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Real Time Data Logging of Different Parameters of Airjet Looms

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Abstract: ***Real time data logging of different parameters of Air jet looms should be implemented to reduce the time-consuming method in the textile manufacturing industry. Implementation area of this system is a reduction of efforts and errors done by workers in the textile looms. Existing system is not able to give real time data required by the user at the required time. This system actually keeps record of different stoppages that leads to break the continuity of the machine and hence reduces the machine efficiency. This is a real time system in which wireless communication is used to transfer the recorded data to user's computer. This recorded detail in turn is transmitted to the PC of the user to do further computation of wages of the worker and manage their work efficiency. This is a real time system in which wireless communication is used to transfer the recorded data to user's computer as well as on mobile phone. This will provide an additional facility of monitoring the working condition of machine whether it is proper or not and thus user can also keep watch on the workers.***

Keywords: ***PC, Air jet loom, Bluetooth.***

I. INTRODUCTION

Now a day's textile industries are growing at a faster rate. Textile industries are related to clothes. Manufacturing of the clothes involves many processes such as, Spinning, Weaving, dying and bleaching etc. In textile industry clothes are manufactured by using weaving Machines called looms. Also, there are different types of looms available. This paper is focusing only on Airjet looms. Air jet looms are equipped with a console panel on which different parameters are made available to the observer. These parameters are recorded by the supervisor, for further use such as calculating workers' wages, efficiency of the loom and intern the efficiency of the worker as well. Real time data logging of the various parameters in textile looms is the best way to provide automation for textile entrepreneurs. The proposed system minimises the manual operation done by the supervisors in recording the readings and calculating the efficiency of the loom is quite time-consuming process than the implemented technique. The proposed system keeps the keen records of different stoppages of the machine such as warp break stoppage, weft break stoppage, manual stoppages & other stoppages and considering the related stoppages machine efficiency is calculated.

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This is continuous time system which will be monitoring the RPM and stoppages continuously so, the user will be provided with required data at any required time. Even if, machine is stopped due to, the power down or manual stoppage of machine the real time data will not be lost. The entrepreneur will be able to check that whether the machine is working or not and thus, will be able to take the actions accordingly for the same. This technology will also provide entrepreneur to cross check the liability of the workers towards their work and appropriate corrective actions can be taken if required. Thus, the system reduces the human efforts and time consumption to calculate wages of the workers also minimises human errors associated with it. The efficiency of any machine is the essential part of any production house. Similarly, in the textile looms various parameters affect the efficiency of the production of textile looms. These parameters which affects the efficiency of the loom must be made available to the user at any required time and must also be able to get the previous data as well. But, the state of the art fails to do so. The monitoring of different parameters is not possible at present time. Also, the workers have to take the readings manually. Thus, Real time data logging is not possible.

II. MOTIVATION

As we went through the textile looms, we came to know the working of an air jet loom also took the note of various parameters and their working respectively. We studied the parameters and their relations which affect the actual efficiency of machines understood the real situation and problems faced by the workers while taking note of the same. We also came to know that the actual real time data of different parameters was not available easily to the entrepreneur this was which motivated as for providing real time data to the entrepreneur when required at any time. Also, the workers have to record all the readings manually on a record book so this was also one factors which motivated as to help them in providing the data on user's PC. This helps to reduce the problems faced by the workers while taking the readings as well as helps to keep a keen eye on the work progress and also to get the accurate reading of the parameters on precise timing.

III. STATE OF THE ART

The efficiency of any machine is the essential part of any production house. Similarly, in the textile looms various parameters affect the efficiency of the textile loom production. These parameters which affect the efficiency of the loom must be available to the user at any required time and must also be able to get the previous data too. But the present system fails to do so. The monitoring of different parameters is not possible at present time.

Also, the supervisor takes the readings manually. Thus, Real time data logging has not been in practice.

