TITLE PAGE

- **Problem Statement ID – SIH25012**
- **Problem Statement Title- Automated Attendance System for Rural Schools**
- **Theme- Smart Education**
- **PS Category- Software**
- **Team ID-**
- **Team Name- AttenSync**

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IDEA TITLE

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IDEA / SOLUTION :

Implementation of an **Offline-First RFID-based Attendance Protocol** specialized for low-cost, low-network rural school environments.

- Autonomous **RFID-enabled** local unit for attendance capture.
- Unique student RFID card for fast, **error-free authentication**.
- Time-stamped, locally-stored attendance records for **offline reliability.**
- Robust **DBMS Integration**, stored in MySQL, ensuring smooth data management, and seamless integration with analytics and government portals.
- **User-friendly** interface allowing easy access for faculty/students.
- A **Time series forecasting model** trained to identify trends, seasonal fluctuations, and external impacts on attendance.

Problem Resolution :

- **Enhanced Efficiency** : Automates attendance within seconds, significantly reducing time lost to manual processes.
- **Data Accuracy** : Minimizes human error, ensuring reliable and tamper-proof student attendance records.
- **Cost-Effective Scalability** : Utilizes affordable RFID technology that can be easily implemented and expanded across rural schools.
- **Resource Allocation** and Mid-Day Meal Forecasting

Unique Value Proposition :

- **Real-Time Feedback Loop**: LCD gives instant confirmation(“Attendance Marked”),
- Plug-and-Play Simplicity : **Easy setup**, requires zero technical expertise for teachers.
- **Actionable Data Insights** : Advanced analytics on attendance trends.
- **Hybrid** Hardware + DBMS integration.
- **Smart Resource Optimization** – Forecasts meals, saves time, resources.

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TECHNICAL APPROACH

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Technology Stack:

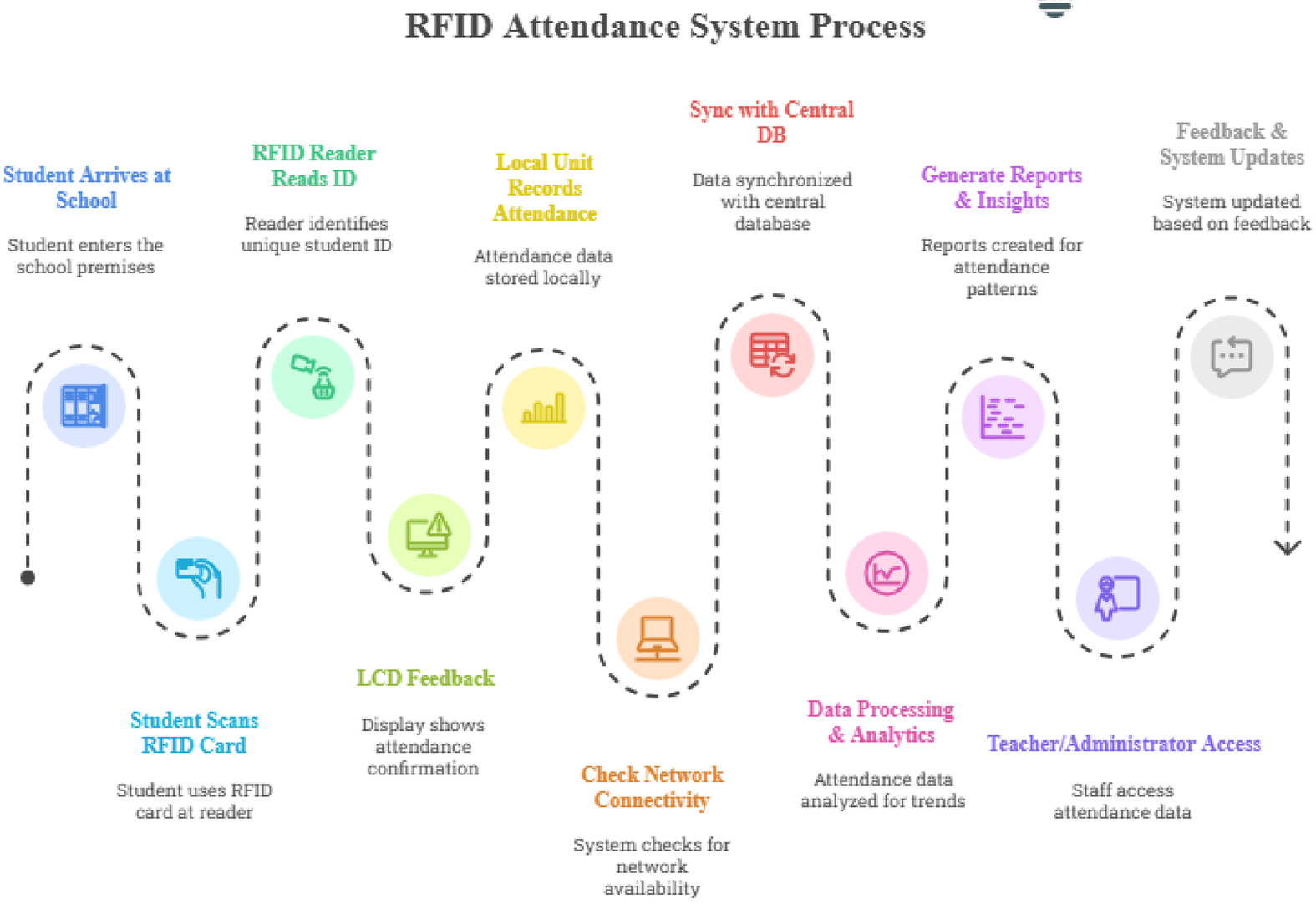
Hardware:
RFID Reader, ESP32, LCD, RTC

Backend:
Python (Flask/Django) & ML Model (ARIMA/Prophet)

