TAMIL NADU CENTRE OF EXCELLENCE FOR ADVANCED MANUFACTURING (TANCAM)

TIDCO

TANCAM'S

HACKATHON FOR WOMEN IN ENGINEERING

THEME: URBAN MOBILITY USING IOT

TITLE: DIGITAL BUSPASS SYSTEM

VENUE: RAJALAKSHMI ENGINEERING COLLEGE

TEAM LEADER NAME: SOWMIYA P

DASSAULT SYSTEMES

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PROBLEM STATEMENT :

The current manual process of checking bus passes during peak hours presents significant challenges for passengers and operators alike. High volumes of commuters lead to long queues, overcrowded buses, and delays in boarding. Passengers face frustration and stress navigating through crowds, exacerbating inefficiencies. The Smart Card Bus Pass project seeks to address these issues by introducing smart card technology to streamline boarding processes and eliminate cash transactions. However, real-time problems persist, including the need for automated verification to expedite boarding, reduce congestion, and improve the overall passenger experience. To enhance fleet management, the system must effectively manage peak-hour demand without requiring additional monitoring. Seamless integration, reduced operational costs, and valuable data insights promise to modernize and optimize public transportation systems, offering convenience, security, and efficiency to both passengers and operators.

OBJECTIVES OF THE WORK:

- To implement automated verification processes to expedite boarding, reduce congestion thereby improving operational efficiency, passenger experience, .
- To introduce smart card technology to streamline boarding processes and eliminate cash transactions.
- To utilize data insights from smart card usage to optimize public transportation routes and schedules, effectively managing peak-hour demand
- To modernize existing manual processes with smart card technology, paving the way for innovation and advancement in the public transportation sector encouraging more individuals to utilize public transportation services.

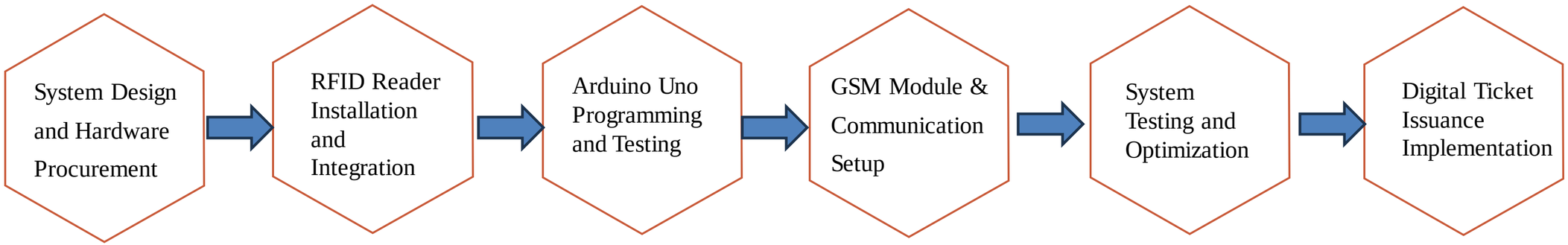
DASSAULT SYSTEMES

PROJECT DESCRIPTION:

- **Project Title:** Digital Bus Pass System Implementation
- **Overview**: The project aims to implement a digital bus pass system utilizing passive RFID cards and GSM technology for real-time validation. This system enhances passenger convenience, reduces paper-based passes, improves operational efficiency, and enables real-time monitoring of passenger activity.
- **Project Justification:** The current manual process of checking bus passes during peak hours presents significant challenges for passengers and operators. Introducing a digital bus pass system addresses these issues by streamlining boarding processes, reducing congestion, and enhancing the overall passenger experience.
- **Timeline:**

  - Week 1: Enable digital ticket issuance to passengers via SMS message.
  - Week 2 : Utilize GSM modules for real-time validation and communication with a central server.
  - Week 3 : Integrate RFID readers with Arduino Uno microcontrollers for data processing.
  - Week 4 : Implement automated RFID card scanning on buses.

