

Smart Automation in Textile for Fault Detection & Salary Calculation

^[1] Ms.Anuradha.A.Nirmal ^[2] Ms.Vijayalaxmi B.Patil ^[3] Ms.Amruta S.Digraje ^[4] Ms.Supriya S.Gondkar
^{[1] [2][3][4]} Lecturer, Electronics and Telecommunication Department,

Sharad Institute of Technology Polytechnic, Yadrav, Tal-Shirol, Dist-Kolhapur, Maharashtra.416121

Abstract: - The explosion in the wireless technology has seen the emergence of many standards, especially in the industrial, scientific and medical (ISM) radio band. GSM is an IEEE 802.15.4 standard for data communications with business and consumer devices. GSM is targeted at applications that requires low data rate, long battery life, and secure networking. GSM has a defined rate of 250 kbits/s, best suited for periodic or intermittent data or a single signal transmission from a sensor or input device. The wireless home Automation systems is supposed to be implemented in existing home environments, without any changes in the infrastructure. The automation centers on recognition of voice commands and uses low-power GSM wireless communication modules along with microcontroller. This system is most suitable for the elderly and the disabled persons especially those who live alone and since recognize voice so it is secure. The home automation system is intended to control all lights and electrical appliances in a home or office using voice commands. So in this paperwork our aim is to designed Smart automation in textile for detection & salary calculation system, GSM based.

This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control. In GPRS mode you can also connect to any remote FTP server and upload files for data logging. This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 applications. Supports features like Voice, SMS, Data/Fax, GPRS and integrated TCP/IP stack.

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I. INTRODUCTION

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By establishing the Mega Cluster, global prominence will be given to these centers, a new thrust will be provided for the modernization of looms, introduce new technology and state of the technology will be viable. Presently due to lack of service facilities productivity is lesser than what is expected and in product development the exporters are not able to provide the latest designs and develop the products as per the buyers needs.

This cluster will provide the essential facilities so that the exporters in and around Erode will be able to develop products and develop the samples and will offer to the international buyers. They will be able to analyze the marketing strategy and their entrepreneurial skills will be developed to face the international competition. . Hence, Indian textiles are getting squeezed out of the global scene.

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It is largely unseen, with the decentralised powerloom and handloom sectors accounting for the bulk of textile industries. The paper discusses about the status of handloom & powerloom industry in the region, which has about 22,000 handlooms and 6,000 powerlooms and are major contributors of economy of Karnataka state in India. It probes into the operational management of handloom sectors and identifies the issues for effective strategic management.

II. LITRETURE REVIEW:-

The huge components of the loom are the warp beam, heddles, harnesses, shuttle, reed and takeup roll. In the loom, yarn processing includes shedding, picking, battening and taking-up operations.

Shedding:-

Shedding is the raising of the warp yarns to form a loop through which the filling yarn, carried by the shuttle, can be inserted. The shed is the vertical space between the raised and unraised warp yarns. On the modern loom, simple and intricate shedding operations are performed automatically by the heddle or heald frame, also known as a harness. This is a rectangular frame to which a series of wires, called heddles or healds, are attached. The yarns are passed through the eye holes of the heddles, which hang vertically from the harnesses. The weave pattern determines which harness controls which warp yarns, and the number of harnesses used depends on the complexity of the weave. Two common methods of controlling the heddles are dobbies and a Jacquard Head.

Picking:-

As the harnesses raise the heddles or healds, which raise the warp yarns, the shed is created. The filling yarn is inserted through the shed by a small carrier device called a shuttle. The shuttle is normally pointed at each end to allow passage through the shed. In a traditional shuttle loom, the filling yarn is wound onto a quill, which in turn is mounted in the shuttle. The filling yarn emerges through a hole in the shuttle as it moves across the loom. A single crossing of the shuttle from one side of the loom to the other is known as a pick. As the shuttle moves back and forth across the shed, it weaves an edge, or selvage, on each side of the fabric to prevent the fabric from raveling.

