



# LOCATION BASED INDUSTRIAL MONITORING & SYSTEM USING 3G WIRELESS TECHNOLOGY

Sanket A.Nirmal<sup>1</sup>, Abdul Wasay Mudasser<sup>2</sup>, S.V.Altaf<sup>3</sup>

Student, ECE, Lords Institute of Engineering & Technology, Hyderabad, India<sup>1</sup>

Assistant Professor, ECE, Lords Institute of Engineering & Technology, Hyderabad, India<sup>2</sup>

Associate Professor, ECE, Lords Institute of Engineering & Technology, Hyderabad, India<sup>3</sup>

**Abstract:** The position Based Industrial Monitoring & system using 3G wireless technology is used to monitor the different industrial nodes through web server. In this project we design and implement a low price feature which is based on embedded platform for industrial appliances monitoring as well as home appliances which uses Ultrasonic sensor, temperature sensor & UVC driver camera to discover the obstacle, temperature. Also to get a video status of an industry we use a UVC (Universal video class) driver camera is a video camera that feeds its image in real time to a computer or computer network. The project uses ARM11 micro controller which is 32-bit controller to process the information. This paper probes into the design of the intelligent monitoring system based on S3C6410X ARM11 micro controller. This development uses Ultrasonic Sensor, temperature sensor, and camera to detect respective constraint also we use 3G modem & GPS that is coupled to S3C6410X board that is by using 3G wireless technology we can do video observing & the status of the sensor on preferred web page. The web-server is connected to Internet through 3G wireless modem. The industrialized owner on the terminal is also connected to same Internet. By typing the cloud address on the network browser, the owner gets a web page on screen. This page encloses all the figures about the standing of the sensors or else the owner can also monitor the grades through mobile if the mobile has 3G internet competence.

**Keywords:** ARM 11Board, CMOS Camera, Face Recognition, GPS, Sensors, Wireless Monitoring.

## I. INTRODUCTION

World Wide Web, wireless communication tools and gadgets are being extensively utilized by the youth via social networks, smart phone and GPS technologies. While on the move, young home owners are utilizing GPS and GIS technologies for road and personal navigation, texting each other using smart mobile devices, using social media to communicate and follow each other's news instantaneously. The wide-spread popularity, acceptance and usage of these technologies has presented an opportunity to research and development engineers as well as information technology service providers to develop and provide value-added services. One such value-added service can enable the digital native generation to access and interact with their home appliances and to monitor and control their home systems in addition to smart energy conservation while on the move. Recent developments in publically available web based Geographical Information Systems (GIS) and the availability of low-cost integrated General Packet Radio Service (GPRS)/Global Positioning Systems (GPS) modem have enabled the development of embedded stand-alone Industrial monitoring systems.

This paper presents the design, implementation and testing of a home-monitoring system that utilizes online Map from a

GIS in conjunction with the readily available public satellite-based GPS, and GPRS mobile networks. In addition to detecting intruders, the system allows an Industrial/ home

Owner to remotely monitor various critical home sensors status [1].

This project uses ultrasonic sensor, temperature sensor and USB camera to detect respective parameter also we use 3G modem that is connected to S3C6410X board that is by using 3G wireless technology we can wirelessly monitor video information & sensor data on desired web page. The web-server is connected to Internet through 3G wireless modem.

## II. LITERATURE SURVEY

Home security system is needed for occupants' convenience and safety. In this paper, we present the design and implementation of low cost, low power consumption, and GSM/GPRS (Global System for Mobile Communication General Packet Radio Service) based wireless home security system [2]. Also ZigBee based home automation system and Wi-Fi network are integrated through a common home gateway. The home gateway provides network

interoperability, a simple and flexible user interface, and remote access to the system [3]. The architecture is based on the Zigbee protocol that is cost-effective and scales to a large number of devices. The system can be interfaced with existing smart home automation systems to allow multiple users to wirelessly monitor their home appliances status and get real-time data from the World Wide Web such as weather and traffic status, stocks market prices and public transportation schedule [4]. Also the design of a home network using a wireless USB controller that offers several benefits such as low cost, expandability and outstanding performance. Wireless USB can also be used in home security system [5]. According to connecting mode, home network can be divided into two kinds: wireless network and non-wireless network [6]. The wireless technology has some remarkable benefits comparing with non-wireless technology. For example, it makes the installation and maintenance easier and reduces the system cost [7]. Bluetooth [8], ZigBee [9], 802.11 [10] and wireless USB [11] are the most popular technologies in the field of home wireless network.

