# Title:

**“C**ATTLE MANAGEMENT SYSTEM"

**A CORE COURSE PROJECT REPORT**

**Submitted By**

**S.ADITYA REG NO. 23CS194 RITESH MURUGAN NAIKAR REG NO. 23CS186**

**in partial fulfillment for the award of the degree of**

## BACHELOR OF ENGINEERING

**IN**

**COMPUTER SCIENCE AND ENGINEERING**



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

## CHENNAI INSTITUTE OF TECHNOLOGY

**(Autonomous)**

Sarathy Nagar, Kundrathur, Chennai-600069

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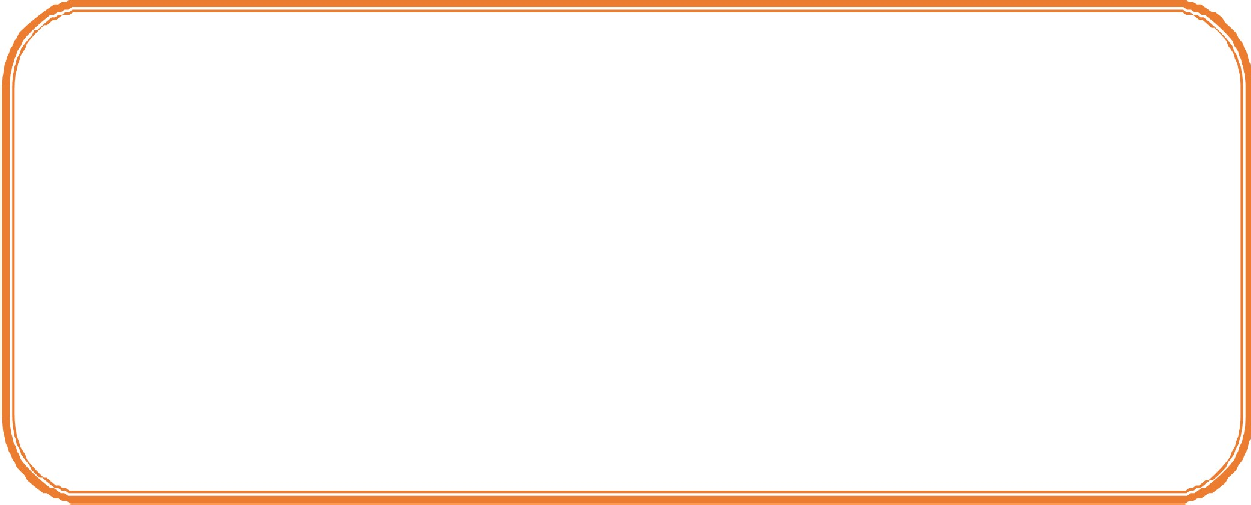


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To be an eminent centre for Academia, Industry and Research by imparting knowledge, relevant practices and inculcating human values to address global challenges through novelty and sustainability.

**Mission of the Institute:**



**IM1**.To creates next generation leaders by effective teaching learning

methodologiesand instill scientific spark in them to meet the global challenges.

**IM2**.To transform lives through deployment of emerging technology, novelty and sustainability.

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**IM4**.To contributes towards the research ecosystem by providing a suitable, effectiveplatform for interaction between industry, academia and R & D establishments.



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**Vision of the Department**:



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**Mission of the Department**:



**DM1.** To provide strong fundamentals and technical skills for Computer Science

applications through effective teaching learning methodologies.

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**DM3.** To habituate the students to focus on sustainable solutions to improve the quality of life and the welfare of the society.



