

Intelligent Sensors Sleeve's For Maximizing Workplace Efficiency.

Prof. S.B.Dhonde, Priyanka Karde, Jayshree Chikhalkar

Abstract – This paper describes “Intelligent sensors sleeves for maximizing workplace efficiency” for industrial workers or persons. Today’s mass production is very much essential to increase productivity. Human workers are the important part of Industry. Therefore it is very important to know efficiency of worker’s , how long they can work or to monitor their health condition while they are doing their work in assembly line. It is also important to avoid accident with worker’s in the company .In company to monitor workers manually or by human is the time wasting job to identify their superfluous movement overly frequent tools changes, or impractically located components.

In our system we can easily monitor the worker by using sensor based sleeve's. The sleeve's contains Two sensors pulse Rate , Accelerometer which is located on lower arm and upper arm. In industries it does not required any infrastructure to monitor worker's movement. Accelerometer is use to monitor acceleration or vibration. By using pulse rate sensor we can monitor heart beats. The VB based PC is used to gathered all the information to made system very accurate.

Index Terms—Pulse Rate, Accelerometer, VB based PC ,Sleeve's, Sensors, Infrastructure.

I. INTRODUCTION

The main aim of this system is to contribute the advance version of timely monitoring system for industries for workers. some time the worker's are sick or under illness while they are doing their work in company especially in the factories. Due to this the efficiency and consistency decrease this happens also in the case of some workers are doing their work proper or they are not put their efforts while doing their assigned task. To avoid time consumption to timely monitored them. Or to supervise them periodically. Sometimes due to health issue accident occurs in the industries .also in the case of improper work . nowadays mass production is very essential in the industries to make a growth of industries or to gain the profits. It very important to avoid accident in company to recognize the improper work. Sometime workers are nervous by monitoring someone. and do their work either fast for slow. It is possible to make mistakes and time consuming method

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to monitor someone periodically so employees are being taken away from their duties it may decrease efficiency and the productivity. To provide fast medical service while healthy issues the human supervisor system is out of question.

So by developing “Intelligent sensor sleeves for maximizing workplace efficiency” lot of problems will be solved .it will helpful to reduce extra manpower to supervise someone else .this sensor based sleeves are very compact so it does not required any infrastructure. It Avoids major accidents in works .timely monitoring can possible as fast as . by remotely operation of this system measures accurate parameters to recognize workers .

II. EXPERIMENTAL PROCEDURE

A. Literature Survey

Research in the field of timely monitoring system are still going on .it has many approaches like structural health monitoring system for infrastructure. [1] Jay Chen ,Kerric Kwang,“wearable sensor's for reliable fall Detection” the system designed was wireless sensor network to avoid injuries with elder persons.in this system low cost and low power MEMS Accelerometer are used to detect the fall and RF module are to track the fall location.[2] M. J. Mathie, J. Basilakis, and B. G. Celler, “A system for monitoring posture and physical activity using accelerometers “This system developed was fall are the big obstacles to independent living for elder persons . To avoid it fall detector is designed which is small size radio pager .It uses two stages for detection of fall .which sense shock and orientation of wearer in 20 sec and the alarm was triggered. This system allows to detect 180 Different falling scenarios. [3] J. Yin, Q. Yang, and J. J. Pan, “Sensor-based abnormal human-activity detection,” The system developed has two approaches to detect the abnormal activities based on wireless sensor's. the wireless sensors attached to human body the approach is totally based on (SVM) support vector machine use to trained normal activities .when abnormal activities are detected the alarm on and give indication.[4] Bin Lu, Long Wu Thomas .G. Habetler “On the Application of Wireless Sensor Networks in Condition Monitoring and Energy Usage Evaluation for Electric Machines apply ”The developed system is based on wireless sensor network in condition monitoring and energy usage evaluation for Electric machine. Monitoring Energy usage and condition of machine is necessary to avoid failure's occur in machine.[5]. K. Doughty, R. Lewis, and A. McIntosh, "The design of a practical and reliable fall detector for community and institutional telecare “This system was developed by using axial accelerometer within the home telecare system .which is use to monitor physiological and functional parameter ,for daily movement the patients posture energy expenditure and movement is important parameter can be measure by using Accelerometer.[6] G.

