MOBILE TRACKING SYSTEM

A PROJECT REPORT

Submitted by

SHAMITHA SRI R(2303811724322102)

in partial fulfillment of requirements for the award of the course

CGB1201 – JAVA PROGRAMMING

in

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

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

SAMAYAPURAM – 621 112 DECEMBER,

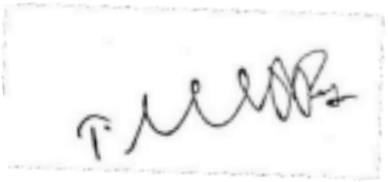
2024

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **"MOBILE TRACKING SYSTEM"** is the bonafide work of **SHAMITHA SRI R(2303811724322102)** who carried out the project work during the academic year 2024 - 2025 under my supervision.



Signature
Dr. T. AVUDAIAPPAN M.E.,Ph.D.,
HEAD OF THE DEPARTMENT,
Department of Artificial Intelligence,
K. Ramakrishnan College of Technology,
Samayapuram, Trichy -621 112.

Signature
Mrs. S. GEETHA M.E.,
SUPERVISOR,
Department of Artificial Intelligence,
K.Ramakrishnan College of Technology,
Samayapuram, Trichy -621 112.

Submitted for the viva-voce examination held on 3.12.24

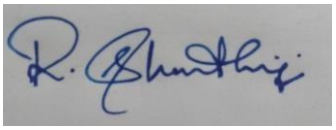
INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

I declare that the project report on "**MOBILE TRACKING SYSTEM**" is the result of original work done by me and best of my knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF TECHNOLOGY**. This project report is submitted on the partial fulfillment of the requirement of the award of the **CGB1201 – JAVA PROGRAMMING.**

Signature



SHAMITHA SRI R

Place: Samayapuram

Date: 3/12/2024

ACKNOWLEDGEMENT

It is with great pride that I express our gratitude and indebtedness to our institution, **"K. Ramakrishnan College of Technology (Autonomous)",** for providing us with the opportunity to do this project.

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I wish to express our special thanks to the officials and Lab Technicians of our departments who rendered their help during the period of the work progress.

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

VISION AND MISSION OF THE DEPARTMENT

To excel in education, innovation and research in Artificial Intelligence and Data Science to fulfill industrial demands and societal expectations.

Mission 1: To educate future engineers with solid fundamentals, continually improving teaching methods using modern tools.

Mission 2: To collaborate with industry and offer top-notch facilities in a conductive learning environment.

Mission 3: To foster skilled engineers and ethical innovation in AI and Data Science for global recognition and impactful research.

Mission 4: To tackle the societal challenge of producing capable professionals by instilling employability skills and human values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Compete on a global scale for a professional career in Artificial Intelligence and Data Science.

PEO 2: Provide industry-specific solutions for the society with effective communication and ethics.

PEO 3: Hone their professional skills through research and lifelong learning initiatives.

PROGRAM OUTCOMES

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.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Capable of working on data-related methodologies and providing industryfocussed solutions.
- **PSO2:** Capable of analysing and providing a solution to a given real-world problem by designing an effective program.

ABSTRACT

The Mobile Tracking System (MTS) is designed to provide real-time tracking of mobile devices, offering users a comprehensive solution for locating lost or stolen devices, monitoring device movements, and ensuring remote security of sensitive data. The system leverages GPS technology and cellular networks to track the precise location of mobile devices, offering an efficient means of recovering lost or stolen devices. In addition to location tracking, the system enables users to remotely lock their devices, erase confidential data, and track device movements over time. The key objective of this project is to enhance the security of mobile devices, providing users with peace of mind and control in the event of loss or theft. Through a user-friendly interface and robust security features, the Mobile Tracking System aims to serve as a critical tool in safeguarding personal information and promoting mobile device security.

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CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

The Mobile Tracking System is a comprehensive solution designed to enhance the security and tracking of mobile devices. Utilizing GPS and cellular technologies, the system allows users to monitor the real-time location of their devices, providing an effective means to recover lost or stolen smartphones and tablets. In addition to tracking, the system offers features such as remote locking, data erasure, and movement monitoring, ensuring that users can protect their sensitive information even in the event of theft.