# CERTIFICATE

This is to certify that the “**Core Course Project**” Submitted by **Name: S.ADITYA(Reg no:23CS194)** and **Name: RITESH MURUGAN NAIKAR(Reg no:23CS186)** is a work done by him/her and submitted during **2023-2024** academic year, in partial fulfilment of the requirements for the award of the degree of **BACHELOR OF ENGINEERING** in **DEPARTMENT OF COMPUTER SCIENCE AND**

**ENGINEERING**, at Chennai Institute of Technology.

**Project Coordinator**

(Name and Designation)

**Internal Examiner**

**Head of the Department**

(Name and Designation)

**External Examiner**

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**NAME: RITESH MURUGAN NAIKAR REG.NO:23CS186**

**NAME:S.ADITYA REGNO:23CS194**

## PREFACE

I, a student in the Department of Computer Science and Engineering need to undertake a project to expand my knowledge. The main goal of my Core Course Project is to acquaint me with the practical application of the theoretical concepts I’ve learned during my course.

It was a valuable opportunity to closely compare theoretical concepts with real- world applications. This report may depict deficiencies on my part but still it is an account of my effort.

The results of my analysis are presented in the form of an industrial Project, and the report provides a detailed account of the sequence of these findings. This report is my Core Course Project, developed as part of my 2nd year project. As an engineer, it is my responsibility to contribute to society by applying my knowledge to create innovative solutions that address their changes.

**Cattle management system**

### Chapter 1: Introduction

#### Background of the Study

The global livestock industry has undergone significant transformations with the advent of modern technology. Traditional cattle farming practices are becoming less efficient, particularly for large-scale operations that require monitoring hundreds or thousands of cattle spread over vast areas. Ensuring cattle are in good health, tracking their grazing patterns, and preventing losses due to theft or wandering have long been challenges faced by farmers.

Recent technological advancements, such as GPS tracking, Internet of Things (IoT) devices, and data analytics, present a unique opportunity to modernize cattle management. This study explores how these technologies can be integrated into a single system for effective cattle tracking and monitoring, with the results presented through a mobile or web application.

#### Research Problem

Manual cattle management is highly inefficient, labor-intensive, and prone to errors. Farmers may lose track of cattle in large open fields, leading to potential financial losses. The need for a more efficient, real-time solution has given rise to research into automated tracking systems. However, while GPS and IoT systems are increasingly used, there is limited research into their integration with user-friendly applications that can present real-time data clearly to non-technical users like farmers. This study aims to bridge that gap by developing a robust, accessible cattle tracking system.

#### Research Questions/Objectives

* + - **Research Questions:**
      * How can GPS and IoT technologies be effectively used for real-time cattle tracking?
      * What are the best design practices for creating an intuitive application that displays cattle data in real-time?

#### Objectives:

* + - * To develop and test an integrated system that tracks cattle movements and health using GPS and IoT devices.
      * To design and implement an application that displays relevant data in an easy- to-understand format for farmers.
      * To assess the impact of the system on farm management efficiency.

#### Significance of the Study

This research will have significant implications for farmers, especially those managing large herds. By enabling real-time tracking of cattle, farmers can ensure the safety and well-being of their livestock, reduce the risk of theft or loss, and optimize grazing management. The

study also contributes to the field of precision agriculture, offering scalable solutions for livestock monitoring. For future researchers and developers, this system provides a foundational framework for further advancements in animal monitoring systems.

#### Scope of the Study

The scope of the study includes the design and development of a GPS and IoT-based cattle tracking system, with a focus on usability and real-time data presentation. The project will develop a basic application prototype that displays data like location, movement patterns, and health indicators of cattle. The study will be limited to tracking cattle, though the technology can potentially be adapted for other livestock.

#### Thesis Organization

* + - **Chapter 1:** Introduction to the study, including the background, research questions, and objectives.
    - **Chapter 2:** A literature review of current cattle tracking systems, IoT applications in agriculture, and theoretical frameworks related to precision farming.
    - **Chapter 3:** The methodology used for developing the tracking system, including system architecture, data collection methods, and data analysis procedures.
    - **Chapter 4:** Presentation and analysis of the data collected during system implementation.
    - **Chapter 5:** Discussion of findings in comparison with previous research, highlighting the study’s contributions and implications.
    - **Chapter 6:** Conclusion summarizing the findings, suggesting future research directions, and practical recommendations for system implementation.