- **Phases of Work:**



PROJECT DESCRIPTION:

Risk Management Plan:

- **Hardware Malfunction** - To mitigate this risk, we will implement regular maintenance schedules and quality assurance checks & backup systems in place to minimize downtime in case of failures.
- **To adopting the new system** : Providing clear communication about the benefits of the digital bus pass system and addressing any concerns or objections through targeted stakeholder engagement, offering training and support programs fostering acceptance and buy-in throughout the organization.
- **Data Security Risk :** To implement robust data encryption protocols to safeguard sensitive passenger information. Conduct regular security audits and penetration testing to identify vulnerabilities and address them promptly

Metrics for Evaluating and Monitoring:

- Reduction in boarding time during peak hours
- Decrease in queue lengths at bus stops
- Increase in passenger satisfaction ratings
- Real-time monitoring of passenger activity for transit authorities
- Overall time for scanning
- Accuracy of the result
- Decision Time of Arduino
- Scanning Speed per user

Estimated Budget: Rs.2000/- (inclusive of hardware, software, labor, and testing expenses)

WORK FLOW :

The workflow of the project initiates with the Arduino Uno, GSM 900A module, and RFID reader powered by an external source. Upon system activation, the RFID reader scans a card within its range, transmitting the data to the Arduino Uno for processing. Subsequently, upon successful processing, the Arduino triggers the GSM 900A module to dispatch an SMS notification to a predefined number, signaling the completion of the scanning process. Simultaneously, the Arduino activates the buzzer and LED lights to furnish visual and auditory cues, affirming the completion of the scanning process. The resistor integrated into the circuit ensures signal conditioning, validating successful card scanning. Throughout this seamless workflow, each component plays a pivotal role: the RFID reader captures data, the Arduino processes it, and the GSM module facilitates real-time communication, while the buzzer and LED lights furnish immediate feedback to users. This integrated approach ensures swift and efficient card scanning, coupled with prompt notification delivery, thereby enhancing system functionality and user experience. Moreover, the inclusion of LED lights, SMS notifications, and a buzzer not only facilitates real-time communication but also contributes valuable data for optimizing public transportation efficiency. Furthermore, the system's remote management capabilities empower administrators to monitor and oversee the entire infrastructure, minimizing the necessity for on-site interventions and ensuring seamless operations.