IV. LITERATURE REVIEW

Gandhali Khandekar.et.al, presented a paper on data logging of different parameters of air jet looms. The main goal of today's looms is to achieve maximum efficiency with high production so that a system comes into picture for achieving optimum quality and maximum production with certain features and configuration. Loom data system fulfills these requirements. Loom data interpretation system" is an "Automated Information System" which will give the better control over production monitoring and take corrective steps immediately. Rui Wang and Huawu Liu,et.al, reported about, the economic benefits of weaving production are mainly reflected in the yield of loom, whereas the loom weaving efficiency is the main decisive factor of high yield. In the production of air-jet loom weaving production, fault shutdown is the major factor impacting the weaving efficiency. Therefore, this paper carries out analysis on the quality of yarn of air-jet loom in actual production and discusses the impact of weft quality on fault shutdown of air-jet loom, so as to provide basis for the improvement of loom weaving efficiency, giving full play to the efficient weaving of air-jet loom and generating better economic benefits. Md. Ruhul Amin et.al, the efficiency can be analysed by various parameters. This gives a detailed idea of factors affecting the efficiency. If corrective action could be taken based on the results analysed, it can be possible to achieve a better efficiency. A small increase in efficiency will give higher productivity and profitability and that has been obtained. From the results the various factors affecting the efficiency is found and by concentrating in those areas the efficiency of the loom shed is increased.

V. SYSTEM BLOCK DIAGRAM

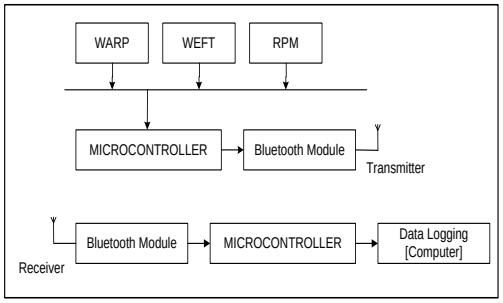

Fig. 1 Block Diagram of implemented work

5.1 Warp Stop Sensor:
The longitudinal yarn which comes in parallel form from the warp beam for the formation of a fabric is called as warp. Thus, the yarn needs to be wrapped onto a beam before weaving can commence. This warp is held under high tension during the entire process of weaving. When a warp yarn is cut then this sensor will sense this and a signal is sent to Arduino kit and this is counted accordingly for breakages of warp.

5.2 Weft Stop Sensor:
The horizontal threads interlaced through the warp in a woven fabric is called as weft or filling. Weft is also the yarn which when placed in between the warp yarns continuously forms the cloth. The weft is inserted by means of a shuttle or by passing over the compressed air. When a weft yarn is cut then this sensor will sense this and a signal is sent to Arduino kit and this is counted.

5.3 RPM Measurement:
The efficiency of any machine is based on its RPM and various parameters. RPM is one of the major factors in calculating the efficiency of any machine. The main motor is required to drive the machine. The efficiency of a machine is calculated from this measured RPM.

5.4 Arduino Kit:
Arduino/Genuine Uno is a microcontroller board based on the ATmega328P. Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. In order to send the data on the pc it must be encoded so Arduino kit is used before sending the data.

5.5. Bluetooth Transmitter:
Bluetooth is a wireless communication technology used for exchange of data over short distances. It is found in many devices ranging from mobile phones and computers. Bluetooth technology is a combination of both hardware and software. HC-05 is a class 2 Bluetooth module with Serial Port Profile (SPP). It can be configured either as master or salve. It is a replacement for wired serial connection.

5.6 Receiver Module:
To receive the data sent from the transmitter, Bluetooth Receiver module is used. It will receive the data sent from multiple transmitter devices. Then this received data is sent to the Arduino kit.

5.8 Pc Display/Mobile:
The readings are to be observed on the device, so the PC is used. One can observe the readings of more than one machine at a time. He can also get the present status of the machine whether it is in working condition or stopped for any reason.