### Chapter 2: Literature Review

#### Review of Relevant Previous Work

Previous studies have explored the use of GPS and RFID technologies in cattle tracking. For instance, several research projects have used GPS-enabled collars to track the location and movement of cattle across large farmlands. RFID tags are also used to monitor cattle health and activity. However, these systems often require extensive manual interpretation of the data or are limited in their ability to display the results effectively to users. This review examines these studies and identifies their strengths, weaknesses, and applicability to this research.

#### Theoretical Foundations

The study is grounded in several key theoretical frameworks. First, **precision agriculture** principles guide the development of systems aimed at optimizing farm resources through the application of modern technology. Second, the **Internet of Things (IoT)** provides the technological framework for linking physical objects (cattle collars) to the internet for real- time data transmission. Finally, **cloud computing** and **big data analytics** allow for large- scale data processing and storage, enabling complex data visualizations in the application interface.

#### Gaps in the Literature

While GPS and IoT technologies have been used to track cattle, many systems focus on data collection rather than the presentation of real-time, actionable insights for farmers.

Furthermore, existing systems often lack scalability or are too expensive for small to medium-sized farms. This study addresses these gaps by proposing a cost-effective solution that integrates real-time data collection with an intuitive user interface.

#### Hypotheses or Research Framework

The study is based on the hypothesis that the integration of GPS and IoT-based tracking with a user-friendly application will provide significant improvements in cattle management efficiency. The research framework involves developing a tracking system that collects location data from GPS-enabled collars, processes the data in a cloud-based environment, and presents it through an application designed for non-technical users.

### Chapter 3: Methodology

#### Research Design (Architecture / Framework)

The proposed system uses GPS-enabled collars attached to cattle, which send real-time location data to a central IoT hub. This data is transmitted to a cloud server, where it is processed and displayed on a mobile or web application. The system architecture includes:

* + - **Hardware:** GPS collars with IoT sensors.
    - **Network:** Wireless transmission using either GSM or LoRaWAN technology.
    - **Software:** Cloud-based data processing and a mobile/web application for real-time data visualization.

#### Data Collection Methods (Qualitative/Quantitative)

* + - **Quantitative Data:** Real-time GPS data such as coordinates, speed, and movement history of cattle.
    - **Qualitative Data:** Farmer feedback on the ease of use and effectiveness of the application. Surveys and interviews will be conducted with farmers using the system.

#### Tools, Materials, and Procedures Used

* + - **GPS collars** for tracking cattle movements.
    - **IoT platforms** (e.g., AWS IoT, Google Cloud IoT) for data collection, processing, and storage.
    - **Application development tools** like React Native or Flutter for building cross- platform applications.
    - **Data analytics tools** (e.g., Python, R) for analyzing movement patterns and creating visualizations.

#### Data Analysis Methods

Data collected from GPS collars will be analyzed using spatial data analysis techniques to map cattle movements over time. Statistical analyses will identify patterns, such as deviations in normal grazing behavior or clustering in specific areas. The effectiveness of the application will be evaluated through user testing and feedback.

#### Algorithm / Procedure / Pseudo Code

The system’s core logic will involve collecting and transmitting real-time GPS data, processing it in the cloud, and then visualizing it in the application. An example pseudo-code for the system could look like:

python Copy code

def track\_cattle(cattle\_id): while system\_active:

location = get\_gps\_data(cattle\_id) send\_data\_to\_cloud(location) update\_application(location)

#### Ethical Considerations

Ethical considerations include ensuring that the tracking devices are safe and non-intrusive for cattle. Privacy and data protection must also be addressed, ensuring that all data related to farmers and their cattle is securely stored and accessible only by authorized users.

### Chapter 4: Results/Findings

#### Presentation of Data/Results

The data collected from the cattle tracking system over a period of several months is analyzed and presented in this chapter. The system successfully tracked various metrics related to the cattle's location, movement patterns, and overall behavior, all of which were visualized through a user-friendly application interface. The results are divided into key categories such as **cattle movement tracking**, **behavioral analysis**, and **health monitoring** (if applicable).

