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Development of an automatic monitoring and control system for the objects on the conveyer belt

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ABSTRACT

This paper proposes a new algorithm for a real time charging recommendation for an electric vehicle (EV) driver based on an accurate real-time range indicator system to avoid range anxiety. In this algorithm the graphical user interface (GUI) of the real-time range indicator system is also used to show the driver an accurate estimation of the remaining range to destination and the current state of charge (SoC). This algorithm also calculates the minimum charging time required at the charging station to reach the destination. Charging recommendation system, electric vehicle, energy management, real-time range estimation model, state of charge estimation these are tools required for implementing this paper. The proposed system will enhance the use of electric vehicles by reducing range anxiety and reduce the necessary charging time along a route and also helps the driver to travel over a longer distance by a depleted electric battery.

Keywords: Charging recommendation system, Electric vehicle, Energy management, Real-time range estimation model, State of charge estimation.

INTRODUCTION

This paper presents the design, fabrication and validation of a prototype of an automatic monitoring and control system designed for monitoring the precautionary alarm system which is turned on before running a conveyor in cement industry. This system uses microcontroller ATmega8 for controlling and feedback sensors for monitoring the objects. Cement Industry Conveyors are important contributors. The siren will be broadcast before conveyor is start on. Sometimes the siren is broken down or the siren gets lost and the sound does not come from the siren but the conveyor starts. If human are working than it can endanger. Our paper suggested that, To prevent this from the above mentioned event, the system will not start unless the signal from the microphone is verified by the controller.

SYSTEM ANALYSIS

Conveyer is utilized to transport raw material in cement industry. Every time siren starts 7 sec before the conveyor start and sounds up to 20 sec. The siren is about to a kilometer. This is the motor siren used in cement industry. This motor runs at 110 volts and sometimes the conveyor belt start if the motor has been repaired. If people are working then there will be an accident.

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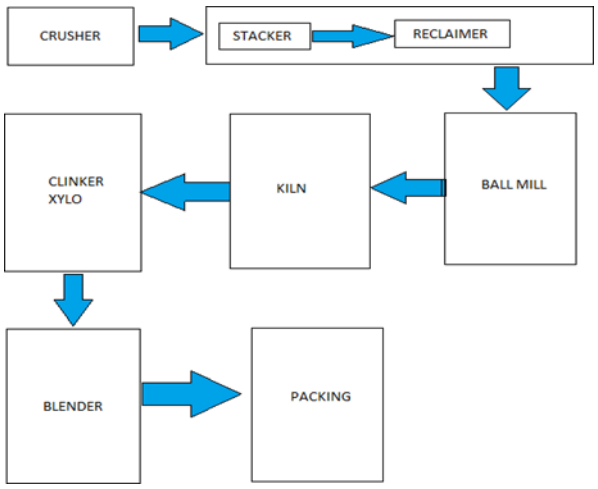

Fig:1 Process Flow Diagram

LITERATURE SURVEY

In this type of cement industrial errors are happening. The plant has been laid down to fix it. If the motor siren does not work, the siren sound is absorbed by the sensor and it sends a signal to the microcontroller and we have program to start the conveyor belt before the controller sends the signal. If suppose the siren does not arise the sound , the sensor absorbs and send signal to microcontroller to stop the conveyor belt.

CONCEPTUAL DIAGRAM

Stacker

A stack stacker large machine used to stack the lime stones into huge size. It forms the pile formation to store the lime stones into the stockpile. Stackers are normally stores in tons per hour. Normally Traveller rail between stack piles in stack yard. Stacker can usually moving to direction horizontal along rail and vertical luffing .In same industry approximately a stacker stores 1 acre for storing cursed lime stones. Stackers in different patterns such as cone stacking and chevron stacking. In coarser with crusher move into base in Rock on ply stacking additional cone added to next cone. In chevron stacking ,it's stack along with length of the stack pile

Re Claimer

The main purpose of the re claimer is storing the bulk materials of limestone from the stacker. Stacker is used to stack a material and re claimer is used to claim the material from the stacker .Re claimer are volumetric machines and are rated in M^3/ h for capacity which is often converted to t/h. Normally the re claimer travel on rail between stock pile in the stockyard. In cement industry they are using bucket wheel re claimer. Bucket wheel re claimer move in three directions Horizontally along the rail, vertically by luffing its boom and rotational by slewing it's boom

Ball Mill

Ball mill is a type of grinder ball mill is in cylindrical shape which contains iron balls with weights of to 4to 5 of. It contains inner shell of cylindrical shape. It consists of cylindrical shell rotating about its axis it's partially filled with balls. In cement industry shrinked lime Stones from the re claimer is feed into the rotating shell of the ball mill. In rotating axis the iron ball moves horizontally and vertically to find the line stones into fine powder. Due to friction the limestone are crushed with balls into fine powder.