An embedded board physically connected all the home automation devices and, through integration with a personal computer (PC) based web server, provided remote access to the system. The use of Java technology, which incorporates built-in network security features, produces a secure solution. However, the system requires an intrusive and expensive wired installation and the use of a high end PC [12]. The common methods are based on temperature sampling, relative humidity sampling, smoke analysis, in addition to ultraviolet and infrared sampling it presents a fire-alarming method based on video process. Although the method mentioned in [13] can provide additional information about the process of burning, it is too expensive to be used in home security system. Embedded server based on home network is also one of the phenomenon mentioned [14].

An Industrial surveillance system based on an embedded system with multiple ultrasonic sensor modules to enhance the system's reliability. Each ultrasonic sensor module includes a transmitter and a receiver, and the modules are placed in a line direction. The aim of this paper is to develop and implement an affordable low cost web-camera based surveillance system for remote security monitoring [15]. Previously introduced a phone based remote controller for home and office automation. The system differs in that all communications occur over a fixed telephone line and not over the Internet. The system can be accessed using any telephone that supports dual tone multiple frequency (DTMF)[16].

### III. PROPOSED SYSTEM BLOCK:

This system takes capture image by means of web camera connected to ARM microcontroller through USB and the image is processed by using image processing technique.

Image processing is any form of signal processing for which the input is an image, such as a photograph or video frame; the output of image processing may be either an image or a set of characteristics or parameters related to the image. Camera view is used to detect human beings, ultrasonic sensor is used to objects, GPS is used to find out location values and temperature sensor to find out atmospheric conditions. Buzzer and DC motor is to alert the security at surrounding area where as to alert security at control room monitored conditions are viewed on web page with unique URL. In this project we going use S3C6410 based microcontroller, which the current dominant microcontroller in mobile based products.

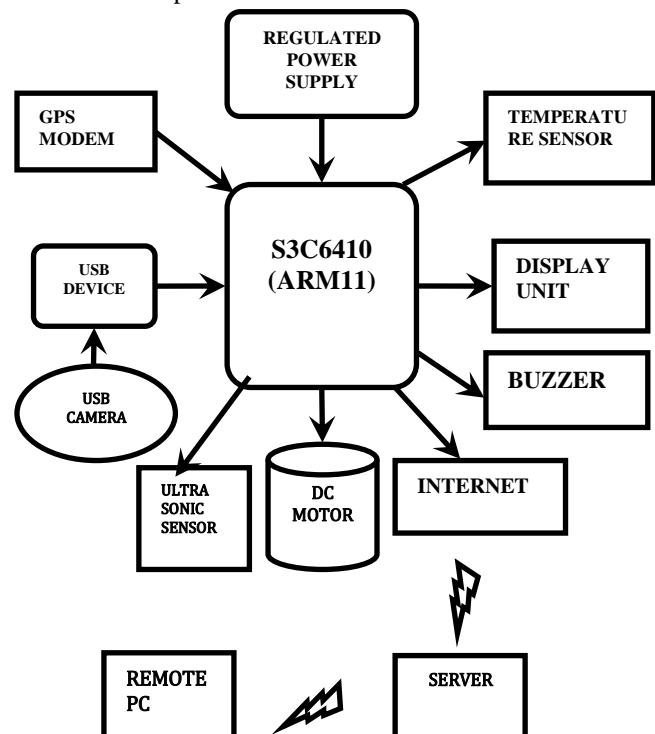


Fig 1: Block Diagram of Location based Industrial monitoring system

### IV. PROPOSED WORKING PRINCIPLE

The proposed pedestrian detection system makes use of CMOS camera which is interfaced to lower power consumptive and highly advanced micro controller like S3C6410. We cannot get S3C6410 microcontroller individually. We will get it in the form of FRIENDLY ARM board otherwise we can call it as MINI 6410 board [17].