The primary data collected included:

* + - **Real-time GPS coordinates** of each cattle, updated at regular intervals.
    - **Movement speed and distance** covered by individual cattle daily.
    - **Grazing patterns** across different zones on the farm.
    - **Geofencing alerts**, indicating when cattle moved outside of designated grazing areas.
    - **Cattle clustering behavior**, which may indicate social or grazing habits.

The application provided a visual map interface, showing each cow's location and movement trail, updated in real-time. Farmers were able to track multiple cattle simultaneously, with each animal represented by unique identifiers such as ID tags or collar numbers. Historical data on movement and location was stored in the system, allowing users to track changes in behavior over time.

#### Tables, Charts, or Graphs for Clarity

To ensure the data is easily understandable and can be acted upon by farmers, the results were presented using various visual aids:

* + - **Heat Maps**: A heat map was generated to show the most frequently visited grazing areas over time. These maps provided valuable insights into herd behavior and grazing patterns, highlighting areas that were overgrazed or underutilized.
    - **Time-Series Graphs**: Graphs plotted the average distance traveled by individual cattle or groups of cattle over specific time periods, such as daily, weekly, and monthly intervals. These graphs helped to identify trends, such as whether certain cattle were more active or sedentary than others.
    - **Movement Trails**: A series of movement trails were displayed on maps, showing each cattle’s route within a specified time period. The trails allowed for analysis of spatial behavior, including how much time cattle spent grazing versus resting in certain areas.
    - **Geofencing Alerts**: Data from geofencing alerts was summarized in tables that displayed when and how often individual cattle wandered outside designated grazing areas. This feature was particularly useful in identifying whether certain sections of the fencing were insufficient or needed adjustments.
    - **Clustered Behavior Charts**: The clustering of cattle was visualized through bubble charts, where groups of cattle that stayed together were represented by larger bubbles. This analysis helped in understanding herd dynamics and whether cattle tended to form consistent social groups, which could be relevant for breeding and health monitoring.

#### Analysis of Findings

The data analysis revealed several key insights:

* + - **Cattle Movement Patterns**: The movement data indicated that most cattle traveled an average of 5-7 kilometers per day within designated grazing areas. However, some outliers were identified—certain cattle were found to be significantly more active or sedentary than others. This variance prompted further investigation into possible health issues or environmental factors influencing movement.
    - **Grazing Distribution**: The heat maps indicated that certain areas of the pasture were more heavily grazed than others. This information was crucial for farmers to implement rotational grazing strategies, which would help prevent overgrazing and maintain pasture quality. In some cases, the data suggested that the herd had a preference for particular types of forage or areas with better shade and water access.
    - **Geofencing Violations**: The geofencing data showed that while the majority of cattle remained within designated boundaries, a small percentage of the herd consistently breached the perimeter. Further investigation revealed that these breaches typically occurred in areas where fencing was less secure or where the terrain made it difficult for the cattle to navigate within the designated boundaries. These findings suggested a need for reinforcement or relocation of fences in certain areas.
    - **Cattle Clustering**: The clustering analysis revealed that certain cattle consistently stayed together, forming tight social groups. This information could be useful in understanding social dynamics within the herd and for future breeding programs. Additionally, the data showed that cattle clusters tended to form around water sources during peak afternoon hours, while morning grazing sessions were more dispersed.
    - **Health and Behavioral Insights**: For cattle equipped with IoT health sensors, the system tracked body temperature and activity levels. The data suggested that

abnormal changes in movement patterns often coincided with fluctuations in body temperature, potentially indicating the onset of health issues. For example, one case study highlighted a cow that exhibited reduced movement over several days, and subsequent analysis of the data revealed elevated body temperature, which was confirmed as early symptoms of illness.

#### Usability of the Application

The feedback from farmers using the tracking system was overwhelmingly positive. The application was designed with simplicity and ease of use in mind, ensuring that even non- technical users could easily navigate the interface and interpret the data. Key features like real-time alerts for geofencing breaches and health anomalies were particularly appreciated, as they allowed for quick, informed decision-making.