Cement Kiln

kiln is the heart part of the cement plant which is used to mix the raw material into the clinker. The final product come out from the kiln is clinker. Over a billion tonnes of cement are made per year, and cement kilns are the heart of this production process. Normally the fly ash from coal mill and the fine powder of the lime stone from ball mill is mixed in the kiln and also heating up to 1000-1450degree Celsius. Finally it's heat the raw materials and produced clinker

Clinker (Cement)

Clinker is the final product come out from the kiln the manufacturing of the kiln normally 3 -25 mm of clinker is produced .in cement industry two conveyor are used for the clinker process conveyors. Conveyor 1 is used for send the clinker into the clinker cylo. Conveyor 2 is used to send back the irregular powder into ball mill for again fining . After the clinker storing process. It mix with gypsum and produced cement .The gypsum and the clinker mixed in blender, for the final cement.

BLOCK DIAGRAM

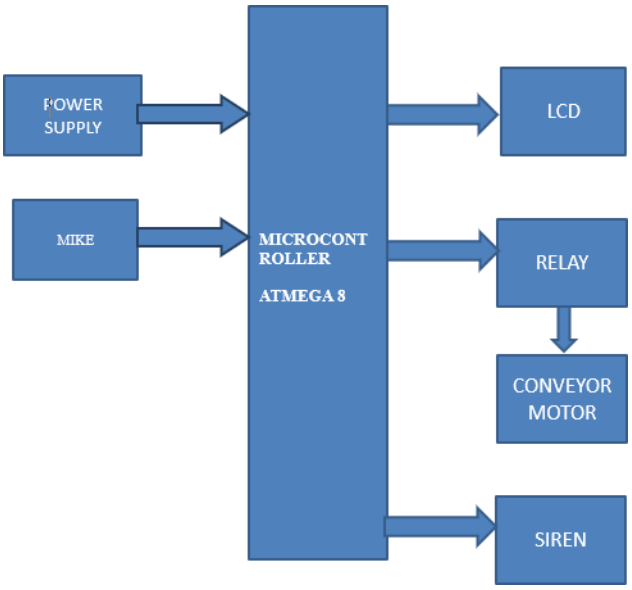

Fig: 2 Block Diagram

WORKING

In this Paper we are using Atmega8 as microcontroller to control the overall process. Using the AVR programmer to program the controller. First of all siren sounds 7 Seconds before the conveyor starts and sounds up to 20 seconds after the conveyor starts running. In this we set the microphone to absorb the sound come out from the siren. The microphone is connected to the microcontroller. The sound rise up to 90 to 120 DP level is the set point to send the signal to the microcontroller. When the microphone receives the 90 to 120 DP level sound from the siren it takes the signal to the microcontroller to turn on the relay to start the conveyor. If suppose the microphone does not receive the above level of sound it takes signal to microcontroller to turn on relay to off the conveyor belt. There are two types of conveyors used in the cement industry ,belt conveyor and bucket conveyor .Belt conveyors is used to transport the bulk raw materials The adaptation of belt conveyor for special purpose and the integration of belt conveyor with other equipment has increased their usefulness. And another one is bucket conveyor, Bucket conveyors consist of endless chains or belts to which are

attached buckets to convey bulk material in horizontal, inclined, and vertical paths. The buckets remain in carrying position until they are tipped to discharge the material. Various discharging mechanisms are available. In this project we are using belt conveyor

EQUIPMENT HARDWARE

Equipment

- Microcontroller – ATmega8A
- Power supply unit
- LCD display – 16x2
- Hooter
- Microphone
- Conveyor

Microcontroller – AT mega 8

It is an 8 bit CMOS built microcontroller from the AVR family (developed by Atmel Corporation in 1996) and is built on the RSIC (Reduced Instruction Set Computer) architecture. Its basic advantage is it doesn't contain any accumulator and the result of any operation can be stored in any register, defined by the instruction. Instructions in the Program memory are executed with a single level pipelining. While one instruction is being executed, the next instruction is pre-fetched from the Program memory. This concept enables instructions to be executed in every clock cycle. The Program memory is In-System

Reprogrammable Flash memory. The fast-access Register File contains 32 x 8-bit general purpose working registers with a single clock cycle access time. This allows single-cycle Arithmetic Logic Unit (ALU) operation. In a typical ALU operation, two operands are output from the Register File, the operation is executed, and the result is stored back in the Register File in one clock cycle.

Power Supply

The given block diagram includes following:

A transformer is an electro-magnetic static device, which transfers electrical energy from one circuit to another, either at the same voltage or at different voltage but at the same frequency. The function of the rectifier is to convert AC to DC current or voltage.