Database:
MySQL (local) and Google (cloud)

Frontend:
HTML, CSS, JavaScript, React

Communication:
REST API, Data Synchronization Script



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FEASIBILITY AND VIABILITY

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Aspect	Feasibility Analysis	Potential Challenges & Risks	Strategies for Overcoming Challenge
Technical	LoRa + DBMS (MySOL/MongoDB) enables offline, reliable data logging.	Sensor-LoRa integration issues; hardware failures.	Modular hardware design, robust table storage, lightweight sync algorithms.
Financial	Affordable hardware; no recurring cloud costs due to DBMS use.	Initial setup cost may be high for small schools.	Government subsidies, bulk procurement, phased rollout.
Market	Strong demand in schools & health sectors for transparency and efficiency.	Resistance to shift from manual/traditional systems.	Pilot programs, awareness campaigns, proof of cost savings.
Operational	Easy deployment with minimal training for teachers/staff.	Maintenance and uptime issues in rural remote areas.	Local technician training, remote diagnostics, low-power design.

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IMPACT AND BENEFITS

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For Teachers & Schools :

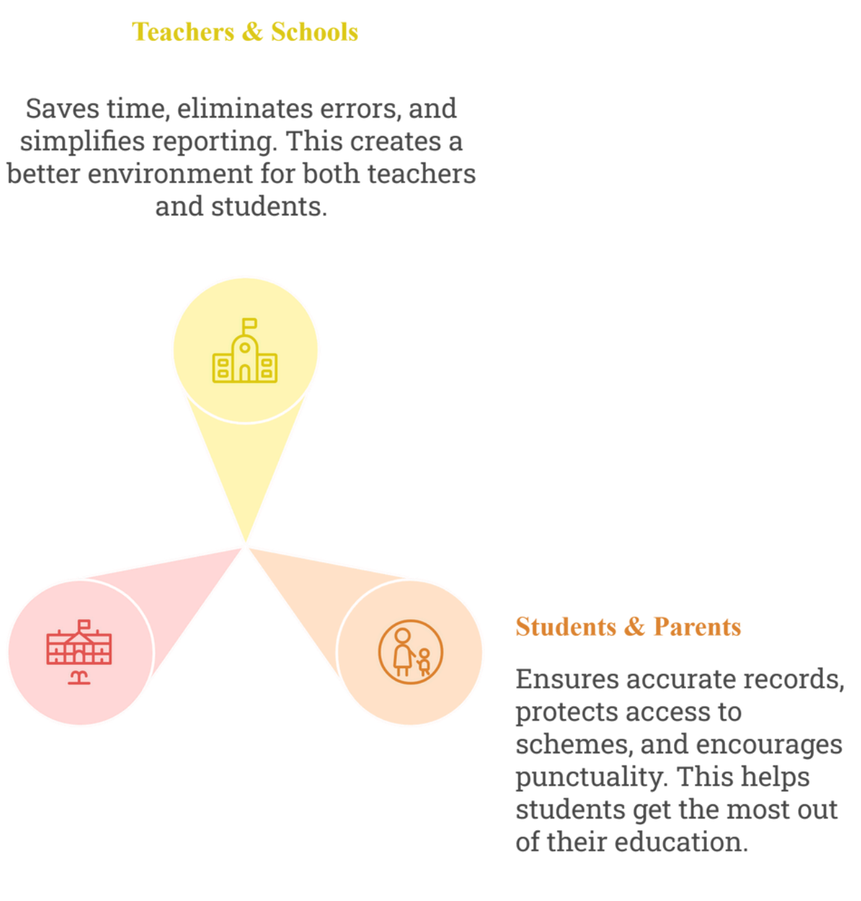
- Saves 15–20 minutes daily for teaching.
- Eliminates human error in attendance records.
- Simplifies daily/weekly/monthly attendance reporting.

For Students & Parents :

- Ensures accurate and tamper-proof attendance records.
- Protects access to schemes like mid-day meals.
- Encourages punctuality and reduces absenteeism trends.

For Government & Administrators :

- Real-time data for transparent governance.
- Accurate records aid fair resource allocation.
- Helps track absenteeism and dropout risks.



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RESEARCH AND REFERENCES

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Problem Validation: State of Rural Education

Annual Status of Education Report (ASER) 2024:
Details: This is a nationwide survey that provides credible data on the state of rural schooling and basic learning outcomes. It highlights the administrative challenges and lack of resources in under-resourced schools, directly validating your problem.
Link: https://asercentre.org/

Technical Viability: RFID and IoT Systems

"IoT Based Smart Attendance System Using RFID: A Systematic Literature Review" (2023):
Details: This academic paper validates the use of RFID technology for smart attendance systems. It discusses how RFID-based solutions are user-friendly, reliable, and address issues like time-wastage and human error..

Government Context & Policy Alignment

Digital India Programme:
Details: Your project aligns with the "Digital Empowerment of Citizens" and "Governance and Services on Demand" pillars of this flagship government program. It shows your solution is part of a larger national vision.
Link: https://www.digitalindia.gov.in/
National Education Policy (NEP) 2020:
Details: The NEP 2020 emphasizes the use of technology to bridge the rural-urban education gap and improve administrative processes. Your project is a direct implementation of these policy goals.