1.2 OBJECTIVE

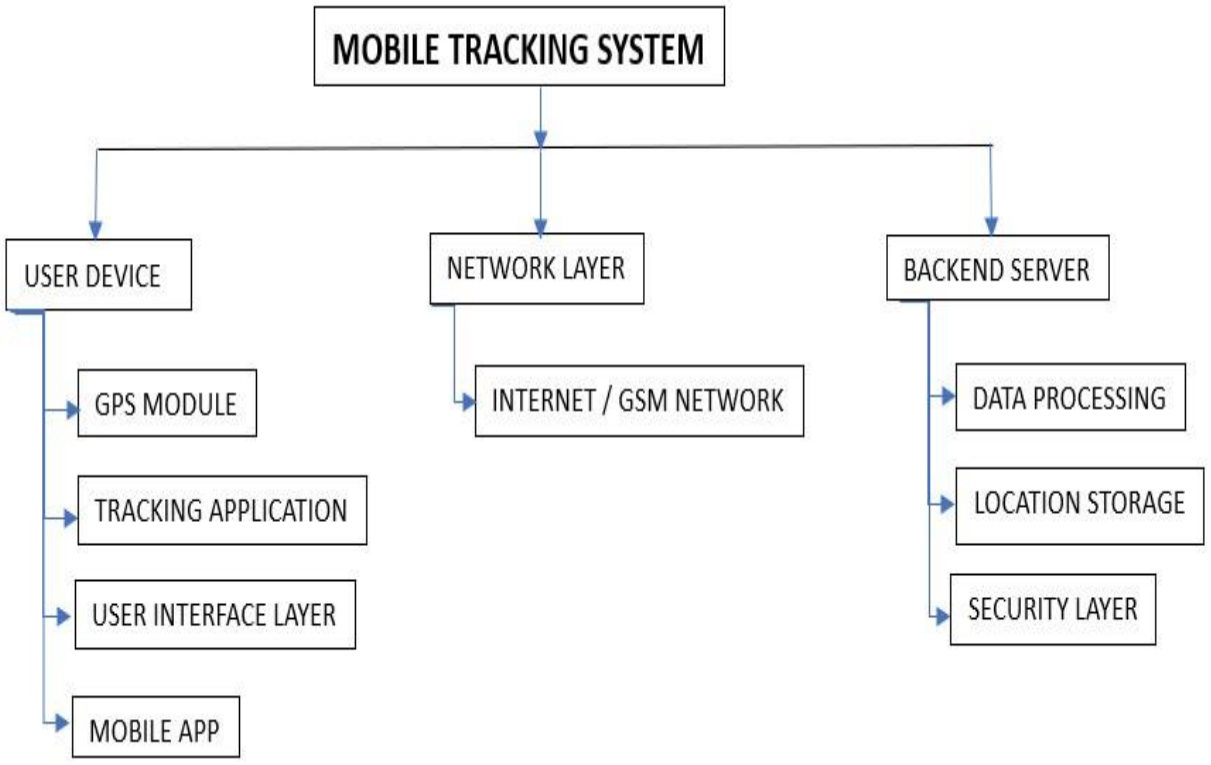
The primary objective of the Mobile Tracking System is to provide users with an efficient and reliable solution for tracking the real-time location of their mobile devices. The system aims to assist in recovering lost or stolen devices by delivering accurate location information and enabling users to monitor device movements over time.

CHAPTER 2 PROJECT METHODOLOGY

2.1 PROPOSED WORK

The proposed work focuses on the design and development of a Mobile Tracking System that enhances the security of mobile devices by providing real-time tracking, remote data protection, and device recovery features. The project will be implemented using Java programming and integrated with GPS, internet, and cloudbased services to enable effective tracking of mobile devices.

2.2 BLOCK DIAGRAM



CHAPTER 3 JAVA PROGRAMMING CONCEPTS

3.1 Object-Oriented Programming (OOP)

- **Encapsulation:** Securely manage user data (e.g., credentials, device information) through private fields and public getter/setter methods.
- **Inheritance:** Reuse common functionalities, such as data encryption and notification mechanisms, across multiple classes.
- **Polymorphism:** Implement different behaviors for location tracking (e.g., GPS, network-based tracking) depending on the device's capabilities.
- **Abstraction:** Simplify complex features like geolocation APIs by providing clear interfaces for the tracking module.

