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# System Automation And Production Monitoring In Industries Using Arduino With IoT Technology

***Ms. Nithya.S[1], Mr.Arjun.C[2], Mr.Ashok.M[3], Mr.Jeevanantham.B[4]***

[1]Assistant professor, ECE, KPR Institute of Engineering and Technology, Coimbatore.
*nithyakpr@gmail.com*

[2,3,4] Students , ECE, KPR Institute of Engineering and Technology, Coimbatore
*carjunbe@gmail.com ashokam192837@gmail.com jeeva.wifi@gmail.com*

Abstract***: This paper presents an interactive model based system for the management of production and controlling process in spinning mill using embedded system and Internet of Things. This system consists of various sensors to measure and store different parameters that are calculated to find the production rate. Apart from a comprehensive presentation of the set of the modules the system is composed of, together with their interrelationships, the above characteristics are analyzed, and their impact on the production control system is explained.. The system is also related to two control process namely air cooler controller and moisture mixer sprayer controller. This process is currently done manually which is being automated.Making Automated in this system we can effectively control the quality of the yarn that is produced in those alike industries. The system's attributes are presented with the aid of data structure diagrams, while the complete algorithm concerning the arduino module, in a algorithm form is provided and it presents a survey of all such systems.***

**Keywords:** : System controlling, Air cooler, Mixture Sprayer, Android mobile, Ethernet shield, IoT.

## 1. INTRODUCTION

Automation is achieved by various means such mechanical, hydraulic, pneumatic, electrical, electronics and computers. The biggest benefit of automation is that it saves labor however it is also used to save energy and materials and to improve quality, accuracy and precision. The primary aim of the project is to design, develop and implement automation in the some section of the spinning mill. In this system we are using some sensors like Load calls, Temperature sensor, Moisture sensor, for respectively monitoring the parameters of Temperature, Moisture, Input / Output weight of the cotton and cones. The sensors are interfaced with Arduino and the production value is calculated. All those measured parameters are displayed in LCD and also synced with cloud. To Design a system for collectively controlling monitoring and maintaining various parameters using different sensors in mill. To display the measured parameters in LCD display. To synchronously calculate and monitor the production rate in Arduino and upload it to the cloud storage as it can be viewed at any time anywhere using Internet of Things Technology. The ability of a company to fully understand the system and realize its great potentials - The speed at which the company can adjust its management strategy to accommodate effective and efficient implementation of the Automation in its system.[1] These two criteria can be met at no additional cost to the company. They only require commitment and strive to do things differently using the exiting qualifications. In addition, continuous appropriate implementation of the Automation System will eventually lead to substantial reduction in personnel involvement.

## 2. PROPOSED SYSTEM:

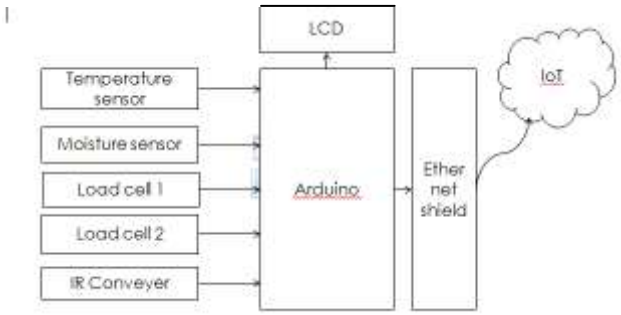


Fig 2.1

## COMPONENTS USED:

- Arduino Uno
- Temperature sensor
- Moisture sensor
- IR module
- Load cell
- Ethernet Shield
- Relay driver circuit
- Adapter(+12v)

### 2.1 Arduino:

The board features an Atmel ATmega328 microcontroller operating at 5 V with 2Kb of RAM, 32 Kb of flash memory for storing programs and 1 Kb of EEPROM for storing parameters.

Fig 2.2

The clock speed is 16 MHz, which translates to about executing about 300,000 lines of C source code per second. The board has 14 digital I/O pins and 6 analog input pins. There is a USB connector for talking to the host computer and a DC power jack for connecting an external 6-20 V power source, for example a 9 V battery. When running a program while not connected to the host computer. Headers are provided for interfacing to the I/O pins using 22 g solid wire or header connectors. Thus for now we had designed a system for proper controlling monitoring of production and other parameters in spinning mill using IoT.