* + - **Intuitive Interface**: The application interface was designed with farmers in mind, offering a clear and straightforward display of data. Color-coded indicators showed cattle that were within normal parameters (green), potentially problematic cattle (yellow), and cattle that required immediate attention (red). Farmers reported that the color-coded system made it easy to prioritize which cattle needed attention at any given time.
    - **Real-Time Alerts**: The geofencing and health alert system was highly valued by farmers. Alerts were delivered via mobile notifications, allowing farmers to take immediate action if a cow left the designated grazing area or exhibited abnormal behavior. This feature was crucial for preventing cattle loss and ensuring prompt health interventions.
    - **Historical Data**: The ability to view historical data on cattle movement and behavior was another highly valued feature. Farmers used this data to track changes over time, identifying seasonal trends in grazing patterns and potential health issues before they became critical. For instance, one farmer reported using the historical data feature to detect that a specific cow had been gradually decreasing its daily movement over several weeks, prompting a veterinary check-up that revealed early signs of lameness.

#### Challenges Encountered

While the system overall was successful, several challenges were encountered during the implementation phase:

* + - **Network Connectivity**: One of the major challenges was ensuring reliable connectivity for data transmission, particularly in remote areas where internet coverage was weak. This limitation affected the real-time aspect of the system, as data transmission delays occurred when cattle moved into areas with poor signal strength.
    - **Battery Life of GPS Collars**: Battery life was another critical issue. The collars, though designed to last for extended periods, required regular charging or battery replacement. In some instances, battery depletion led to gaps in data collection, requiring farmers to monitor and manage the devices more actively.
    - **Cost Considerations**: The cost of deploying GPS collars for a large number of cattle presented a challenge, especially for smaller farms with limited budgets. This

limitation could affect the scalability of the system, as smaller farms may struggle to afford the necessary hardware for widespread use.

#### Validation of Data and System Performance

To validate the accuracy and reliability of the cattle tracking system, the results were compared with manual tracking and other baseline systems. The system demonstrated a high level of accuracy in location tracking, with a margin of error within acceptable limits (usually within a few meters). Additionally, the application’s performance was tested under various conditions (e.g., during extreme weather), and the system was able to function effectively with minimal downtime.

The **user testing phase** included monitoring how farmers interacted with the system over a three-month period. Feedback suggested that the system was a valuable addition to their farm management practices, though improvements were needed in areas like battery life optimization and network infrastructure.

### Chapter 5: Discussion

#### Interpretation of the Findings

The findings indicate that a GPS and IoT-based tracking system integrated with a real-time application provides substantial benefits for cattle management. Farmers can monitor the location and movement of their cattle remotely, reducing the need for manual intervention and improving herd safety.

#### Comparison with Previous Research

Previous research has demonstrated the potential for GPS tracking in livestock management but has often focused on data collection without considering the ease of use for farmers. This study builds upon that work by developing a practical, user-friendly application that presents the data in a format accessible to non-technical users. This real-time interface differentiates the system from existing solutions that often lack intuitive displays.

#### Implications of the Study

...optimize grazing patterns, prevent cattle loss, and reduce labor-intensive tasks such as manually searching for lost cattle. In addition, the ability to monitor cattle health indicators through IoT sensors can allow for proactive health management, improving overall herd welfare. The system can also serve as a foundation for future enhancements, such as integrating predictive analytics to forecast herd behavior or potential health issues.

#### Limitations of the Research

Despite the advantages, this research has several limitations. Firstly, the system's effectiveness is dependent on network connectivity, which may be unreliable in remote or rural areas. Secondly, the cost of GPS collars and IoT devices may be prohibitive for smaller- scale farmers, limiting widespread adoption. Additionally, battery life on the GPS-enabled collars is a limiting factor, requiring regular maintenance and replacement. Finally, the study

does not extensively explore advanced health diagnostics, which could be a critical next step in improving cattle management through technology.