Battening:-

As the shuttle moves across the loom laying down the fill yarn, it also passes through openings in another

frame called a reed (which resembles a comb). With each picking operation, the reed presses or battens each filling yarn against the portion of the fabric that has already been formed. The point where the fabric is formed is called the fell. Conventional shuttle looms can operate at speeds of about 150 to 160 picks per minute.

With each weaving operation, the newly constructed fabric must be wound on a cloth beam. This process is called taking up. At the same time, the warp yarns must be let off or released from the warp beams. To become fully automatic, a loom needs a filling stop motion which will brake the loom, if the weft thread breaks.

III. AUTOMATION:-

Automation will also result in a reduction in the number of machines in each of these sectors (as each machine becomes more productive). This may create a redundancy of jobs. Some effort also needs to be taken to ensure that those displaced are retrained and absorbed in the industry. Manpower training and organized placement services may address this issue.

How this money is utilized to solve specific problems will decide the success of the scheme. If the funds are frittered away in short-term subsidies, it will just serve to fill the pockets of a few entrepreneurs, while the rest will continue to languish. What happens once the funds received as subsidies are absorbed and digested? While subsidies may entice people to set up businesses, they are definitely harmful in the long run as they do not build competitiveness. If at all subsidies are offered, they should be based on a strategy of long-term operation.

By establishing the Mega Cluster, global prominence will be given to these centers, a new thrust will be provided for the modernization of looms, introduce new technology and state of the technology will be viable. Presently due to lack of service facilities productivity is lesser than what is expected and in product development the exporters are not able to provide the latest designs and develop the products as per the buyers needs.

This cluster will provide the essential facilities so that the exporters in and around Erode will be able to develop products and develop the samples and will offer to the international buyers. They will be able to analyze the

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marketing strategy and their entrepreneurial skills will be developed to face the international competition.

This mega clusters will also organize international fairs so that the buyers will come and meet the manufacturers directly and see the product development and place orders. Such direct liaison will eliminate the intermediaries in the buyers country and also in our country. There are also places where many home furnishing products like, Chennimalai, Bhavani, Karur, and Vellakoil. This mega cluster will be a great benefit to the manufacturers and exporters. Presently the powerloom weavers are employed to weave the fabrics for the orders as and when the power loom units get them. By establishing the mega clusters, there will be immense possibility of increase in the value of products and volume of products. More employment will be generated and more wages can be paid for the weavers. At present the weavers of the Rapiers looms and air jet looms are paid on monthly basis or weekly basis, but the powerloom weavers are given the job work based on the meters produced in a day. When the production is reduced due to order shortage, due to maintenance, or power shut down, the weavers will not get their earnings. The establishment of mega cluster will provide opportunities for continuous production which will result in the increase in the wages of powerloom weavers and they can be assured of the monthly wages too.

The employment opportunity will increase in and around the area of 150 kms, in direct and indirect way related to the textiles activities, this will undoubtedly change the living standards of the weavers and their families.

1.1 Existing procedure for calculating salary & fault detection

1. Salary calculation:-

For calculating salary in practice in Textile industry uses catlog record maintances. In this process they measures what amount of fabric get constructed by a single person & it get multiplied by rate decided for a one meter of fabric. This process calculate salary of single person for single day. Same formula is applied for week & then for months. This process is followed for each & every worker in the industry.

This process takes lots of time, huge written data, record maintances, extra worker to maintain this record. Thus process may get suffered by lots of errors.

2. Fault detection:-

In Textile industry there is protection is provided against fault occurred during actual process of constructing yarns. But there is no any quick system which detects fault & inform to consulting person. Due to high voltages three phase can get affected, frequency fluctuations can be occurred, passing of yarns through harnesses can be mismatched. Occurances of faults may damage the devices, reduces accuracy, affects on the quality of fabrics.

In order to detect the occurances of fault quickly & it must inform to the person who works for correcting it, this fault detection system is designed.