3.2 Networking and Multithreading

- **Networking:** Use Java's Socket and HttpURLConnection classes to communicate with servers and retrieve real-time location data.
- **Multithreading:** Enable simultaneous tasks, such as tracking movement and notifying users, using Java's Thread and ExecutorService.
- **API Integration:** Integrate Google Maps API for location visualization and Android Location Services for precise tracking.

CHAPTER 4 MODULE DESCRIPTION

4.1 User Authentication Module

The User Authentication Module is responsible for verifying and managing the identity of users accessing the Mobile Tracking System. This module ensures that only authorized users can track or interact with the system. It will support secure login methods, such as username/password authentication, and can optionally incorporate two-factor authentication (2FA) for added security. Upon successful login, the user will be granted access to their personal dashboard, where they can view the location of their device, monitor movements, and control security settings. This module will also manage user registration and password recovery features.

4.2 Real-Time Location Tracking Module

The Real-Time Location Tracking Module is the core functionality of the mobile tracking system, responsible for continuously tracking and updating the device's location using GPS coordinates. The system will update the device's position in real time and send this information to a server, where the data can be viewed on a web-based dashboard. The module will use GPS data in combination with network-based location services to improve accuracy, even in areas with limited satellite signals. Users can track the device’s movements, set alerts for specific locations (geo-fencing), and get real-time notifications if the device enters or leaves designated zones.

4.3 Security Management Module

The Security Management Module provides critical security features to protect the device and sensitive user data. This module includes functions such as remote device locking, which prevents unauthorized access to the device in case of theft or loss, and remote data wiping, which erases all user data from the device to prevent data theft. The module also includes features for setting up a “panic button,” which, when activated, sends an emergency alert to predefined contacts or authorities.

Additionally, the security management module allows users to track the device’s movement history for security auditing purposes and to view a history of lock and wipe commands issued.

4.4 Data Encryption Module

The Data Encryption and Privacy Protection Module ensures that all sensitive user data, including location information, authentication credentials, and personal data, is encrypted to protect user privacy. This module will utilize encryption protocols such as SSL/TLS for secure data transmission between the mobile app and the server. It will also encrypt data stored on the server and on the device, ensuring that only authorized users can access their information.

4.5 Backup and Recovery Module

The Backup and Recovery Module is designed to protect user data and ensure its availability even in the event of device failure, loss, or theft. This module will provide functionality for automatically backing up critical data, including location history, security settings.In the case of a device being lost or wiped, the backup and recovery system allows users to restore their data onto a new device**.**

CHAPTER 5 CONCLUSION

The **Mobile Tracking System** project incorporates a wide range of features that enhance the security, monitoring, and management of mobile devices. These features can be tailored to meet various needs, ranging from individual users to enterprise level requirements. By implementing core functionalities such as **real-time location tracking**, **geofencing**, **device security management**, and **data encryption**, the system provides a robust solution for users to safeguard their devices and sensitive information. The Mobile Tracking System was successfully developed using a modular approach, integrating key components such as the Mobile Device, Tracking Application, Cloud Server, and User Interface. Each module played a vital role: the Mobile Device enabled real-time location tracking via GPS and GSM, the Tracking Application ensured smooth communication, the Cloud Server provided secure data storage and processing, and the User Interface offered an intuitive platform for monitoring and management. This system effectively enhances device security, enables real-time tracking, and ensures user convenience, achieving its objective of providing a reliable solution for lost or stolen devices.

REFERENCES:

- "Java: The Complete Reference" by Herbert Schildt (McGraw-Hill Education, 10th Edition).
- "Effective Java" by Joshua Bloch (Addison-Wesley, 3rd Edition).