In order to work with ARM 11 micro controllers we require 3 things. They are listed below.

1. Boot Loader
2. Kernel
3. Root File System

#### 1. BOOT LOADER:

The main functionality of boot loader is to initialize all the devices that are present on the mother board of MINI 6410

and at the same time to find out whether any problem or any other fault is there in the devices that are present on that mother board of MINI 6410.

The other feature of the boot loader is to find out what are the different operating systems that are present in the standard storage devices and to show it on to the display device so that user can select between the operating systems into which he wants to enter[18].

## 2. KERNEL:

The core part of an operating system we can call like kernel. Operating system will perform its functionalities like File management, Process management, Memory management, Network management and Interrupt management with the help of the kernel only. Kernel holds the device related drivers that are present on the motherboard. FRIENDLY ARM board supports for operating systems like SYMBION, ANDROID, EMBEDDED LINUX, and WIN CE. But in all these operating systems EMBEDDED LINUX will provide high security to drivers and files. So in our current project we are making use of kernel of EMBEDDED LINUX with which device related drivers that are present on the mother board of FRIENDLY ARM board will automatically come when we load EMBEDDED LINUX related kernel.

## 3. ROOT FILE SYSTEM:

File system will tell how the files are arranged in the internal standard storage devices. In embedded Linux, kernel treats everything as a file even the input and output devices also. In embedded Linux, Root is the parent directory it contains other sub directories like dev, lib, home, bin, sbin, media, mnt, temp, proc, etc, opt and etc[19]. According to our application we will interface some external devices also. All the devices means internal devices that are present on the motherboard of MINI 6410 will get their corresponding drivers when we load Embedded Linux related kernel. But these device drivers require micro controller related header files and some other header files which will be present in the lib directory which is present in the root directory. And also the devices related drivers will be present in the dev directory which is again present in the root directory. So whenever we will load the Root File System then we will get different directories which will be helpful to the kernel. So compulsorily we need to load the Root File System. MINI 6410 specific Root File System is Root Qtopia[20].

## V. HARDWARE INTERFACED TO PROPOSED SYSTEM

The essential programs that are required in order to work with MINI 6410 like Boot loader, Embedded Linux related Kernel, Root File System will be loaded into the NOR flash which is present on the MINI 6410 board itself. The program that is related with the application will be loaded into NAND flash which is also present on the MINI 6410 board itself.



Fig 2: Hardware implementation of proposed system

By using boot strap switch that is present on the MINI 6410 will help the user to select either NOR or NAND flash. After that by using DNW tool we can load Boot loader, Embedded Linux related kernel and Root File System into NOR flash by using USB cable and the application related program into NAND flash [21].

Once loading everything into MINI 6410 board it will work based on the application program that we have loaded into the NAND flash. Now the CMOS type camera will be interfaced to the MINI 6410 board itself. The camera will continuously record the video and continuously it will send them to controller. By using 3G mobile, each and every movement is monitored from any location through mobile no need to maintain any control room for monitoring. If we want to monitor through remote PC we can connect PC through Ethernet technology frame by frame. If any motion is detected it can be either related to any person or related to any object at that moment it will capture that image and stores into the internal memory of the micro controller. So it will reduce the power consumption when compared to the normal Motion detecting Systems.

In this way we can design a lower power working Motion Detection System by using MINI 6410 board and Embedded Linux.

The system uses USB webcam which is connected to ARM11 board through USB device. Camera receives image of a person and finds whether it is person or object internally by using Haar features. The webcam captures the face of a person present in the region only in the form of frames by using Open CV library later it retrieves image pixel data. It compares the captured image with Haar features of a face image which is stored in the form of .xml file [22].

