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A Review on IOT based Power Loom Automation

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Abstract: Automation is the process to reduce the man power and the idea of automation is to provide a test run in an Atmega328p microcontroller-based system to monitor and control the production operation. The main objective of this project is to control the electric power wastage and take data logs from a motor and also to check the performance of an employee in industries. This system works on Atmega328p microcontroller so it requires low cost and gives efficient performance in unnecessary electric power wastage in power loom motors. All the system is designed on basis of Atmega328p microcontroller, proximity sensor and RFID. The system includes IoT design to observe worker performance online from anywhere in the world.
Keywords: Loom, Atmega328p microcontroller, DC Motor, RFID, and Relay.

I. INTRODUCTION

Power loom is one of the machines used for textile production in most small scale industries. Industry has become the second largest employment generating sector in the world. Data interpretation system is an Automated Information System which gives better control over production monitoring and takes corrective steps immediately. It provides better control over quality and production. It calculates how much work done by worker on that machine and store the Continuous performance of every single worker in a mill gives a high productivity. With its increasing growth and demand, textile industry faces many problems is the use of automation in textile industries. Automation can be defined as the process of reducing human assistance in the process performed. In most sectors of textile manufacturing, automation is one of the major key to quality improvement and cost competitiveness. Processes that have been automated require less human intervention and less human tier to develop. A process control or automation system is used to automatically control industry. The process automation system uses a network to interconnect sensors, controllers, operator terminal and actuators.

The textile industry mainly deals with the design and production of yarn, cloth and their distributions. Power loom is one of the machines used for textile production in most small-scale industries. Power loom is motorized loom powered by a line shaft. In most sectors of textile manufacturing, automation is one of the major key to quality improvement and cost competitiveness. Processes that have been automated require less human intervention and less human tier to develop. A process control or automation system is used to automatically control industry. The textile industry mainly deals with the design and production of yarn, cloth, and their distributions. Power loom is one of the machines used for textile production in most small-scale industry. Industry has become the second largest employment generating sector in the world. Data interpretation system is an Automated Information System which gives better control over production monitoring and takes corrective steps immediately. It provides better control over working process of employee.

A. Problem Statement

In this Industry some problems are occurs such as they are measuring the length of cloth manually as well as marking system on the cloth also manually and how much cloth gained then decide on this salary of each workers in this industry many workers are working in this field suppose one workers complete the task 6 hours then similarly second worker same task continuously work. And also measuring process are very lengthily manpower required is very high in this system so I have design a new automation power loom system in textile industry which is fully automatic to reduce human efforts, time and money so we can design an automatic system which measure the length the cloth automatically while production is going on.

B. Objective

1) Now the power looms are manual in recording the data are available, so we are making system to make it automatic.
2) Use of identity card (RFID) to keep all the information about the worker or employee.
3) The measurement of cloth on power loom is manual which takes extra time, money, so we can be implementing an automatic system which measure the length of cloth automatically while production going on

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4) In current scenario, in the power loom daily work done is calculated later while measuring the cloth and it's totally manual, but due to this system we can calculate the work done easily day to day and it added to the specific account.

5) After all this, all information about work done by the worker or employee is directly sent on his or her mobile through text message. Due to this system the owner doesn't need to pay extra man power payment and it's too easy to make calculation about salary of employee.

6) Due to IoT based system all the database of worker and status of machine can be accessed live from anywhere in the world.

II. LITERATURE REVIEW

Author Name	Published year	Tittle	Relevance to current study
Kunal Joader & Daniel Raviv	June 1994	New methods to calculate looming for autonomous obstacle avoidance	In this paper were proposed the concept of automation system to avoiding collision and to calculate the thread hence the visual looming is related to an increased projected size of an object on a viewer's retina as the relative distance between the viewer and the object decreases.
Mr. S. D. Gokhale & Mr. V. B. Kumbhar	October 2017	Automation of plain weaving machine using PLC	Were proposed that the aim of this paper is to design system which in increases production and efficiency of loom in various expects without increasing cost. PLC is used for handling oil necessary computational control
Fabio Prevadi, Sergio M. Savaresi & Corrado Volpi	November 2022	A numerical model of the weft yarn filling insertion process in rapier looms	Were proposed that the process of an weft yarn filling insertion process in an repair looks are determined by means of an mathematical model.
M. Saravanan & M. Jagadesh	2018	Smart data monitoring system for power loom using IOT	Textile Industry has occupied the second position next to agriculture. Due to increase in population growth.

