WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Textile Mending Data Logging Automation System

Mrs. M.S. Mali[1], Samruddhi M. Bedage[2], Sonali A. Kudache[3], Sakshi S. Miraje[4], Sneha S. Patole[5]

[1]Assis. Professor, Electronics & Telecommunication Engineering, Sharad Institute of Technology College of Engineering, Yadrav, Maharashtra, India.
[2,3,4,5] Student Sharad Institute of Technology College of Engineering, Yadrav, Maharashtra, India.

ABSTRACT

Mending is the process of actually fixing flaws, such as using a hand needle to weave in a missing warp or weft yarn or patching tiny holes and tears. In the knitting and sweater industries, the word "mending" Initially, the repair procedure involved human labour, including data logging. Later, a motorized machine was created for convenience, but it still required manual labour for database management and data logging. We shall now automate the data logging system to increase efficiency and reduce the need for human labour.

KEYWORDS: Textile Industry, Mending Machine, Data Logging, Automation, Digital Database Management. IoT Server

1. Introduction

In this project, we'll automate the manual data logging system to boost productivity and cut down on the amount of time spent on data logging and management. Technically speaking, our project entails designing an HMI and feedback system for the current manual mending machine. This machine currently logs data manually, which may reduce accuracy. In our system, we will use a sensor to read the roll length and then feed that information to the HMI. All other parameters that need to be printed on the slip will then be entered on the HMI interface, and in the end, we will have a more efficient sticker printed. The fundamentals of sensor-based data feeding, data logging, and HMI controls are all part of technology development. The data logging system will assist in transferring the data to a digital format and enable computer systems to retrieve it. A counting sensor will be used to calculate the feed cloth roll data (in meters). HMI will make it possible for the user and the machine to communicate. and permit the infusion of additional essential data Right now, it is developing the software, designing the interface, and choosing the parts for the HMI display.

2. Literature Review

Regarding the local industries, SUPER ENGINEERING is a company that led the way in designing the semi-automated mending machine. Although it is incredibly well-engineered, traditional mending still relies on manual data logging and automation. The first step was a human power-associated manual repairing machine with manual data logging. The market first saw the introduction of semi-automated and motor-assisted mending machines during the second stage. Additionally, there was still a gap in the automation of sensors, which needed to be filled by developing a fully automated data logging system for repair.

3. Scope of project

The goal of the project is to create a complete system for controlling the production of fabric on looms in the textile industry. Through a keypad, users input vital details like the loom and quality numbers, and a rotary encoder measures and logs the length of the cloth. This data is simultaneously shown in real time on an easy-to-use website. The website acts as a central location for viewing historical data and tracking real-time data from all looms. The collected data is kept safe in a database, preferably as Excel files. The project also includes data analytics and reporting, which enables users to create reports on quality statistics, individual loom performance, and overall production as well as assess production performance. For usage by their companies, users can print or download these reports.

4. Proposed Methodology

4.1 Data Entry Process:

Loom Number Entry: Using the Numpad, the operator inputs the two-digit or loom number to start the data logging procedure. Associating the data with the particular loom requires completing this step.

Quality Number Entry: The Numpad is used to enter the quality number, which describes the sort or grade of fabric being manufactured. This data is critical for quality control and traceability.

Fabric Length Measurement: The rotary encoder continuously measures the length of fabric being produced. This data is dynamically updated and is an important part of the quality control process.

Printing Data: The entered information, which includes the loom number, quality number, and fabric length, is transferred to the thermal printer, which creates a physical record. This printed document is then taped to the appropriate loom for future reference.

Real-time Data Display on the Website: The technology distributes the collected data to a user-friendly webpage concurrently with data entry. This website provides a central location for current monitoring and the storage of past data. The website displays real-time loom data, allowing instant insight into the production process. Users may readily access and visualize live loom data, allowing for faster decision-making and quality control.

Database and Report Generation: The system stores all data in the form of Excel sheets, creating a comprehensive database of historical records. Users can access and download generated reports for further analysis and reporting.