If it detects as person buzzer will turn on as well as the controller apply turns on the DC motor through L293D driver IC and after some delay motor gets turned off.

Ultrasonic sensor is used to detect obstacle if it finds any obstacle it gets activated and sends indication to controller

which turns on buzzer and motor simultaneously and after some delay both buzzer and motor gets turns off. The temperature sensor is to monitor atmospheric temperature of room and GPS is used to find out the location latitude and longitude values. Monitored temperature, location and identified persons face details are sends to server by using FTP protocol.

### VI. EXPERIMENTAL RESULT

As we discuss earlier we obtain an experimental result in the form of image, location data i.e. Latitude and Longitude of desired location where the board is kept and Temperature of remote location.

We can view these details from any remote location by using specific URL. If we log on to specific URL we can view temperature, location values and identified person image on web page.

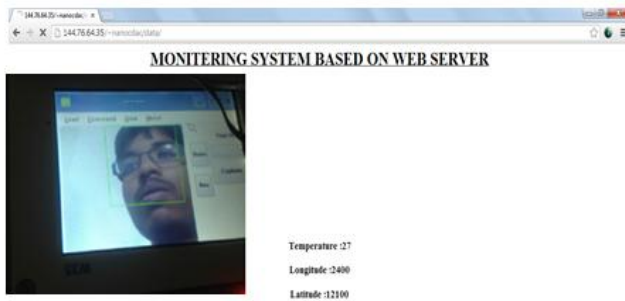
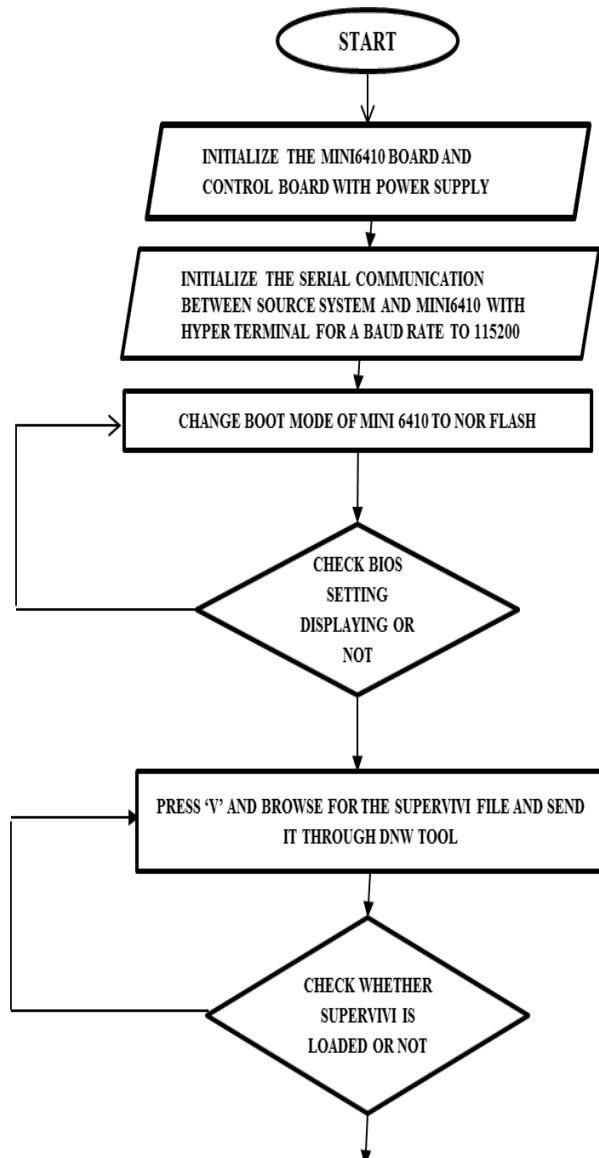
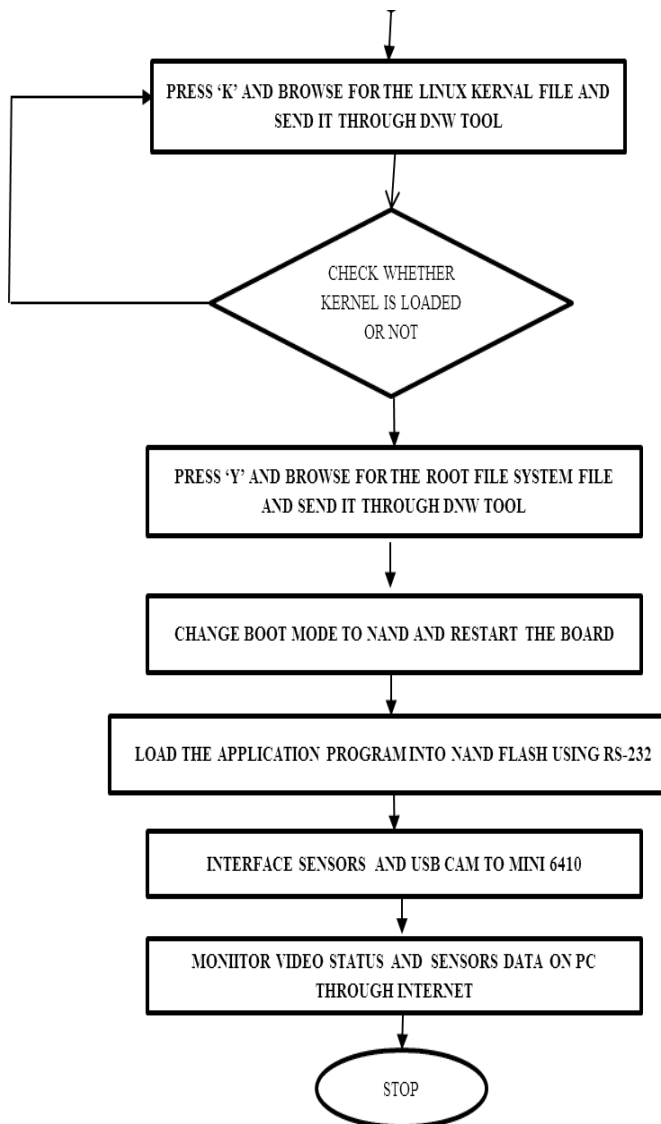