Suresh Babu, Dr. V. Chittaranjan Das.”condition monitoring and vibration analysis of Boiler feed Pump” In that system they developed useful tools for maintenance .they this system to deterioration in plants machinery. Due to this it is useful to perform proactive maintenance and improve productivity of plant. For Boiler feed pump use spectrum analysis for unbalance mass.

B. Proposed Work

The proposed of our system to avoid time consumption and accident occur in industries. This system incorporates two sleeves worn by workers each sleeves contains two sensors located upper and lower arm .accelerometer is use to measure acceleration and angular velocity of arms and hands in the X,Y,Z axes respectively. Pulse rate sensor is use to monitor the health condition of someone or the workers in the industries .so wearing this sensor based sleeves it is possible to timed them simultaneously without adding any infrastructure. It also helpful to increase the productivity in the company.

C. System architecture

1. SPECIFICATION OF THE SYSTEM

The system consist of ARM7(LPC 2138).is mounted on glassy poxy PCB. The PCB considered as a development board for the used application. The ARM7 consist inbuilt ADC, the controller has 64 pins ,it requires 3.7v to operates or control in action .The power supply uses LM7805 and LM117 regulator IC to provide 5V and 3 to 3.7v respectively. System also consist accelerometer ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. It is operates on 3.6 volts and 10,000 shock survivals .it has three axes sensing and provide the outputs with respects to xout, yout, and zout pins. The B.W range is 0.5Hz to 1600Hz for and y axes and 0.5Hz to 550Hz to z axes .16x2 Alphanumeric LCD is used to display information . the PC consist VB based application software is used to calculate efficiency of the persons or worker also it can be use to monitor worker’s physical conditions.

BLOCK DIAGRAM OF SYSTEM:-

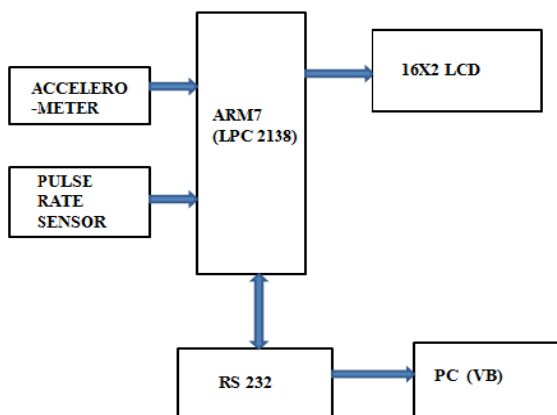


Figure 1: Block Diagram Of The System

2. DESCRIPTION OF BLOCK DIAGRAM

Above fig shows the block diagram of intelligent sensors sleeve’s for maximizing workplace efficiency. It consist of ARM7 (LPC 2138),Accelerometer, Pulse Rate sensors, Lcd Alphanumeric display (16x2),RS232,VB based PC

ARM7(LPC 2138):-

ARM7 controller is used in this system to monitor the signals from Accelerometer ,Pulse Rate sensor, The LPC 2138 has inbuilt 10 bit ADC. Which is use to convert Analog signal in to Digital signal. The signals from the Pulse rate and accelerometer are analog. Which is given to the controller .this signals are use to measure physical efficiency of worker’s. the ARM7 is operates on 3to 3.6 volts .It also has inbuilt memory to store the data. It also has two UART port pins for serial communication.

ACCELEROMETER:-

Basically an accelerometer is an electromechanical Device which contains a piezoelectric. The Accelerometer is used to measure the Acceleration Three axes accelerometer is being used in the system . The Accelerometer can be use to measure static acceleration of Gravity as well as Dynamic Acceleration is generated from motion, Shock or it can be vibration . The output of Accelerometer is with respect to Three axes X,Y,Z respectively .The B.W of Accelerometer is sated using tuning capacitor of Accelerometer.

PULSE RATE SENSOR:-

It is use to measure the pulses or Heartbeats of human’s The pulse Rate sensor is fixed at particular point of Human body especially it is fixed near arm .By using Pulse Rate sensor we can monitor the health of worker’s periodically in this system. if the count of pulse rate is below the reference point then workers have low blood pressure. or higher than reference point the patients Blood pressure so we can provide them medical service easily . So this pulse rate signal’s is given to the microcontroller to monitor Health issue of workers.