III. METHODOLOGY

A. Literature Review Methodology

A.1 Conduct a comprehensive review of existing research and technologies related to IoT in tetile automation.

A.2 Identify gaps in current methodologies and technologies that your system will address.

B. System Design

B.1 Architecture Development: Design a scalable architecture for the IoT-based power loom system, outlining key components such as sensors, actuators, controllers, and communication protocols.

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B.2 Component Selection: Choose appropriate sensors (e.g., temperature, humidity, motion), microcontrollers (e.g., Arduino, Raspberry Pi), and communication modules (e.g., Wi-Fi, Zigbee).

C. Prototype Development :

C.1 Hardware Setup: Assemble the power loom with the selected IoT components, ensuring compatibility and integration of sensors and controllers.

C.2 Software Development: Create software for data collection, processing, and control using programming languages such as Python or C++. Develop a user interface *for monitoring and control.*

D. Data Acquisition and Processing

D.1 Implement data acquisition techniques to gather real-time data from the loom.

D.2Use cloud services or edge computing for data storage and processing to enable remote access and analytics.

E. Testing and Validation

E.1 Conduct rigorous testing of the system under different operational conditions to ensure reliability and accuracy.

E.2Validate the performance by comparing automated operations with traditional methods in terms of efficiency and productivity.

F. Performance Evaluation

F.1Analyze data collected during testing to evaluate system performance metrics such as efficiency, downtime, and resource utilization.

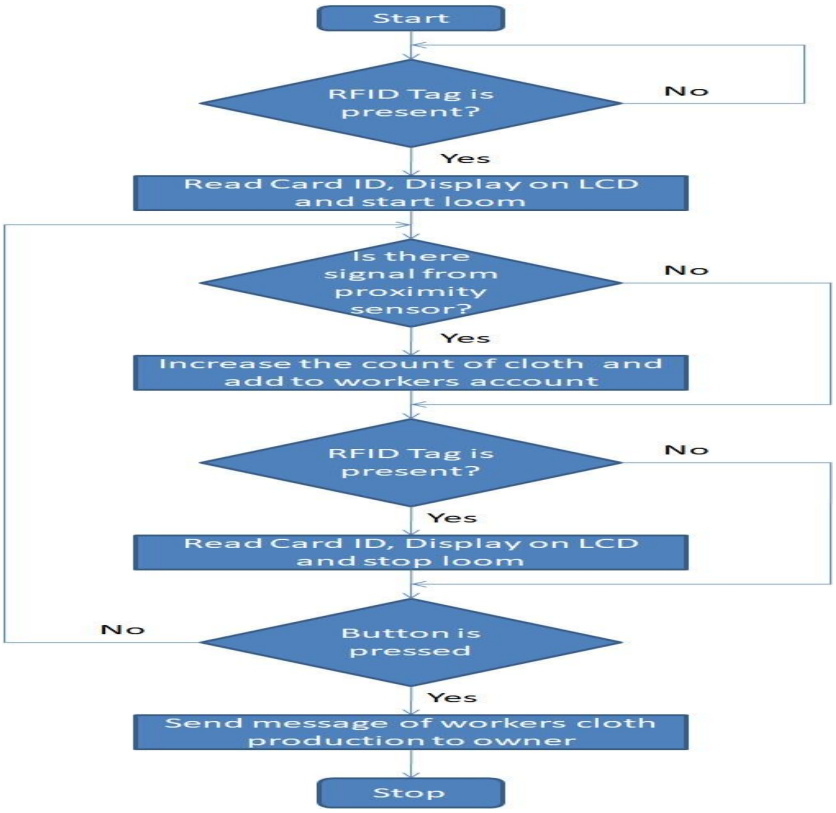
F.2 Gather user feedback to assess usability and identify areas for improvement.

