        add(txtReports, BorderLayout.SOUTH);

        setSize(400, 400);
        setVisible(true);

        addWindowListener(new WindowAdapter() {
            public void windowClosing(WindowEvent e) {
                System.exit(0);
            }
        });
    }

    public void actionPerformed(ActionEvent e) {
        if (e.getSource() == btnSubmit) {
            String disasterType = txtDisasterType.getText();
            String location = txtLocation.getText();
            String description = txtDescription.getText();

            Disaster disaster = new Disaster(disasterType, location, description);
            disasters.add(disaster);

            txtDisasterType.setText("");
            txtLocation.setText("");
            txtDescription.setText("");

            JOptionPane.showMessageDialog(this, "Report submitted successfully!");
        } else if (e.getSource() == btnViewReports) {
            StringBuilder reports = new StringBuilder();
            for (Disaster disaster : disasters) {
                reports.append("Disaster Type:
").append(disaster.getDisasterType()).append("\n");
                reports.append("Location: ").append(disaster.getLocation()).append("\n");
                reports.append("Description:
").append(disaster.getDescription()).append("\n\n");
            }
            txtReports.setText(reports.toString());
        }
    }

    public static void main(String[] args) {
        new DisasterManagementSystem();
    }
}

class Disaster {
    private String disasterType;
    private String location;
    private String description;

    public Disaster(String disasterType, String location, String description) {
        this.disasterType = disasterType;
        this.location = location;
        this.description = description;
    }

    public String getDisasterType() {
        return disasterType;
    }

    public String getLocation() {
        return location;
    }

    public String getDescription() {
        return description;
    }
}
```

APPENDIX B

(SCREENSHOTS)

(DISASTER MANAGEMENT SYSTEM)



```
Disaster Type: Tsunami
Location: Chennai
Description: The 2004 tsunami devastated Tamil Nadu, with Nagapattir

Disaster Type: Flood.
Location: Chennai.
Description: The 2015 Chennai floods, caused by heavy rainfall and po
```

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