A NOVEL APPROACH FOR THE AUTOMATION OF INDUSTRIES

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Abstract - Household appliance control using cell phone through global system for mobile communication (GSM) technology is common in nowadays. The cellular communications is essential for such remote controlling activities. SMS (short message service) technology can be used to control household appliances from distance. While considering the industrial area, the automation is not so much popular. The existing system mainly based on human based automation system. In the existing system, error due to human mistakes is there and chances for accidents are more. The proposed system makes use of wireless control hence can be effectively used in systems were unwired connections are desired. The system allows the user to view the different blocks of an industry through the android application.

Keywords: Mobile handset; wireless control; industry; automation.

I. INTRODUCTION

Embedded systems are playing important roles in our lives every day, even though they might not necessarily be visible. An embedded system can be defined as a control system or computer system designed to perform a specific task and also be defined as a single purpose computer. Some of the embedded systems we use every day are control the menu system on television, the timer in a microwave oven, a cell phone, an MP3 player or any other device with some amount of intelligence built-in.

In the current era, automation is popular. When someone looks around, he can found a lot of applications or systems which are automated. The automation improves the efficiency and also reduces the cost for manpower. The automation of house hold appliances is gaining its popularity in the current era. Considering the industrial sector, the automation is basically concentrated on the automation within the specific block only. The proposed project allows monitoring and controlling an industry through an android application.

The objective of this work is to develop a prototype system which enables to monitor and control an industry through android mobile. The industry can be monitored in 24 hours and can be made online for the backing up of data. This allows the service engineer in an industry to control the different devices remotely and also able to take decisions based on the current status of the industry.

II. RELATED WORK

There are a lot of works are carried out in the same manner in the case of home automation. The advancement in home automation includes monitoring and controlling devices remotely. The work that presented here is new to industrial sector and allows automation to a new meaning. The goal of this paper is to propose a cost effective method for the controlling and monitoring of different sector in an industry.

III. METHODOLOGY

A. Automation in different sector : A Snapshot

Many researches are going on for the automation in different areas. The automation

allows monitoring and controlling different devices or systems within a specific area without the interaction of human. This needs some sort of artificial intelligence. Current technologies help to achieve these goals easily. Following are some of the areas in which automation is implemented.

a) Vehicles:

The newly coming high end vehicles are somewhat automated. The Google also invented driverless car. The automation allows a wide application and helps to improve the living nature of human. The automated car, monitor its surrounding and based on the surrounding it automatically adjust its performance.

b) Defence Area:

The defence area is somewhat advanced in automation. There are a lot of invention is going on in the field of aircraft and launch vehicles. Some of the aircraft can be able to drive without a pilot. The invention in the field of defence serves a major role for the security of human.

c) Home automation:

It includes automatic monitoring and controlling of different devices in a home. The monitoring can be done at any place away from home. This allows the owner to ensure is there any security problem with the home. Also some of the devices can be controlled through wirelessly.

B. Automation in industrial area:

World is contracting with the growth of mobile phone technology. As the number of users is increasing day by day, facilities are also increasing. Starting with simple regular handsets which were used just for making phone calls, mobiles have changed our lives and have become part of it. Now they are not used just for making calls but they have innumerable uses and can be used as a Camera , Music player, Tablet PC, T.V. , Web browser etc . And with the new technologies, new software and operating systems are required. One of the most widely used mobile OS these days is ANDROID**.**

Considering industries, the automation is mainly focus on for the controlling of different devices in a particular system. The proposed system mainly helps the manger to monitor and control the entire factory through an android application. The monitoring can be recorded and may be used for future reference.

The project makes use of the best in technology. The application of the project is mainly concentrated on an industry. The project is the interaction of different technologies available in the market. This includes android application development, simulation and implementation of microcontroller based system, interfacing of different sensors etc.

IV. WORKING PRINCIPLE

Assuming the control system is powered and working properly, then the system works in the following manner.

1. From the mobile application, the user can view and select the required operation to be performed.
2. Based on the operation selected, the corresponding message is transferred to the control system which is placed inside the industry.
3. The control system then sends commands to the associated microcontroller which connected to different devices in the industry.
4. The current status of the system is updated periodically and is send back to the control system.
5. The updated status is also available in the user mobile phone.

V. SYSTEM DESCRIPTION

For the prototype system, it requires both hardware and software. For the implementation of the prototype system, one must install an application in android platform. The application allows the user to review the current status and based on the information he can control the devices in his industry.