G. G Deployment and Maintenance

G.1 Develop a deployment plan for implementing the system in a real-world environment.

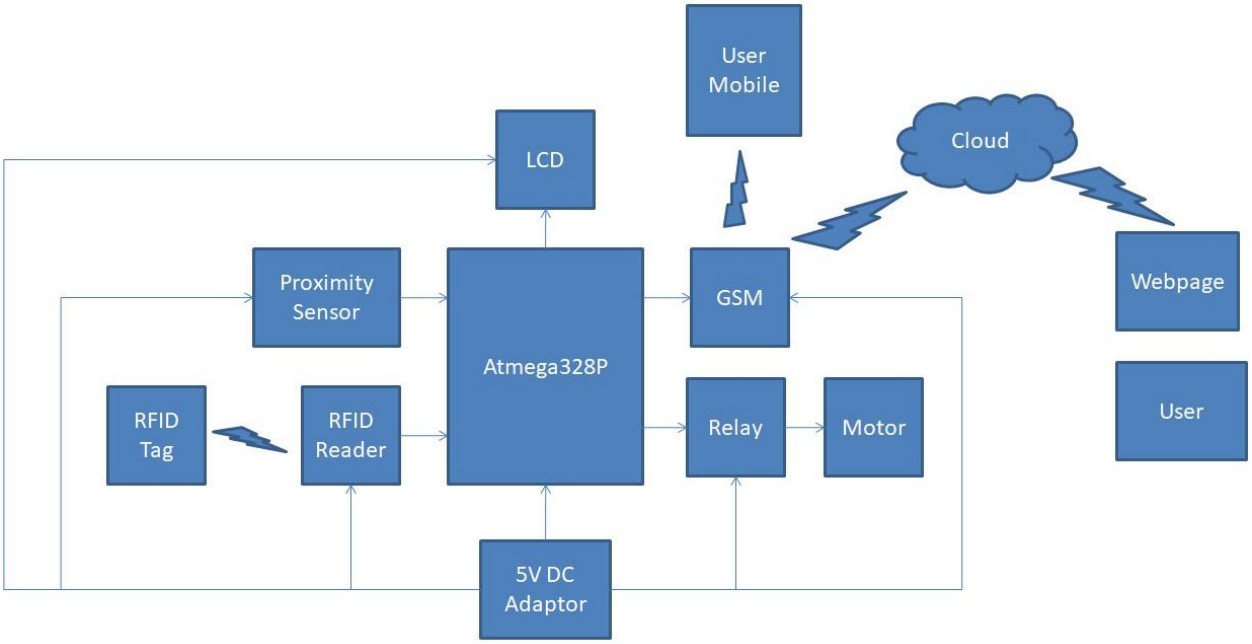
G.2 Establish a maintenance protocol to ensure the system operates smoothly and adapts to changes in production needs.

IV. FLOW CHART



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V. BLOCK DIAGRAM



The name of our project is "IoT based Automation of Power Loom in Textile Industries". The working of this project contains element like RFID tag, RFID reader, proximity sensor, relay, dc motor, GSM, PIC microcontroller. Proximity sensor and RFID card is prior thing in this system. The first element of this is RFID tag, and RFID tag contains data of a particular worker to which is authorized. RFID card when hold by an employee in front of RFID reader. RFID reader will detect the data that which worker is operating on that particular machine. RFID reader contains the program to read the tag information. Second element of a system is proximity sensor which is calculating length of cloth. This calculating cloth length in meter and this data is added to the authorized employee account which is sent to website using IoT. At the time of salary this information is send through text SMS to works mobile number.

VI. CONCLUSION

In this paper, we proposed a method of monitoring the power loom function automatically with the help of AVR microcontroller. AVR microcontroller is one of the advanced controllers used now-a-days. It will display the production of loom continuously using proximity sensor. The future work will send message of loom production through GSM to the manager and worker. Proposed system can be used in small scale power looms where owner of small scale industry cannot afford the cost of autolooms.