Disadvantages of existing system:-

1. As salary calculates in conventional manner:

- 1) Accuracy is reduced due to huge amount of data.
- 2) Large catlog maintance is required.
- 3) Extra workers are required to maintain this record.

2. As fault occurred:

- 1) All devices get affected due to fault occurred in single device as they are interconnected to each others.
- 2) Efficiency is reduced.

1.2 Recent trends:-

The explosion in the wireless technology has seen the emergence of many standards, especially in the industrial, scientific and medical (ISM) radio band. GSM is an IEEE 802.15.4 standard for data communications with business and consumer devices. GSM is targeted at applications that requires low data rate, long battery life, and secure networking. GSM has a defined rate of 250 kbits/s, best suited for periodic or intermittent data or a single signal transmission from a sensor or input device. The wireless home Automation systems is supposed to be implemented in existing home environments, without any changes in the infrastructure. The automation centers on recognition of voice commands and uses low-power GSM wireless communication modules along with microcontroller. This system is most suitable for the elderly and the disabled persons especially those who live alone and since recognize voice so it is secure. The home automation system is intended to control all lights and electrical appliances in a home or office using voice commands. So in this paperwork our aim is to designed Smart automation in textile for detection & salary calculation system, GSM based.

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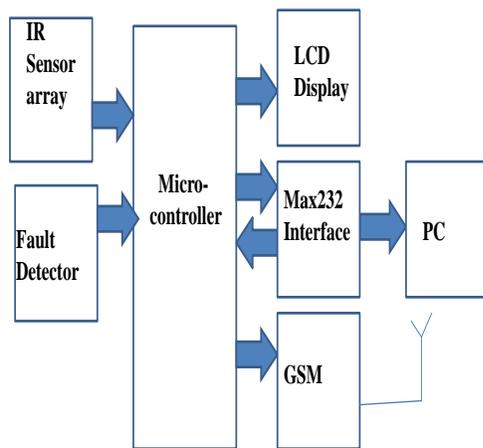
1.3 Aim Of Project:

Our project is designed to overcome the existing system problem. Automation will also result in a reduction in the number of machines in each of these sectors (as each machine becomes more productive). This may create a redundancy of jobs. Some effort also needs to be taken to ensure that those displaced are retrained and absorbed in the industry. Manpower training and organized placement services may address this issue.

For calculating salary in practice in Textile industry uses catalog record maintenances. In this process they measure what amount of fabric get constructed by a single person & it get multiplied by rate decided for a one meter of fabric. Instead, sensors can count numbers of cycles count that get multiplied by respective rate and total salary for each worker can be calculate.

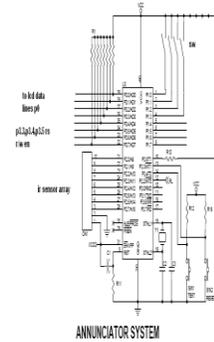
For fault detection in Textile industry there is protection is provided against fault occurred during actual process of constructing yarns. But there is no any quick system which detects fault & inform to consulting person.