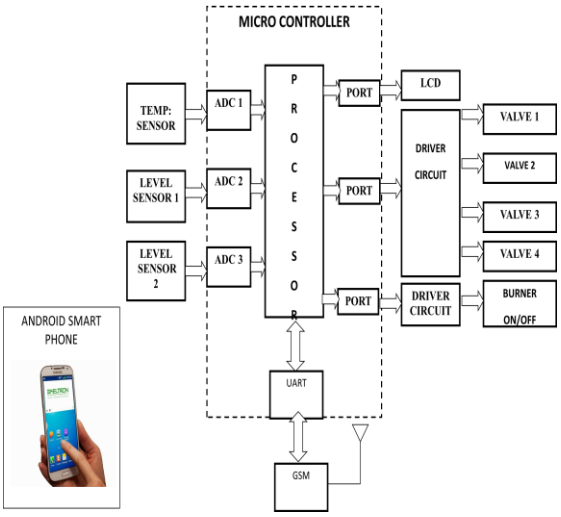

Fig.1. System Architecture

Proposed system architecture is shown in Fig.1. The process is based on android and GSM technology. The project allows the monitoring and controlling of equipments inside a factory. An emergency shutdown is there in the android application which allows the user to shut down the entire system if any fault occurs in any block of the industry. The micro controller monitors and gives the control signal which is given by the user through the android application.

The detail description of individual blocks in the system as follows

A. *User GSM mobile Handset*

Android based mobile handset is chosen for the implementation of the project. It allows installing an application for the industrial automation.

B. *GSM modem*

We have used general packet radio service (GPRS) modem SIM300 from SIMCON ltd. Designed for global market, SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz [7]. SIM300 provides GPRS multi-slot class 10 capabilities and support the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 40mm x 33mm x 2.85 mm, SIM300 can fit almost all the space requirement in application, such as smart phone, PDA phone and other mobile device.

C. *Microcontroller*

Microcontroller is the key element in all embedded systems, control and automation processes. It behaves like a single chip microcomputer and is coupled with a processing unit, memory, input output devices, timers, data convertors, serial port etc. here I chosen the microcontroller from atmel corporation named Atmega2560.

D. Temperature Sensor

Temperature sensor is used to measure the atmospheric temperature in the industry.LM35 is the one which is used in this project and has the following features.

- Calibrated Directly in ° Celsius (Centigrade).
- Linear + 10 mV/°C Scale Factor.
- Rated for Full −55°C to +150°C Range.
- Low Cost Due to Wafer-Level Trimming.
- Low Self-Heating, 0.08°C in Still Air.

E. *Relay board*

Relay board consists of SPDT relay and a relay driver ULN2803. ULN 2803, shown in Fig. 2, is a unipolar motor driver IC with maximum output voltage 50 V and output current 500 mA. It contains eight Darlington pair transistors, each having a peak rating of 600 mA and can withstand 50 Vin off-states. Outputs may be paralleled for higher current capability.

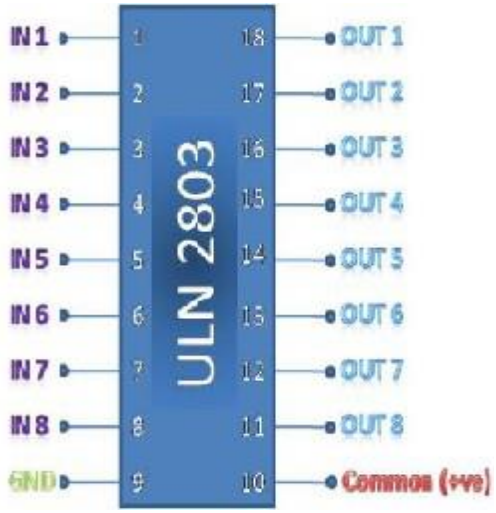

Fig. 2. ULN 2803 relay driver.

VI. EXPERIMENTAL RESULT

I fabricated and evaluated a prototype system for the proposed industrial automation system. The system is checked with different conditions. The application in the android mobile allows the user to select different actions based on the status of the industry. The control system consists of a PC which is directly connected to the microcontroller based system which controls different devices inside the industry. The PC has an internet connection which allows updating the data to the portal and provides timely updating of data in the android application. The system allows an emergency shut down if something went wrong inside the industry. The application allows the user to control and monitor the industry remotely.

VII. CONCLUSION

This paper has reviewed the existing state of industrial automation systems, and identified difficulties in such technologies. Here I made an effort to reduce the complexity and expense of the architectures adopted by existing systems and the lack of interoperability between different industrial automation technologies. A novel architecture for the industrial automation system is proposed and implemented, using the android OS. The main aim of the project is to implement an android based system for the monitoring and controlling of different sectors in an industry. Different sensors are used for monitoring the different operations that takes place in the industry. The control signal is given by the manager or administrator through the mobile application and the corresponding operation is performed at the industry.

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