LCD DISPLAY:-

The LCD display is use to display the information .it shows the status of Accelerometer in terms of change in axes .LCD shows the every position of axes .also it shows pulse rate information which is timely monitored.

RS 232 :-

The RS 232 is use to provide interface between controller and PC .it is use for serial communication .it uses the MAX 232 IC to match the TTL levels and to provide appropriate interface between user defined devices. Mostly the wired communication is faster than wireless communication. And transmission and receiving the information with less noise affection. therefore it give the accurate data to VB based PC

PC(VB):-

The Visual Basics based software is especially designed to Track the Records of the Pulse Rate and acceleration or Vibrations. Timely it can monitored the required parameters and the information from the controller .It is used to calculate the overall efficiency of the person's. All the gathered data is reconstructed by PC based application dividing them into precisely timed and individual action

POWER SUPPLY:-

The power supply is made up of using IC LM 7805 and LM 117 to provide 3.7v for controller and 5v required for device to be interfaced.

CIRCUIT DIAGRAM OF SYSTEM:

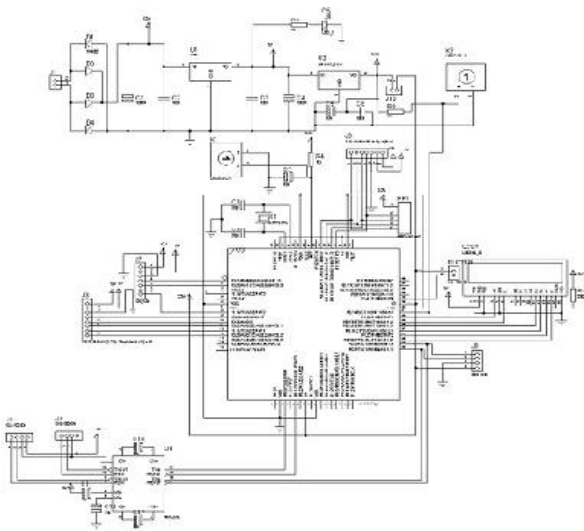


Figure 2: Circuit Diagram Of The System

DESCRIPTION OF CIRCUIT DIAGRAM:-

In above circuit diagram uses for various devices and sensor interfacing require to operate sleeves .12 MHz two pin crystal used in the system named as crystal 1.is used to provide operating frequency of controller.K1 and K2 are used as a RESET switch and programming switch .the controller can be programmed through ISP programming. RESET switch is used to stop current operation of controller .The LCD used in this system named as LM016L the commands pin RS and Enable pin is connected to port1.22 pin(40) and Enable pin is connected to the port 0.13 pin(39)..LCD used in this system is 4bit mode Therefore D4,D5,D6,D7 is the DATA pins connected to the Port 0.12,Port0.11,P1.23,P0.10,LED+,LED- are used to adjust contrast and backlight of the LCD, Buzzer is used for Audio indication in abnormal conditions or the system beyond the specified range. For serial communication between PC and Controller RS 232 is used .for that MAX 232 is used to match the TTL voltage Levels ,T1in and R1out is connected to to the TXD and RXD pins of controller connector J5,J4 is used to interface output Devices.

ADVANTAGES

- 1) High Degree of Automation
- 2) Cost Effective
- 3) Good reliability
- 4) High stability

APPLICATIONS

- 1) Industrial's
- 2) Hospital's

III. CONCLUSION

This Designed of sensor based sleeve's for workplace efficiency is modified and effective version to calculate workers work efficiency. It does not required any supervisor to timely monitor worker's in industries. It reduce the time consumption for timely monitoring .avoids the accident with workers and improves the productivity in the industries. It is very useful gadget to know physical condition of someone in company. Such a type of device is very useful in hospitals also to carries bulky machine and avoid complexity of wirings.

IV. FUTURE SCOPE

In further studies it is aim to make system is more advance and accurate .by using multiple sensors we can monitor more parameters of humans to know their physical conditions. Wireless modem can be use in future studies for avoid wired interfacing using zigbee, or Bluetooth to make it more convenient to gathered all info remotely.

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