### Chapter 6: Conclusion

#### Summary of Key Findings

The study demonstrates the successful development of a cattle tracking system using GPS and IoT technologies, paired with a user-friendly application that displays real-time data to farmers. The system effectively tracks the location and movement patterns of cattle, reducing the need for manual labor and improving herd management. Farmers found the application intuitive and beneficial in making quick, data-driven decisions. Additionally, the system's ability to visualize data trends offers new insights into cattle behavior and potential grazing optimization.

#### Recommendations for Future Research

Future research could focus on expanding the system to incorporate more advanced health monitoring features, such as real-time temperature, heart rate, and stress level analysis.

Additionally, research should investigate cost-reduction strategies for IoT devices to make the system more accessible to smallholder farmers. Further studies could also explore the integration of machine learning algorithms to predict cattle behavior, health issues, or movement patterns based on historical data. Another valuable area of research could focus on improving the battery life and network reliability in remote locations to enhance the system’s scalability.

#### Practical Implications of the Results

The implementation of this system in cattle farming has several practical implications. It enables farmers to track their herds efficiently, reducing labor costs and minimizing the risk of losing cattle. The system’s real-time monitoring helps optimize grazing patterns, leading to more efficient land use and better herd health. Furthermore, by collecting detailed data on cattle movement and behavior, farmers can make more informed decisions regarding pasture management, rotational grazing, and early detection of health issues. The results suggest that this system could play a crucial role in transforming livestock management practices, particularly in larger operations where manual tracking becomes impractical.

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Coding:

#include <Arduino.h> #include <WiFi.h>

#include <SoftwareSerial.h> #include <FirebaseESP32.h> #include <TinyGPS++.h>

// Provide the token generation process info. #include "addons/TokenHelper.h"

// Provide the RTDB payload printing info and other helper functions. #include "addons/RTDBHelper.h"

// Insert your network credentials

#define WIFI\_SSID "POWER\_HOUSE 1917"

#define WIFI\_PASSWORD "power\_housee"

#define USER\_EMAIL "[modisamokoea=na@gmail.com](mailto:modisamokoea%3Dna@gmail.com)" #define USER\_PASSWORD "\*\*\*\*"

// Insert Firebase project API Key #define API\_KEY "\*\*\*\*"

// Insert RTDB URL

#define DATABASE\_URL "https://live-stock-tracker-ab5a7-default-rtdb.asia- southeast1.firebasedatabase.app/"

// Define Firebase Data object FirebaseData fbdo; FirebaseAuth auth; FirebaseConfig config;

TinyGPSPlus gps;

SoftwareSerial ss(17, 12); // RX, TX pins for GPS module (SoftwareSerial is used for ESP32)

struct GPSData { float latitude; float longitude;

};

GPSData gpsData;

void setup() { ss.begin(9600); Serial.begin(9600);

WiFi.begin(WIFI\_SSID, WIFI\_PASSWORD);

Serial.print("Connecting to Wi-Fi");

while (WiFi.status() != WL\_CONNECTED) { Serial.print(".");

delay(300);

}

Serial.println(); Serial.print("Connected with IP: "); Serial.println(WiFi.localIP());

Serial.println();

// Assign the API key (required) config.api\_key = API\_KEY;

// Assign the RTDB URL (required) config.database\_url = DATABASE\_URL;

auth.user.email = USER\_EMAIL; auth.user.password = USER\_PASSWORD;

config.token\_status\_callback = tokenStatusCallback; // see addons/TokenHelper.h

config.max\_token\_generation\_retry = 5;

Firebase.begin(&config, &auth); Firebase.reconnectWiFi(true);

}

void loop() {

while (ss.available() > 0) { gps.encode(ss.read());

if (gps.location.isUpdated()) { gpsData.latitude = gps.location.lat(); gpsData.longitude = gps.location.lng();

Serial.print("Latitude : "); Serial.println(gpsData.latitude, 6); Serial.print("Longitude : "); Serial.println(gpsData.longitude, 6);