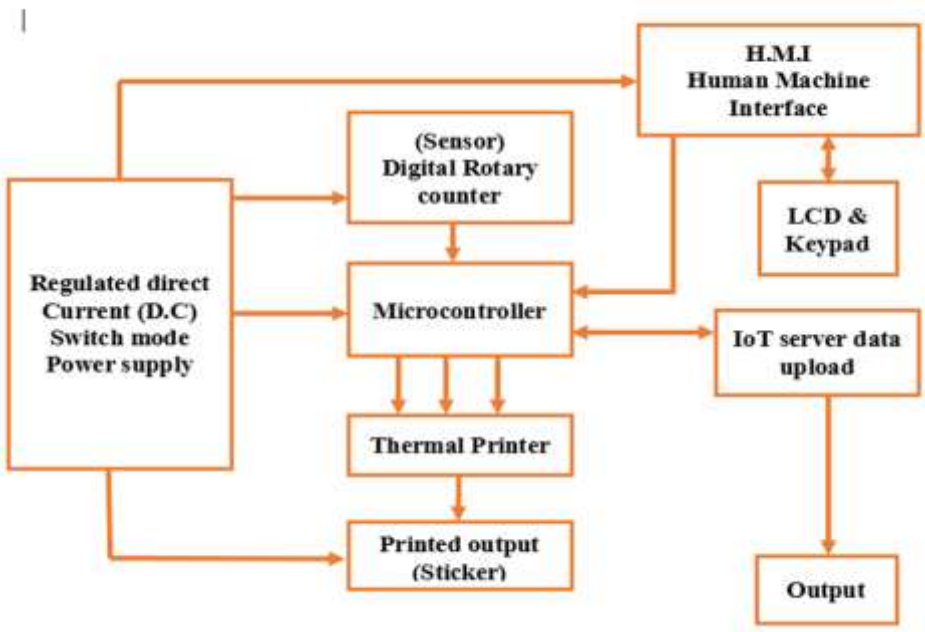

Figure 1. Block diagram for the proposed system

SMPS: [Switch Mode Power Supply]

They are used to deliver different switchable voltages based on component specifications.

HMI: [Human Machine Interface]

The microcontroller receives the fabric parameters that are manually entered by the control person. For example, Sr. No., Loom No., Quality No., etc.

Microcontroller:

It will save the information and then use the start button to begin.

Sensor (Rotary counter):

Fabric length will be calculated in a meter and sent into a database with condition processing in the microcontroller.

Thermal printer:

Then, a print button will be pressed, and a sticker will be printed to be placed on the fabric roll at the mending machine's output.

Communication port:

For communication via a wired connection between the computer and our customized system for further data access and management.

5. Hardware Used:

1. Power Supply
2. Microcontroller atmega328p
3. Arduino UNO
4. ESP8266 (Wi-Fi Module)
5. Encoder 20 PPR
6. Timer IC
7. Numpad
8. Thermal Printer
9. On-off button

6. Advantages:

1. Improved Data Accuracy: Our technology considerably lowers the potential for human mistakes by combining a keypad for data entry and a rotary encoder for fabric length measuring, resulting in more accurate and trustworthy data.

2. Streamlined Documentation: The use of a thermal printer to generate printed records that can be easily connected to the loom gives a quick and easy way to document the information associated with each production run.

3. Real-time Monitoring: Integration with an IoT server allows for real-time monitoring of fabric length, which is critical for quality control and fast action in the event of an issue.

4. User-Friendly Interface: Integration with an IoT server allows for real-time monitoring of fabric length, which is critical for quality control and fast action in the event of an issue.

5. Historical Data Access: Storing data in Excel sheets offers for easy access to and analysis of historical data, facilitating trend analysis and decision-making.

6. Data Reporting: The ability to generate, download, and print reports streamlines the process of summarizing and displaying critical production indicators, which aids in decision-making and quality control.

7. Scalability: The project can be expanded to include more looms, making it appropriate for small and big production companies. This scalability enables businesses to respond to changing production requirements.

8. Data Security: To defend against data loss or illegal access, data saved in Excel sheets and managed through a user-friendly website can benefit from security features and backup methods.

9. Integration with Existing Systems: The project has the potential to be integrated with existing manufacturing and quality control systems, thus increasing overall efficiency.

10. Enhanced Productivity: The project can assist in expediting manufacturing processes by automating data entry, measurement, and reporting, decreasing the time and effort necessary for record-keeping and quality control.

11. Data Accessibility: The web-based interface allows authorized workers to remotely access data, making it easier to manage and oversee production even when they are not physically present at the manufacturing plant.

12. Improved Decision-Making: With real-time and historical data at your disposal, your project lays the groundwork for data-driven decision-making, resulting in improved control and management of the manufacturing process.

6. Applications:

1. Textile Manufacturing Quality Control: In textile mills, the project can be used to measure and document the length of fabric produced on particular looms. This information can be utilized for quality control and production uniformity.

2. Weaving Mills: This method can help weaving mill looms accurately record fabric lengths and maintain production requirements.

3. Apparel Production: Garment:

This system can be used by manufacturers to monitor and manage the fabric length for cutting and sewing, maintaining uniformity in apparel production.