VI. METHODOLOGY

Now a day's data logging is very important for any entrepreneur as the business depends on this real time data. The real time data lessens the work of labourers too and provide an ease to the entrepreneur. The actual implementation takes in the following manner. The real time data logging is very necessary for the textile looms as the entrepreneurs face a lot of problems in keeping a keen eye on the machines if they are working properly or not. Initially the machine will be in the working condition. If it is fully in a good working condition, then its efficiency will be such that as is required by the entrepreneurs. If the machine is stopped then we have to find why machine has stopped and have to check accordingly the factors affecting the machine to stop. On this basis machine can be stopped due to the three factors that are warp breakage, weft breakage, manual stop and other stoppages. SO as soon as the machine is stopped due to the sensors, supervisor will come to know why the machine is stopped. Hence, we come to know in this manner how many times the machine is stopped in 12 hours shift and due to which factors the machine is stopped and is counted accordingly. Based on this factor the efficiency of machine is calculated when the machine is stopped.

This data is thus logged using PLX DAQ software and is transferred through Bluetooth on the user's PC or mobile. Thus, real time data logging of different parameters is achieved. Algorithm of implemented work

1. START.
2. Check if machine is working.
3. If YES then check RPM and calculate efficiency.
4. Display on PC.
5. If NO check for warp, weft, other stops.
6. Check for number of times the machine has stop due to respective stops and send the count accordingly.
7. Calculate efficiency when the machine is stopped due to the stoppages.
8. Display on PC.
9. End.

VII. RESULTS

Real time data logging of different parameters of textile looms is achieved successfully.

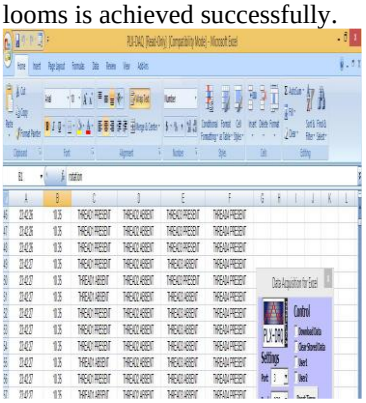

Fig. 2 Data Logging in Excel file

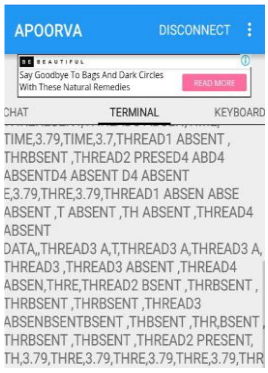

Fig. 3 Data Logging on Mobile App

The above fig 2 shows the outlook of the results of the data sent by the various sensors through the Arduino kit using Bluetooth and Serial data transmission. The real time data is taken in the excel sheet. Through this data one can monitor the working of the machine while sitting in the office. He can also get the data of different parameters of the loom.

Fig 3 show the details of sensors data on mobile app. The real time data logged in using different sensors is transferred through Bluetooth to the users mobile via SPP app Fig.4 shows the overall setup of the entire project module. In this module there are the different components mounted on the PCB and the module is fully in working condition. There are some signals indicated by the LED with different colours such as Green & Red. When the Green LED is on then, the machine is in working (ON) condition otherwise when the Red LED is on then the machine is in not working (Off) condition.

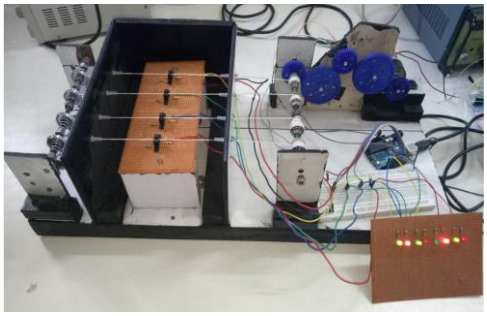

Fig. 4 Data Logging Setup

VIII. CONCLUSION

The proposed system provides automation to Textile weaving industry which uses Air Jet looms. The proposed system can overcome the difficulties faced by the laborers which is time consuming thus offering the user with accurate real time data logging. By doing this the problem of the entrepreneurs can also be resolved. The system helps to keep a watch on their labours working capability as the system provides the real time data at any required time with accurate readings. Proposed system also helps in diagnosing the faults due to which the efficiency of machine is degrading. This system will help in the area of Textile industry in local area.

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