Fig 3: Result obtained on Desired URL

### VII. FLOWCHART







**Fig 4: Flow chart showing entire process for obtaining output**

### VIII. CONCLUSION

“Location Based Industrial Monitoring And System Using 3g Wireless Technology” has been successfully designed and tested. It has been developed by integrating features of all the hardware components and software used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced ARM11 board and with the help of growing technology the project has been successfully implemented.

In this project while developing the low cost embedded surveillance system which is designed for both the industry as well as for home we given the priority for face detection and recognition principle which has automatic door opening and closing features as DC motor drives the door. The

ultrasonic sensor plays the main role and for connecting this sensor to the board we find that for finding out the obstacle, for level detection etc. ultrasonic sensor has better efficiency than any other sensor such as PIR sensor as the heating problem is minimised in this case compared with Humidity, gas, Pressure sensor hence we obtain good result. The ultrasonic sensor Can able to work for many hours as ultrasonic waves which transmit from transmitter and as it collides on any of the object, as in the research it is found that there is no any hazard to the human being from these waves so that we will obtain safety from this transducer come sensor.

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## **BIOGRAPHIES**

**Sanket A. Nirmal** is M.Tech (Embedded system and VLSI Design) student at Lords Institute of Engineering and Technology, JNTU, Hyderabad. He Completed his B.E from YCCE, RTMNU Nagpur. His Research interest includes Embedded and Communication system.

**Mr. Abdul Wasay Mudasser** is Assistant Professor at ECE Department, Lords Institute of Engineering and Technology, JNTU, Hyderabad. He completed his M.Tech from JNTU, Hyderabad

**Mr. S.V. Altaf** is Associate Professor at ECE Department, Lords Institute of Engineering and Technology, JNTU, Hyderabad. He works for many years on embedded system and guided many M.tech students in their projects.