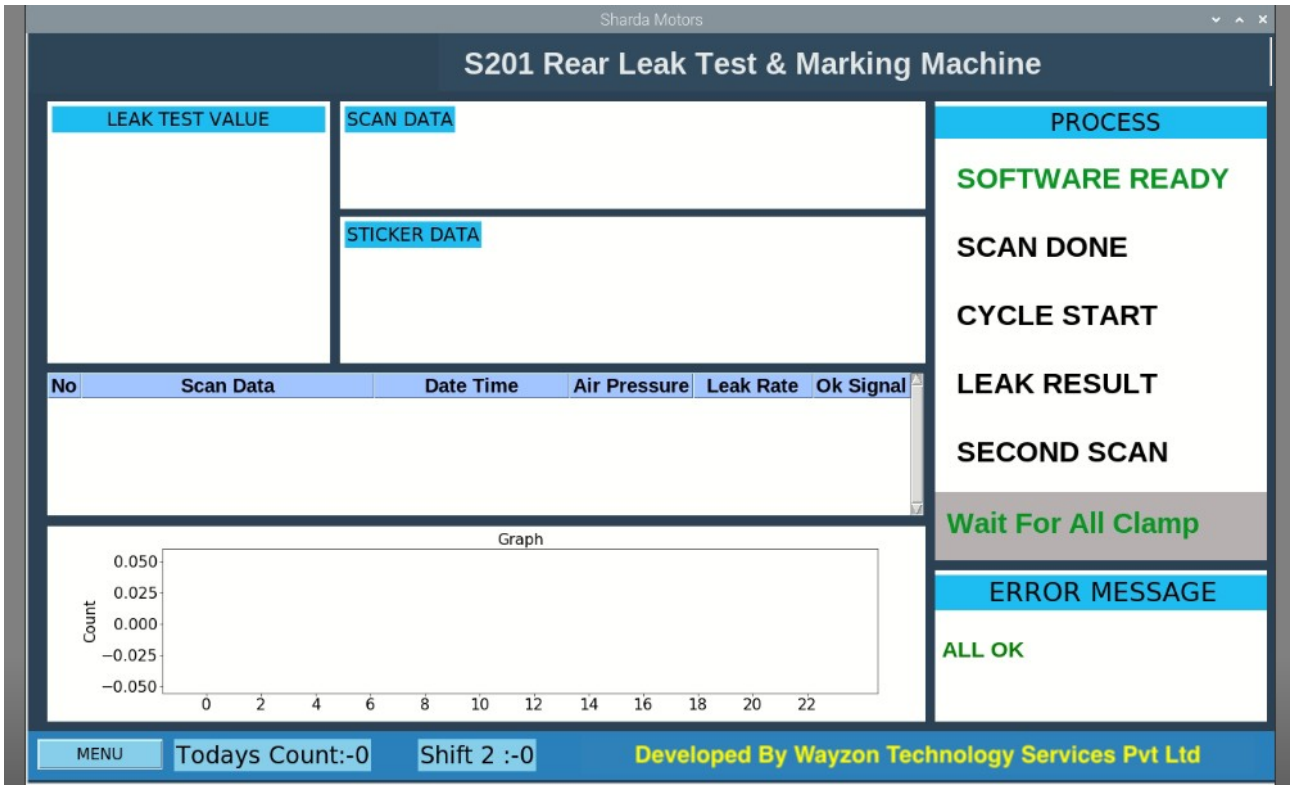
Case Study: IoT-Based Data Acquisition and Traceability System for Leak Test SPM



Client Overview

Sharda Motors Industries Ltd is a leading manufacturer of automotive components, specializing in exhaust systems, suspension systems, and body structures. To enhance their quality control and traceability processes, they required an advanced data acquisition and traceability solution for their **Leak Test Special Purpose Machines (SPMs)**.

Project Summary

The **IoT-based Data Acquisition and Traceability System** was deployed at **Sharda Motors Industries Ltd's Pune Plant 1 & 2 and Nashik Plant 1 & 2**. The system integrates with **leak test machines (such as ATEQ)** and **marking machines (such as Marksman or Automator)** to collect, store, and manage leak test data efficiently.

Challenges Faced

- **Lack of real-time traceability** of leak test results.
- **Manual data logging errors** leading to inconsistencies in quality reports.
- **Inability to link test results with unique part identification**.
- **Repeated leak testing** causing inefficiencies in production.
- **Delayed reporting** affecting production and quality control decision-making.

Solution Implemented

The **IoT-based Data Acquisition and Traceability System** was implemented to overcome these challenges by enabling:

1. Automated Data Collection

- Captures **leak test data in LPM** (Liters Per Minute) directly from leak test machines like **ATEQ**.
- Links test data with **unique part identification** by integrating with **Marksman and Automator marking machines**.
- Provides **unique QR codes** with details including **leak value, date, time, shift, company logo**, ensuring easy traceability.
- **Barcode printers** are used to print QR code labels, which are then pasted onto the respective parts.
- **Scanners** are provided to ensure **Poka-Yoke** validation, confirming that the QR code is affixed to the correct part before moving forward.

2. Cloud-Based Data Traceability

- All leak test data and generated QR codes are **stored securely on the cloud**.
- Data can be accessed anytime, from anywhere, via a **dedicated URL**.
- Enables **real-time tracking of production, quality, and maintenance data**.

3. Automated Reports & Notifications

- **Daily production analysis reports** are automatically emailed to **registered recipients**.
- **Quality, production, and maintenance reports** are accessible online and shared via **email or mobile notifications**.
- **Maintenance alarms** generated by the **PLC** are sent in real-time to the **concerned department**, reducing downtime and improving efficiency.

Key Business Impact

1. Increased Production Efficiency

- At **Lumax**, the implementation of the IoT system resulted in a **25% increase in production**.

2. Reduction in Repeated Leak Testing

- At **Sharda Motors**, **repeated leak testing was reduced by 30%**, improving overall efficiency and reducing waste. Production is increased by 20% as real time data is shown on cloud system for monitoring purpose. Machine ideal state is reduced from 2.3 hrs to 15 minutes .

3. Enhanced Traceability & Compliance

- Each part undergoes **complete traceability**, ensuring adherence to **quality standards and industry regulations**.

4. Real-Time Data Access & Decision Making

- With **cloud-based storage**, **management teams** can access reports anytime and make **data-driven decisions**.
- **Mobile and email notifications** ensure **instant alerts** for any anomalies in production or maintenance requirements.

Conclusion

The **IoT-based Data Acquisition and Traceability System** has significantly improved **operational efficiency, traceability, and production quality** at **Sharda Motors Industries Ltd.** By leveraging **real-time data collection, cloud storage, and automated reporting**, the company has achieved greater accuracy in **leak testing** while reducing downtime and optimizing production workflows.

This successful implementation highlights the power of **IoT in industrial automation** and serves as a model for other **automotive manufacturing** companies looking to improve **quality control and production efficiency** through **smart data acquisition and traceability solutions**.