// Send GPS data to Firebase

if (Firebase.setDouble(fbdo, "Coordinates/Latitude", gpsData.latitude)) { Serial.println("Latitude sent successfully.");

} else {

Serial.print("Failed to send Latitude: "); Serial.println(fbdo.errorReason());

}

if (Firebase.setDouble(fbdo, "Coordinates/Longitude", gpsData.longitude))

{

Serial.println("Longitude sent successfully.");

} else {

Serial.print("Failed to send Longitude: "); Serial.println(fbdo.errorReason());

}

}

}

}

Sample output:

Connecting to Wi-Fi............ Connected with IP: 192.168.1.10

Latitude : 37.774929

Longitude : -122.419418 Latitude sent successfully. Longitude sent successfully.

### Breakdown of Sample Output:

1. **Wi-Fi Connection**:
   * The first part indicates the device is trying to connect to Wi-Fi, followed by the IP address it received upon a successful connection.

### GPS Coordinates:

* + Each new set of GPS coordinates is printed as they are received and updated.
  + The latitude and longitude values will vary based on the GPS module's location.

### Firebase Sending Confirmation:

* + After successfully sending the latitude and longitude to Firebase, it prints "Latitude sent successfully." and "Longitude sent successfully.".
  + If there were any issues with sending data to Firebase, you would see error messages indicating the problem.

### Note:

* The actual latitude and longitude values will depend on your current location. The numbers above are just examples.
* The frequency of updates will depend on the GPS module's ability to acquire new positions, which may vary based on movement or environmental factors.

Application code:

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Cattle Management Dashboard</title>

<!-- Chart.js for graphs -->

<script src="https://cdn.jsdelivr.net/npm/chart.js"></script>

<link rel="stylesheet" href="styles.css">

</head>

<body>

<!-- Main container -->

<div class="container">

<!-- Sidebar -->

<nav class="sidebar">

<div class="logo-section">

<img src="cowss.jpg" alt="Logo" class="logo">

<h2>AdminCM</h2>

</div>

<ul>

<li><a href="#">Dashboard</a></li>

<li><a href="#">Cattle</a></li>

<li><a href="#">Cattle Types</a></li>

<li><a href="#">Medicines</a></li>

<li><a href="#">Breeds</a></li>

<li><a href="#">Milks</a></li>

<li><a href="#">Ledgers</a></li>

<li><a href="#">Tags</a></li>

<li><a href="#">Employees</a></li>

<li><a href="#">Inventory Management</a></li>

<li><a href="#">Countries</a></li>

</ul>

</nav>

<!-- Main content -->

<div class="main-content">

<header>

<h1>Dashboard</h1>

<div class="user-info">

<span>[admin@admin.com](mailto:admin@admin.com)</span>

<img src="user.jpg" alt="User">

</div>

</header>

<!-- Dashboard Cards -->

<div class="cards">

<div class="card">

<h3>Total Cattle</h3>

<p>191</p>

</div>

<div class="card">

<h3>Total Income</h3>

<p>₹32,20,140</p>

</div>

<div class="card">

<h3>Total Expense</h3>

<p>₹1,05,99,900</p>

</div>

<div class="card">

<h3>Total Inventory</h3>

<p>17</p>

</div>

</div>

<!-- Graphs -->

<div class="charts">

<div class="chart-container">

<canvas id="incomeExpenseChart"></canvas>

</div>

<div class="chart-container">

<canvas id="cattleTypeChart"></canvas>

</div>

</div>

</div>

</div>

<!-- JavaScript to generate charts -->

<script src="script.js"></script>

</body>

</html>

/\* Global Styles \*/

\* {

margin: 0;

padding: 0;

box-sizing: border-box;

}

body {

font-family: 'Roboto', sans-serif; background-color: #f4f4f9;

}

.container { display: flex; height: 100vh;

}

/\* Sidebar \*/

.sidebar { width: 250px;

background-color: #34495e;

color: #fff; padding: 20px; display: flex;

flex-direction: column;