**2.2 Temperature measurement:**

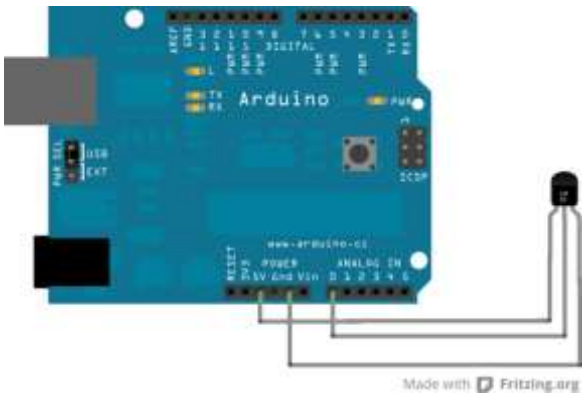


Fig 2.3

A simple temperature sensor using one LM35 precision Integrated-circuit temperature device with an output voltage linearly-proportional to the centigrade temperature and Arduino. It can measure temperature from -55c to +150c. The voltage output of the LM35 increases 10mV per degree Celsius rise in temperature. LM35 can be operated from a 5V supply and stand by current is less than 60µA.The purpose of this sensor in this system is to monitor the temperature and to regulate Air Cooler system .It is designed that whenever the temperature goes beyond 35° C the Air Cooler system has to turned on. Temperature sensor LM35 is interfaced to the Arduino through the analog input pins Ao and 5V and Gnd from Arduino. Analog pin Ao is set as input and the voltage output of LM35 is coupled to the Arduino. The conversion of Celsius and Fahrenheit is done by certain formula. The output is displayed in the serial monitor. When the temperature goes above 35C the cooler system gets ON automatically.

**2.3 Moisture measurement:**

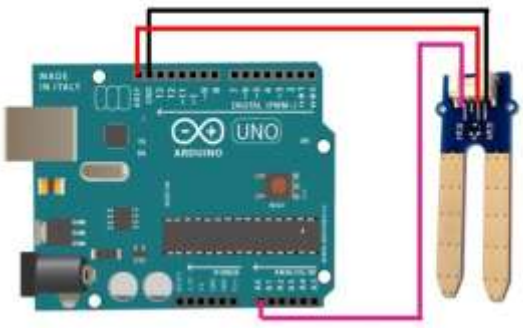


Fig 2.4

Moisture sensor has two probes through which current passes in cotton mixture then it read the resistance of cotton mixture for reading moisture level .In this system, Moisture sensor is used to continuously monitor the water level mixture of cotton and comber. Within many of these processes, including slashing, bleaching, and the finishing operations of cleaning, mercerizing, dyeing, and treating, it is essential to precisely control moisture levels. Failure to do so may result in product and raw material waste, re-work, decreased productivity, and increased production costs. Moistest, with 30 years of knowledge and the assistance of industry partners, has developed the IR-3000 moisture sensor. The IR-3000 is ideally suited to measure moisture levels in the harsh environments found in cotton fiber, yarn, and textile production. Utilizing the IR-3000 to optimize process control improves your product quality, increases productivity, and decreases production costs.

**2.4 Load Count measurement:**

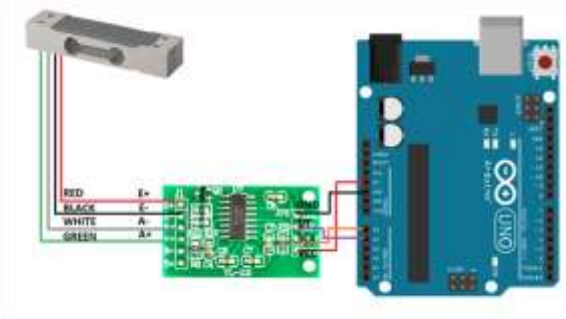


Fig 2.5

Single point load cells generally used to build scales and they offer excellent off-center loading compensation. Rsp1 (single point load cell) weight measures up to 3-150kgs.[2]

**2.5 IR Count Measurement:**

An infrared sensor is an electronic instrument which is used here to detect and count the motion of cones on conveyer.[4] IR sensors are capable of detecting motion of object and heat emitted by an object. IR detectors are specially filtered for Infrared light, they are not good at detecting visible light. On the other hand, photocells are good at detecting yellow/green visible light, not good at IR light.