APPENDICES APPENDIX A –
SOURCE CODE

```
import java.awt.*;
 import java.awt.event.*;
import java.util.HashMap;
import java.util.Map;

public class MobileTrackingSystemGUI extends Frame {
// Simulated user and device databases
private static Map<String, String> userDatabase = new HashMap<>();
private static Map<String, Boolean> deviceLockStatus = new HashMap<>();
private static Map<String, String> deviceLocation = new HashMap<>();
private static Map<String, String> deviceBackup = new HashMap<>();

 private TextField usernameField, passwordField, deviceIdField;     private Label
messageLabel, deviceStatusLabel;     private Button loginButton, registerButton,
trackButton, lockButton, wipeButton, backupButton, recoverButton, exitButton;

 public MobileTrackingSystemGUI() {
setTitle("Mobile Tracking System");
setSize(500, 500);
 setLayout(new FlowLayout());

  // Initialize UI components
add(new Label("Username:"));
usernameField = new TextField(20);
add(usernameField);
```

```
 add(new Label("Password:"));
passwordField = new TextField(20);
passwordField.setEchoChar('*');
add(passwordField);

  loginButton = new Button("Login");
add(loginButton);

  registerButton = new Button("Register");
add(registerButton);

 messageLabel = new Label("");
messageLabel.setForeground(Color.BLUE);
 add(messageLabel);

  // Device options
  add(new Label("Device ID:"));
deviceIdField = new TextField(20);
add(deviceIdField);

 trackButton = new Button("Track Device");
add(trackButton);

 lockButton = new Button("Lock Device");
add(lockButton);

 wipeButton = new Button("Wipe Device");
  add(wipeButton);
```

```
 backupButton = new Button("Backup Device");
add(backupButton);

 recoverButton = new Button("Recover Device");
add(recoverButton);

 deviceStatusLabel = new Label("");
deviceStatusLabel.setForeground(Color.RED);
add(deviceStatusLabel);

 exitButton = new Button("Exit");
add(exitButton);

        // Add button listeners
 loginButton.addActionListener(e -> {
String username = usernameField.getText();
String password = passwordField.getText();
if (login(username, password)) {
messageLabel.setText("Login Successful!");
System.out.println("User " + username + " logged in successfully.");
} else {
messageLabel.setText("Invalid credentials!");

  System.out.println("Failed login attempt for user: " + username);
            }
        });
```

```
 registerButton.addActionListener(e -> {
String username = usernameField.getText();
String password = passwordField.getText();
registerUser(username, password);
 messageLabel.setText("User Registered Successfully!");
   System.out.println("User " + username + " registered successfully.");
       });

 trackButton.addActionListener(e -> {          String
deviceId = deviceIdField.getText();          String location
= trackLocation(deviceId);
deviceStatusLabel.setText("Location: " + location);
 System.out.println("Device " + deviceId + " tracked to location: " + location);
       });

  lockButton.addActionListener(e -> {
String deviceId = deviceIdField.getText();
lockDevice(deviceId);
  deviceStatusLabel.setText("Device " + deviceId + " is now locked.");
  System.out.println("Device " + deviceId + " locked successfully.");
       });

  wipeButton.addActionListener(e -> {
String deviceId = deviceIdField.getText();
wipeDevice(deviceId);
 deviceStatusLabel.setText("Device " + deviceId + " data wiped.");
System.out.println("Data on device " + deviceId + " wiped successfully.");
       });
```

```
backupButton.addActionListener(e -> {
String deviceId = deviceIdField.getText();
backupDeviceData(deviceId);
 deviceStatusLabel.setText("Backup completed for " + deviceId);
System.out.println("Backup created for device " + deviceId);
      });

 recoverButton.addActionListener(e -> {
String deviceId = deviceIdField.getText();
String backupData = recoverDeviceData(deviceId);
if (backupData != null) {
deviceStatusLabel.setText("Recovered Data: " + backupData);
System.out.println("Data recovered for device " + deviceId + ":
" + backupData);
} else {
  deviceStatusLabel.setText("No backup found for " + deviceId);
  System.out.println("No backup found for device " + deviceId);
  }
  });

exitButton.addActionListener(e -> {
System.out.println("Application closed.");
System.exit(0);
});

// Make the frame visible
setVisible(true);
    }
```

```
    // Simulating user registration
    public static void registerUser(String username, String password) {
userDatabase.put(username, password);
    }

    // Simulating user login
 public static boolean login(String username, String password) {
return userDatabase.containsKey(username) &&
userDatabase.get(username).equals(password);
    }

    // Simulate tracking device location
  public static String trackLocation(String deviceId) {
if (!deviceLocation.containsKey(deviceId)) {
  String newLocation = "Lat: 40.7128, Long: -74.0060"; // Example location
deviceLocation.put(deviceId, newLocation);
  }
  return deviceLocation.get(deviceId);
    }
    // Simulate locking a device
 public static void lockDevice(String deviceId) {
deviceLockStatus.put(deviceId, true);
    }

    // Simulate wiping device data
  public static void wipeDevice(String deviceId) {
if (deviceBackup.containsKey(deviceId)) {
deviceBackup.remove(deviceId);
```