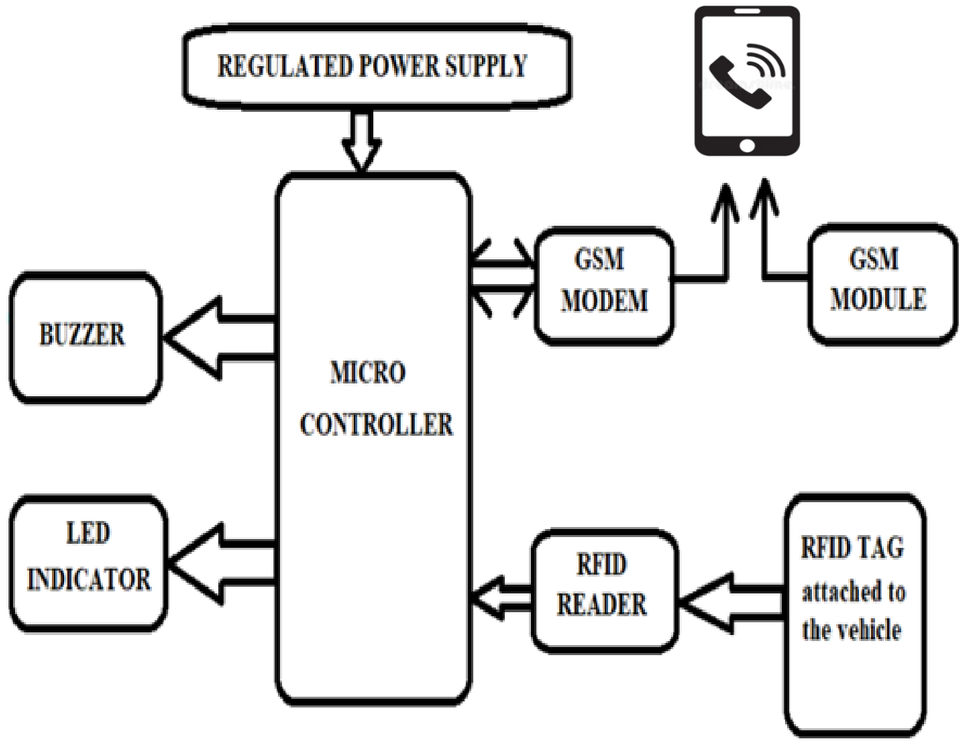


Fig : 1.1 BLOCK DIAGRAM

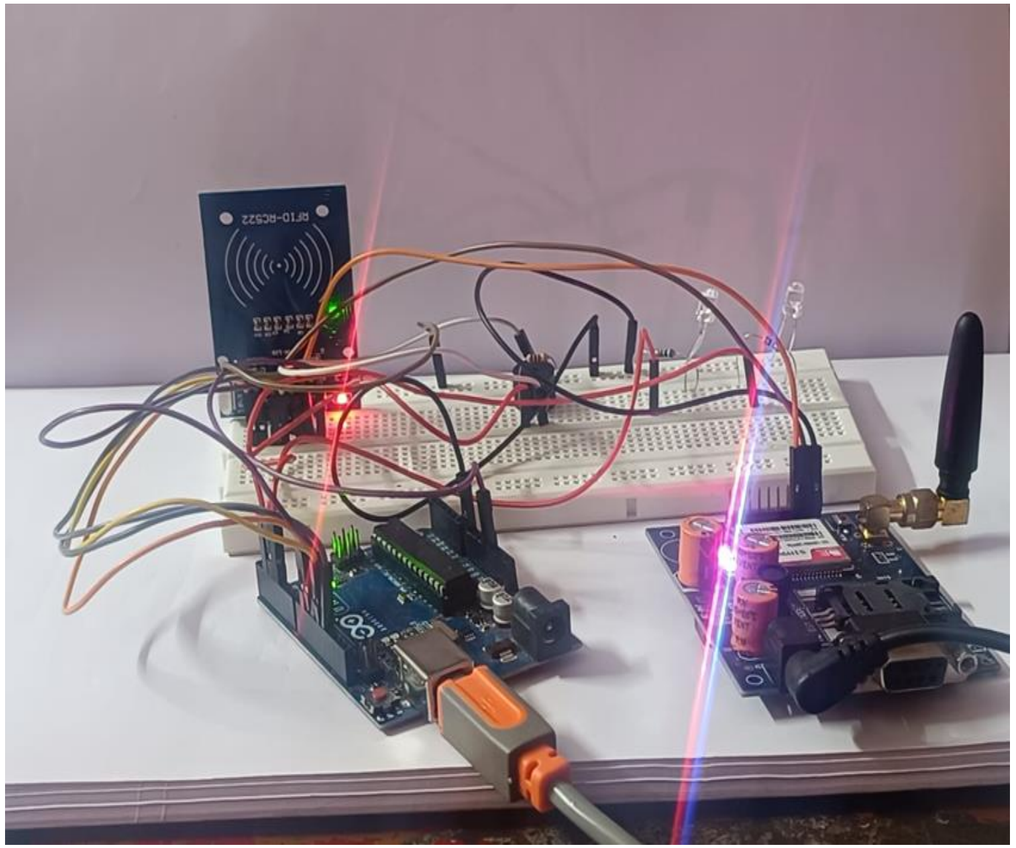


Fig : 2.1

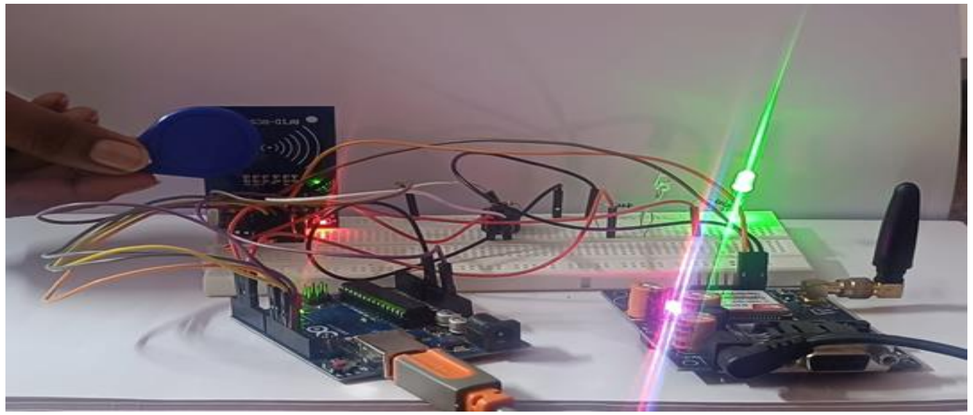


Fig : 2.2

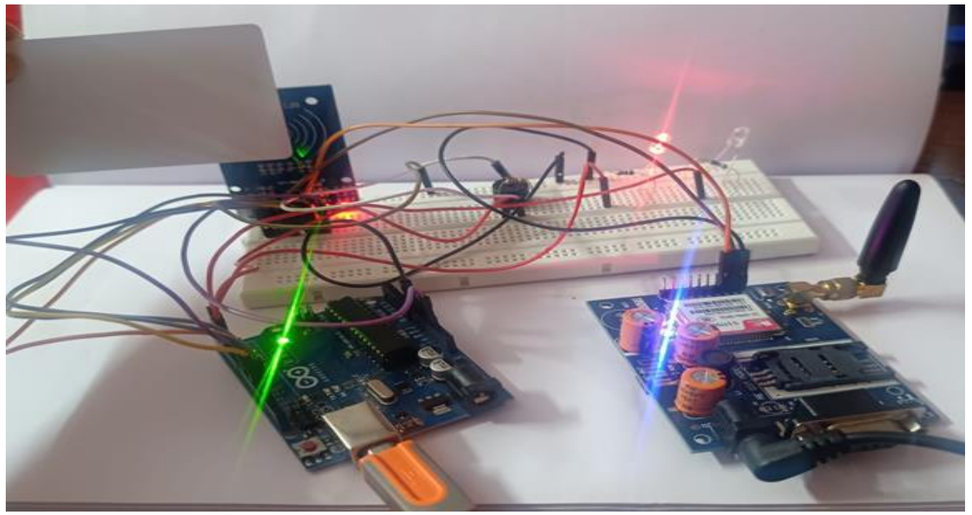


Fig : 2.3

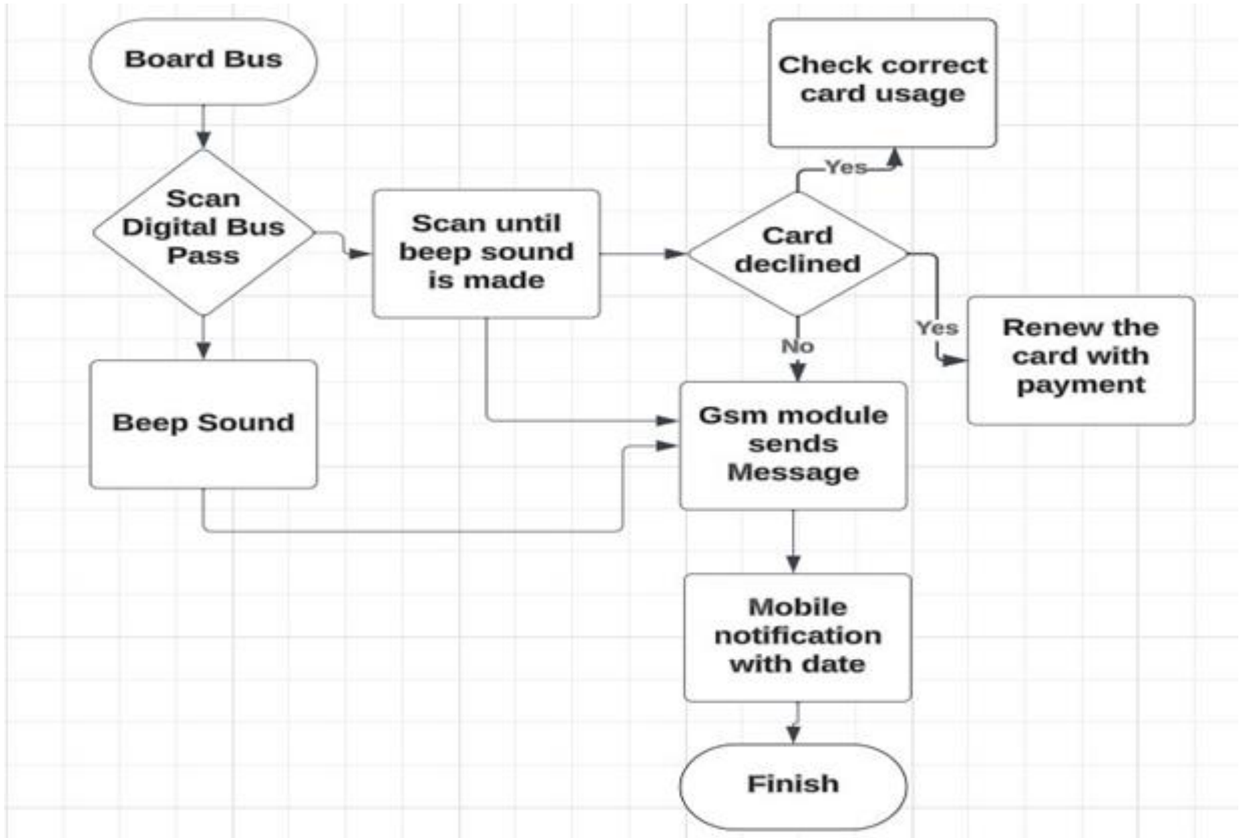


Fig : 3.1 FLOW CHART

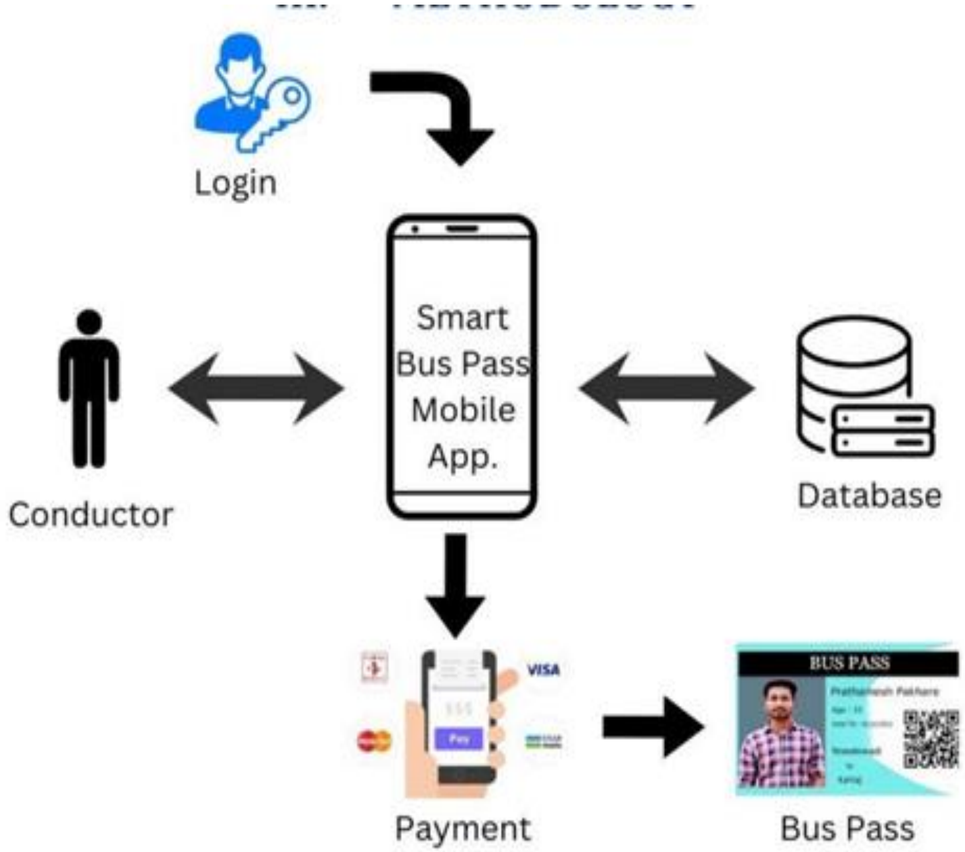


Fig : 3.2 WORK FLOW

USER NOTIFICATION