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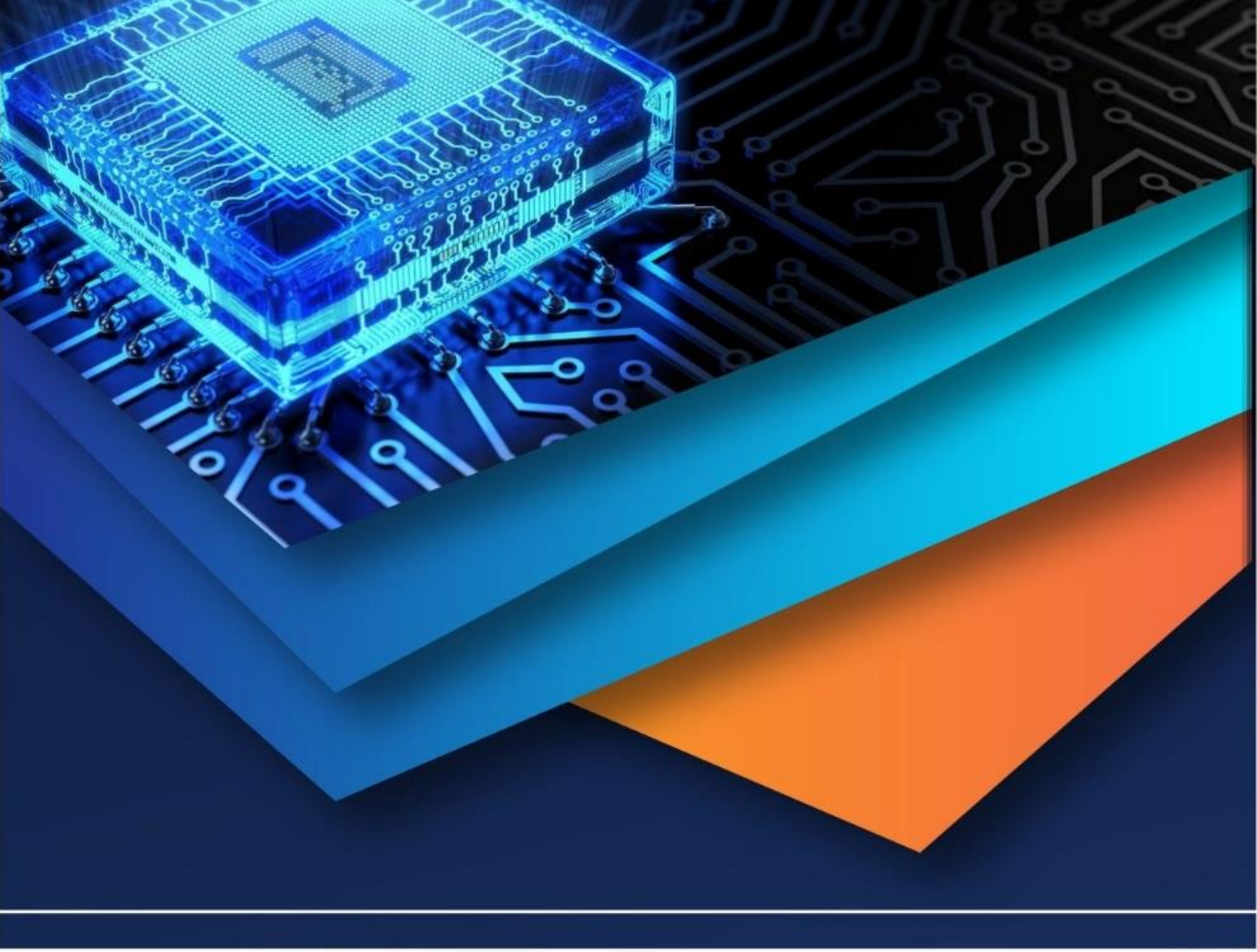
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