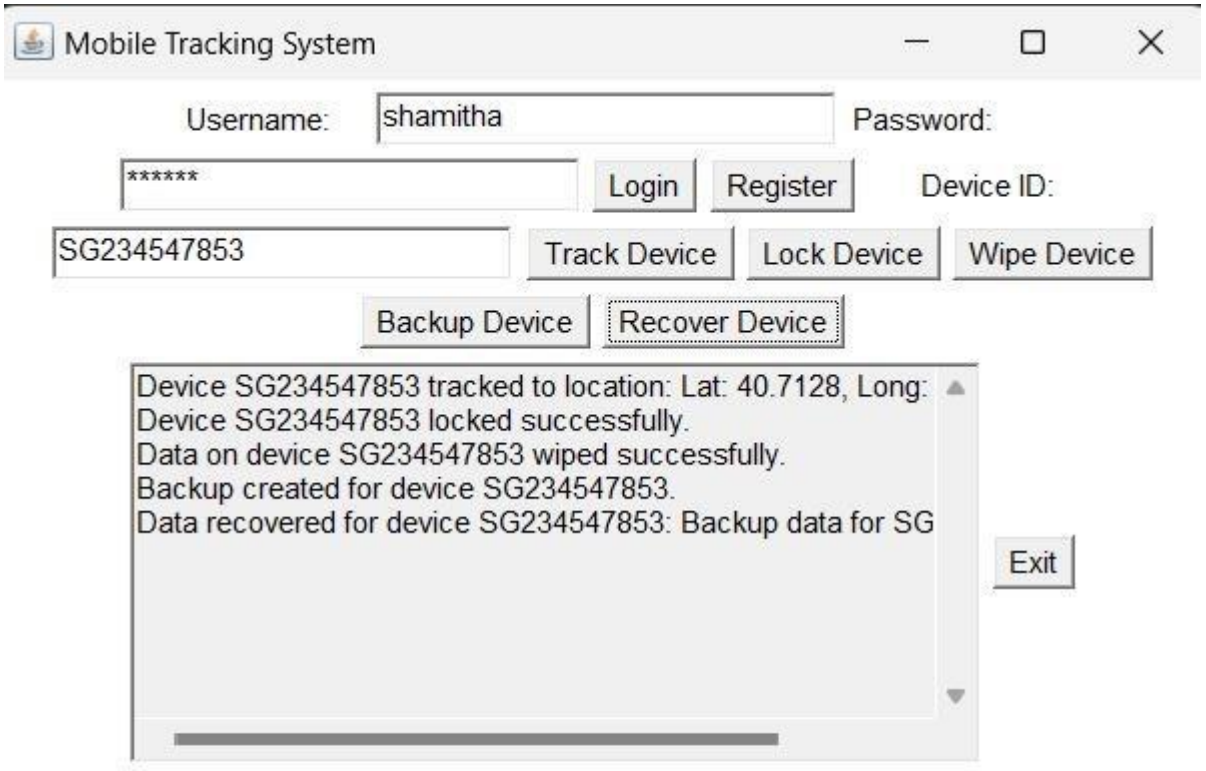
```
        }
    }


    // Simulate backing up device data
public static void backupDeviceData(String deviceId) {
deviceBackup.put(deviceId, "Backup data for " + deviceId);
    }

    // Simulate recovering device data
 public static String recoverDeviceData(String deviceId) {
return deviceBackup.get(deviceId);
    }

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

APPENDIX B - SCREENSHOTS


Mobile Tracking System
Username:
shamitha
Password:
******
Login
Register
Device ID:
SG234547853
Track Device
Lock Device
Wipe Device
Backup Device
Recover Device
Device SG234547853 tracked to location: Lat: 40.7128, Long:
Device SG234547853 locked successfully.
Data on device SG234547853 wiped successfully.
Backup created for device SG234547853.
Data recovered for device SG234547853: Backup data for SG
Exit