A. System Design Block Diagram



Block Diagram

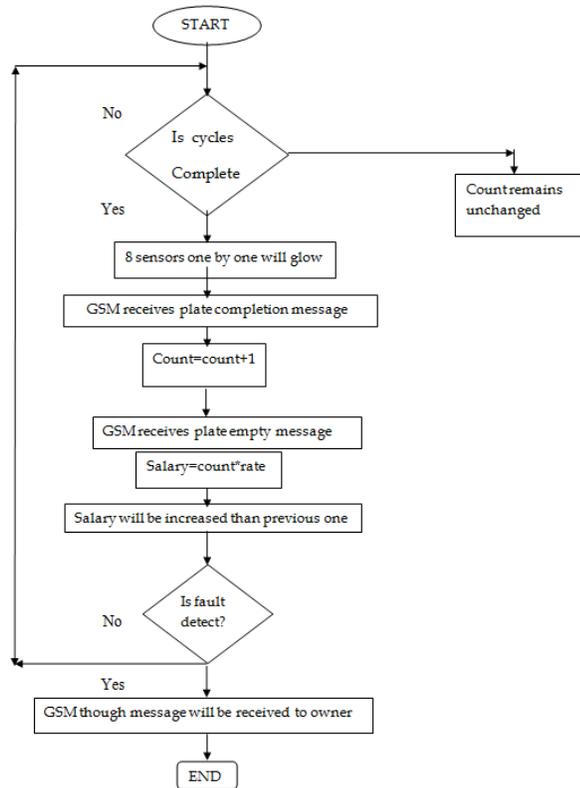
B. System Design Internal Diagram



Specifications of Used Components:-

Components	Specifications	Purpose of use
1. Microcontroller AT89S51	1.1 8K bytes of In-System Programmable Flash memory 4.0V to 5.5V Operating Range 1.2 Fully Static Operation: 0 Hz to 33 MHz 1.3 Three-level Program Memory Lock 1.4 256 x 8-bit Internal RAM 1.5 32 Programmable I/O Lines	The AT89S51 is used with static logic for operation down to zero frequency and supports two software selectable power saving modes.
2. Liquid crystal display	2.1 208 character fonts (5*8 dot) 2.2 32 character fonts (5*10 dot) 2.3 5*8 and 5*10 dot matrix possible 2.4 Low power operation support: 2.7 to 5.5V 2.5 Display driver power 3.0 to 11V	Here we are using a 16 x 2 LCD for displaying the values on the screen. It has 16 pins. It support 16 characters per rows and total no of rows are 2. It means that it can support up to 32 character at a time, which is sufficient for data display purpose.
3. GSM Module	3.1 Adjacent carrier Frequencies in GSM, this is 200 kHz. 3.2 An over-the-air bit rate of 270 kbps.	For transmitter and receiver side two GSM modules are used to receive any fault message to owner. Also cycle completed messages are displayed.
4. IR sensors IC 555	4.1 Temperature range 0°C to 70 °C, 4.2 Positive supply voltage between 3 and 15 V	IR sensors sense the (cone) cycle completion object and after 8 sensors will glow, one cycle is completed.
5. Voltage regulator LM7805	5.1 Output Current up to 1A 5.2 Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V	Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents
6. Relay DC 12v SC5-Eco-S,	6.1 Insulation Resistance 100MΩ 6.2 Operating Temperature - 40 °C ~ + 70°C 7.1 Standard 5 V TTL levels.	Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.
7. MAX 232	7.2 These receivers have a typical threshold of 1.3 V, 7.3 A typical hysteresis of 0.5 V.	The drivers provide RS-232 voltage level outputs (approx. ± 7.5 V) from a single + 5 V supply via on-chip charge pumps and external capacitors.

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IV. CONCLUSION

- ◆ By designing system for fault detection & salary calculation disadvantages over existing system can be eliminate.
- ◆ Efficiency get increased due proper working of this designed system.
- ◆ It can be also applicable for those industries where Counting is preferred for example in resister & capacitor manufacturing industries.
- ◆ With the automation along with GSM network we can eliminate the complication of in record maintances in case of existing system and also it prevent to machines against faulty circuitary.

Future scope

In the existing system in case of salary calculation this process takes lots of time, huge written data, record maintances, extra worker to maintain this record. Thus process may get suffered by lots of errors. So, designed system can eliminate these drawbacks. In Textile industry there is protection is provided against fault occurred during actual process of constructing yarns. But there is no any quick system which detects fault & inform to consulting person. Due to high voltages three phase can get affected ,frequency fluctuations can be occurred, passing of yarns through harnesses can be mismatched. Occurances of faults may damage the devices, reduceses accuracy, affects on the quality of fabrics.

In order to detect the occurances of fault quickly & it must inform to the person who works for correcting it ,this fault detection system is designed. For future scope,security for each worker can be provided,in case of salary and for detection the system can be designed to stop machinery as a fault is detected.

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