Usually in the rectifier circuit full wave bridge rectifier is used. The Filter is used to remove the pulsated AC. A filter circuit uses capacitor and inductor. The function of the capacitor is to block the DC voltage and bypass the AC voltage. The function of the inductor is to block the AC voltage and bypass the DC voltage. Voltage regulator constitutes an indispensable part of the power supply section of any electronic systems. The main advantage of the regulator ICs is that it regulates or maintains the output constant, in spite of the variation in the input supply.

LIQUID-CRYSTAL DISPLAY

A **liquid-crystal display** (**LCD**) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as pre-set words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

HOOTER

Electronic hooter is a motor siren used for alarm system. It contains electronic coil and to carbon brushes form based on the size ,it rang varies. Normally in industry there using 1 km range hooters. Basically 110v supply passed to the carbon brushes , it pushes the coil to form electromagnetic induction to run the motor. in front of the hooter plastic plate is fixed with some holes. When the motor starts it sucks the air inside the holes to create the heavy sound. Normally its sounds up to the range of 90 to 120 DP.

MICROPHONE

A microphone is a device that captures audio by converting sound waves into an electrical signal. This signal can be amplified as an analog signal or

may be converted to a digital signal, which can be processed by a computer or other digital audio device. While all microphones (or "mics") serve the same basic function, they can capture audio in several different ways. Therefore, multiple classes of microphones exist.

CONVEYOR

A conveyor system is a common piece of mechanical handling equipment that moves materials from one location to another. Conveyors are especially useful inapplications involving the transportation of heavy or bulky materials. Conveyor systems allow quick and efficient transportation for a wide variety of materials, which make them very popular in the material handling and packaging industries. They also have popular consumer applications, as they are often found in supermarkets and airports, constituting the final leg of item/ bag delivery to customers. Many kinds of conveying systems are available and are used according to the various needs of different industries. There are chain conveyors (floor and overhead) as well. Chain conveyors consist of enclosed tracks, I-Beam, towline, power & free, and hand pushed trolleys.

SOFTWARE REQUIREMENTS

- Platform - AVR STUDIO
- In System Programmer - ProgISP 172
- Compiler – Win AVR

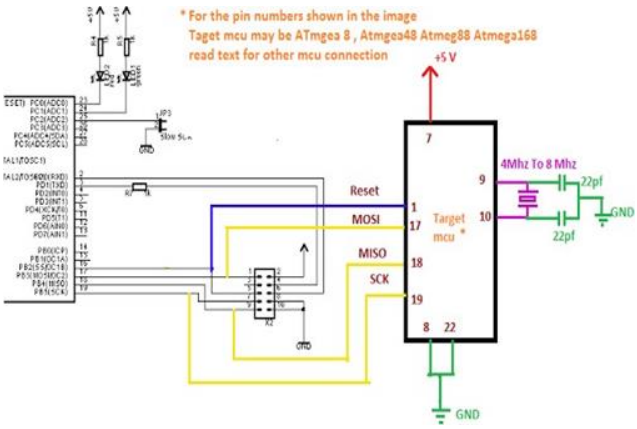

Fig: 3 Simulation Output

AVR ISP and AVR ISP mkII

The AVR ISP and AVR ISP mkII are inexpensive tools allowing all AVRs to be programmed via ICSP. The AVR ISP connects to a PC via a serial port, and draws power from the target system. The

AVR ISP allows using either of the "standard" ICSP pinouts, either the 10-pin or 6-pin connector. The AVR ISP has been discontinued, replaced by the AVR ISP mkII. The AVR ISP mkII connects to a PC via USB, and draws power from USB. LEDs visible through the translucent case indicate the state of target power.

AVRDUDE AVR PROGRAMMER

USBasp - USB programmer for Atmel AVR controllers. USBasp is a USB in-circuit programmer for Atmel AVR controllers. It simply consists of an ATMega8 and a couple of passive components. The programmer uses a firmware-only USB driver Flash Burner for AVR Series from ATMEL Communication – USB. Auto Erase before writing and Auto. Verify after writing. Freeware AVR GCC C Compiler. ISP Programming FRC Socket. Connects through AVR DUDEDeviceSupport

Compiler – Win AVR

WinAVR contains all the tools for developing on

the AVR. This includes avr-gcc (compiler), avrdude (programmer), avr-gdb (debugger), and more! WinAVR is used all over the world from hobbyists sitting in their damp basements, to schools, to commercial projects. WinAVR™ is comprised of many open source projects.

SIMULATION OUTPUT

AVR software simulation output is given below depending upon the working of hardware setup ion the cement industry.

CONCLUSION AND FUTURE ENHANCEMENT

The automatic monitoring and control system is designed, fabricated and validated successfully for monitoring and controlling the siren of a conveyor belt using microcontroller ATmega8. The system was validated successfully by test conditions. Experimental trials confirm the accuracy and validity of the prototype. Behaviour and performance of the automatic monitoring and controlling system was found to be as per expectations with minimal deviations.

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