## 3. CIRCUIT DIAGRAM:

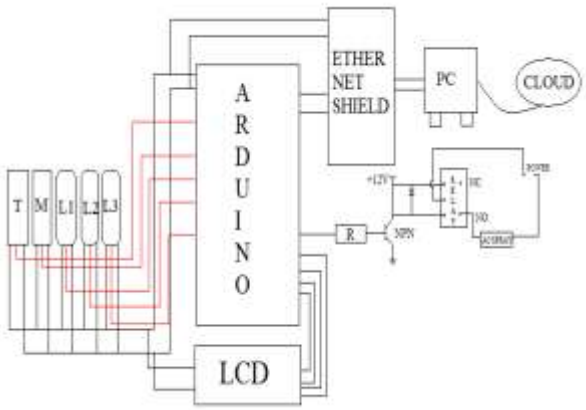


**Fig 3.1**

## 4. PRODUCTION MONITORING USING IoT:

The Internet of Things (IoTs) can be described as connecting everyday objects like smart-phones, Internet TVs, sensors and actuators to the Internet where the devices are intelligently linked together enabling new forms of communication between things and people, and between things themselves. Now anyone, from anytime and anywhere can have connectivity for anything and it is expected that these connections will extend and create an entirely advanced dynamic network of IoTs. IoTs technology can also be applied to create a new concept and wide development space for smart homes to provide intelligence, comfort and to improve the quality of life. A close connection between things and humans, the cyber world and the physical world, has thus been established via sensors and devices. And that is why the potential for transformation is immense. Every industry will create new business or implement the technology to offer new services to the customers and to increase the quality and performance of the system. In this paper, we extend our previous work [5] and present a low cost and flexible home control and monitoring system using an embedded micro-web server, with IP connectivity for accessing and controlling devices and appliances remotely using Android based Smart phone app. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor and control the home environment with more than just the switching functionality.[6] We have utilized rest ful based Web services as an interoperable application layer that can be directly integrated into other application domains like e-health care services, utility, distribution, or even vehicular area networks (VAN).

### 4.1 WORKING PRINCIPLE:

Initially arduino Ethernet shield is interfaced with arduino properly and Ethernet LAN cable is connected with Ethernet shield in this IoT project we are going to control the home appliances through the android application called “Blynk”. This app is available in Google playstore. After installing that app in our phone we need to create an individual account by using our mail ID. [7]

Then we need to create a new project. After creating the project it will generate a unique key, this key will further used in arduino programming to interconnect a mobile app with arduino Ethernet shield. Then we want to download the Blynk library in arduino home page. Then it is added to the arduino IDE. There are so many programs available in that file, but we need only Ethernet program. On clicking that program, we need to replace the token with that unique key generated by Blynk app. This app consists of 3 modules which are used to represent the input stock value, Lap weight count, Output number value respectively.

### 4.2 M2M DEVICE CONNECTION AND FUTURE PREDICTION:

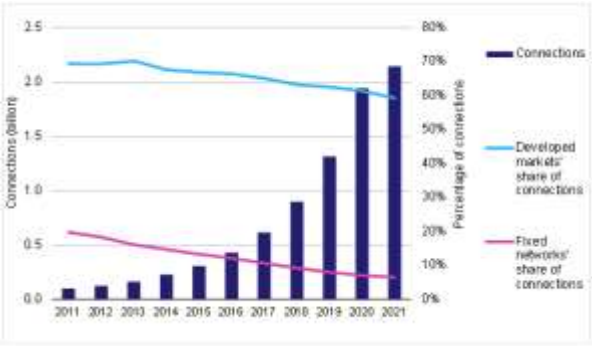


Fig 4.1

### 4.3MOBILE APPLICATION (BYLNK):


Fig 4.2

## CONCLUSION:

- System automation is achieved by controlling the air cooler system in the industry.
- Sprayer element in the system is also automated so that the high quality of the product is obtained.
- These integrated controlling elements are efficiently and economically reasonable for quality management and power consumption.
- Input stock and output number of cones are monitored synchronously.
- Those values can be viewed from anywhere anytime.

## APPLICATION:

- This System can be installed in any industries regarding to yarn productions.
- Predominantly this system is designed to use in cotton spinning mills.

## ADVANTAGES:

- We can monitor device from a long distance, thus it gives ease of access.

- Faster operation and efficient.
- No need to carry separate remote or any other controlling unit.
- Wastage of current can been reduced.
- Theft in the Industries can be minimized as the input and output values are monitored and balanced.

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