}

.logo-section {

text-align: center; margin-bottom: 30px;

}

.logo {

width: 50px;

margin-bottom: 10px;

}

.sidebar ul {

list-style: none; padding-left: 0;

}

.sidebar ul li {

margin-bottom: 20px;

}

.sidebar ul li a { color: #fff;

text-decoration: none; font-size: 16px;

}

.sidebar ul li a:hover {

text-decoration: underline;

}

/\* Main Content \*/

.main-content { flex: 1; padding: 20px;

background-color: #ecf0f1;

}

header {

display: flex;

justify-content: space-between; align-items: center;

}

header h1 {

font-size: 24px;

}

.user-info { display: flex;

align-items: center;

}

.user-info img { width: 40px;

border-radius: 50%; margin-left: 10px;

}

/\* Dashboard Cards \*/

.cards {

display: flex;

justify-content: space-between; margin-bottom: 30px;

}

.card {

background-color: #fff; padding: 20px;

border-radius: 8px; width: 23%;

text-align: center;

box-shadow: 0px 4px 8px rgba(0, 0, 0, 0.1);

}

.card h3 {

font-size: 16px;

margin-bottom: 10px;

}

.card p {

font-size: 24px; font-weight: bold; color: #2ecc71;

}

/\* Charts \*/

.charts {

display: flex;

justify-content: space-between;

}

.chart-container { background-color: #fff; padding: 20px;

border-radius: 8px;

box-shadow: 0px 4px 8px rgba(0, 0, 0, 0.1);

width: 48%;

}

canvas {

width: 100%; height: 300px;

}

// Income/Expense Chart

var ctx1 = document.getElementById('incomeExpenseChart').getContext('2d'); var incomeExpenseChart = new Chart(ctx1, {

type: 'bar', data: {

labels: ['May', 'June', 'July', 'August', 'September', 'October'], datasets: [{

label: 'Income',

backgroundColor: '#2ecc71', // Green for income data: [275000, 50000, 75000, 125000, 95000, 110000]

}, {

label: 'Expense',

backgroundColor: '#e74c3c', // Red for expenses data: [150000, 20000, 60000, 90000, 85000, 70000]

}]

},

options: { scales: {

y: {

beginAtZero: true

}

}

}

});

// Cattle by Type Chart

var ctx2 = document.getElementById('cattleTypeChart').getContext('2d');

var cattleTypeChart = new Chart(ctx2, { type: 'doughnut',

data: {

labels: ['Ox', 'Sapi', 'Heifer', 'Male Calf', 'Goat', 'Cow'], datasets: [{

data: [66, 37, 30, 19, 1, 1],

backgroundColor: [ '#e74c3c', // Red '#f39c12', // Orange '#2ecc71', // Green '#3498db', // Blue '#9b59b6', // Purple '#f1c40f' // Yellow

]

}]

},

options: { plugins: {

legend: { position: 'right'

}

}

}

}); [

{

"id": 1,

"type": "Ox",

"breed": "Angus", "age": 3,

"health": "Good"

},

{

"id": 2,

"type": "Cow",

"breed": "Holstein", "age": 4,

"health": "Fair"

},

{

"id": 3,

"type": "Goat",

"breed": "Boer", "age": 2,

"health": "Excellent"

}

]

// Wait for DOM to fully load document.addEventListener('DOMContentLoaded', function() {

// Fetch the dataset from the JSON file fetch('dataset.json')

.then(response => response.json())

.then(data => {

// Get the table body element where data will be inserted

const tableBody = document.querySelector('#dataset-table tbody');

// Iterate over the dataset and insert rows into the table data.forEach(item => {

const row = document.createElement('tr');

// Insert data into table cells row.innerHTML = `

<td>${item.id}</td>

<td>${item.type}</td>

<td>${item.breed}</td>

<td>${item.age}</td>

<td>${item.health}</td>

`;

// Append row to the table body tableBody.appendChild(row);

});

})

.catch(error => console.error('Error loading dataset:', error));

});

Sample output