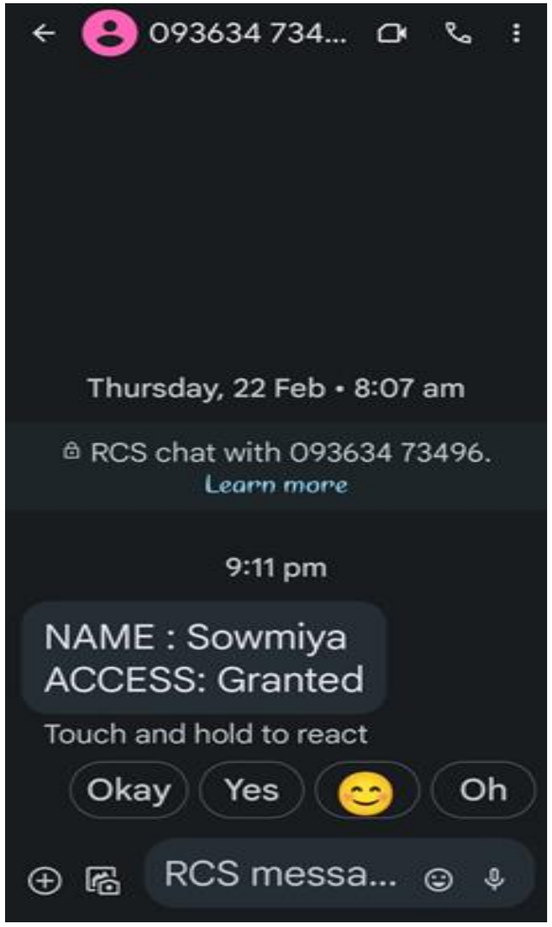


Fig : 4.1

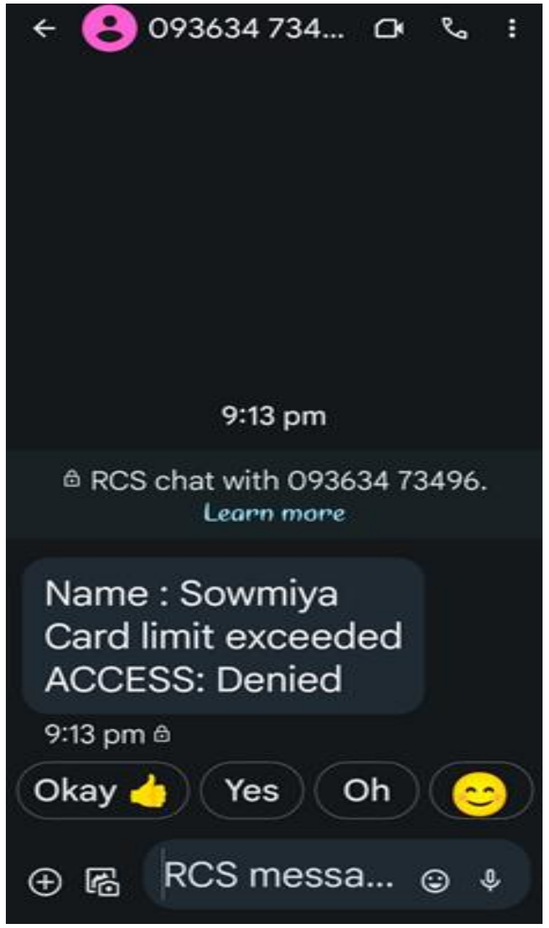


Fig: 4.2

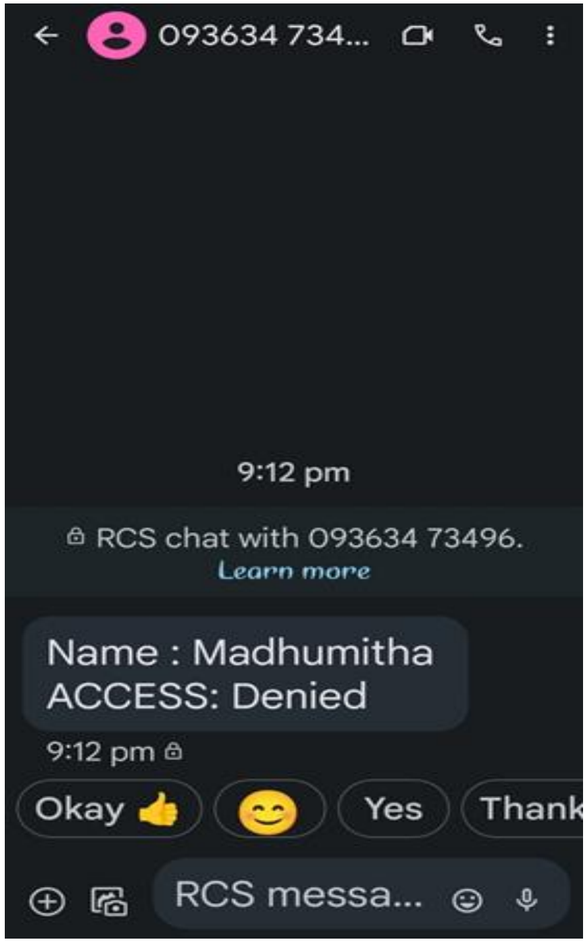


Fig : 4.3

CONCLUSIONS:

Through the diligent implementation of the Digital Bus Pass System, the once daunting challenges of manual ticket verification during peak hours have been effectively mitigated. By seamlessly introducing smart card technology and real-time validation processes, our project has successfully streamlined boarding processes, reduced congestion, and significantly improved the overall passenger experience.

The integration of passive RFID cards and GSM technology has not only expedited boarding but also provided transit authorities with invaluable data insights for optimizing routes and schedules. With reduced queue lengths, increased passenger satisfaction ratings, and enhanced operational efficiency, our project stands as a testament to innovation in the public transportation sector.

With a modest budget allocation inclusive of all expenses, we have ushered in a new era of convenience, security, and efficiency in public transportation, encouraging greater utilization and fostering a more sustainable future for commuters and operators alike.

TEAM MEMBER DETAILS:

TEAM MEMBER 1 :

NAME : SOWMIYA P
SEMESTER : VI
YEAR : III
DEPARTMENT : CSE

TEAM MEMBER 2 :

NAME: MADHUMITHA B
SEMESTER: VI
YEAR: III
DEPARTMENT: CSE

TEAM MENTOR NAME:

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DESIGNATION: ASSOCIATE PROFESSOR
DEPARTMENT: CSE
COLLEGE: VELAMMAL ENGINEERING COLLEGE