4. Textile **rolling machine** and **mending machine.**

7. Analysis of received data on IoT cloud:

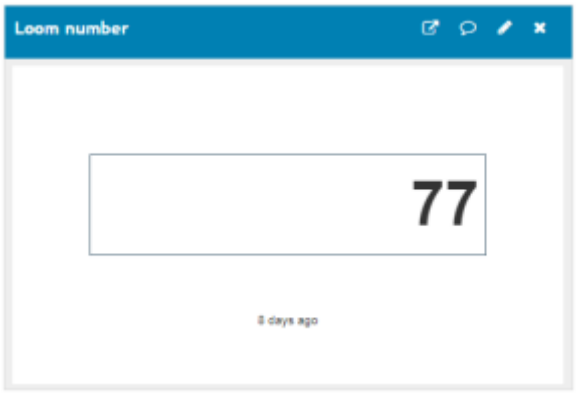

Figure 2. Loom Number

Using an IoT cloud platform to analyze received data, specifically the manually entered loom number. Human operators often enter the looming number, and accurate recording and analysis can provide significant insights. The manually inserted loom number is a numeric code or identifier that corresponds to a specific loom or machine in the manufacturing facility.

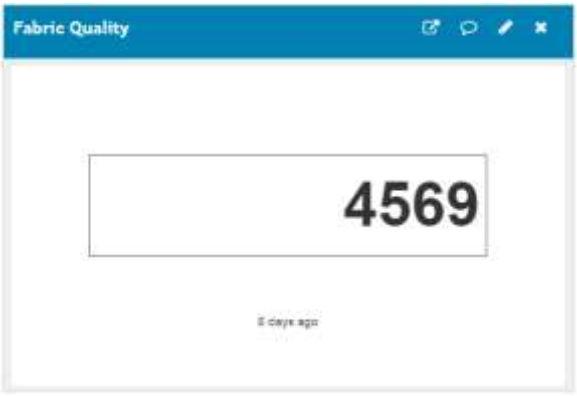

Figure 3. Fabric Quality Number

The manually entered fabric quality number is a numeric or alphanumeric code that uniquely identifies the fabric's quality or grade.

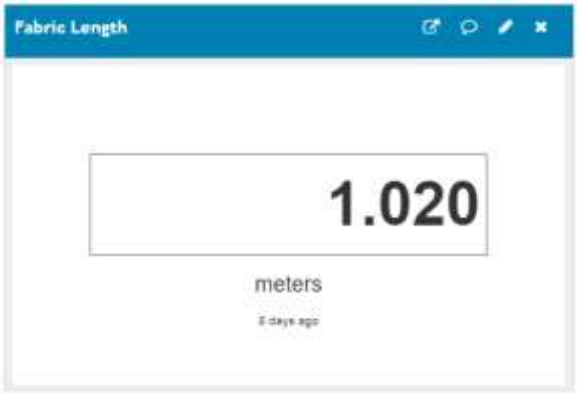

Figure 4. Fabric Length in Meters

The length of the fabric, as determined automatically, is displayed in meters. The rotary encoder continuously updates the screen in real-time, displaying the cloth length in meters. This gives the measurement a dynamic and real-time view.

8. Conclusion

The project's benefits include increased productivity, data-driven decision-making, and improved data accuracy. Textile manufacturers can gain a great deal from efficiently gathering, organizing, and storing vital data related to loom production. This initiative ultimately contributes to better decision-making and overall operations management by ensuring quality control, efficiency, and transparency throughout the production process.

However, the project's success depends on meticulous planning, execution, and continuing maintenance. To fully utilize this important instrument in the textile manufacturing setting, data protection protocols and user training should also be implemented.

9. Acknowledgment

- Advisors and Supervisors: We are deeply thankful to our academic advisor,

Mrs. Sachane Madhuri Nagnath, for their unwavering support, invaluable guidance, and insightful feedback throughout this project. Their expertise and mentorship played a crucial role in the project's success.

- Bedage Samruddhi Mahadev, Sharad Institute of Technology College of Engineering, Yadrav (Ichalkaranji), Maharashtra, India.

- Kudache Sonali Arun, Sharad Institute of Technology College of Engineering, Yadrav (Ichalkaranji), Maharashtra, India.

- Miraje Sakshi Sunil, Sharad Institute of Technology College of Engineering, Yadrav (Ichalkaranji), Maharashtra, India.

- Patole Sneha Subhash, Sharad Institute of Technology College of Engineering, Yadrav (Ichalkaranji), Maharashtra, India.

This project was made possible through the collaborative efforts of numerous individuals, and we are appreciative of their dedication and assistance.

10. References:

[1]https://www.abacademies.org/articles/intelligent- systems-in-the-innovation-processes-of-textile-msmes-a-systematic-literature-review-13234.html

[2]https://ieeexplore.ieee.org/document/9321200

[3]https://howtomechatronics.com/tutorials/ardui no/rotary-encoder-works-use-arduino/

[4]https://ieeexplore.ieee.org/document/6840345