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GSM Based Autonomous Lamps Illumination System for Efficient Power Management and Security Using ARM

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ABSTRACT:

The project deals with the design and development of hardware and software for industrial and home security system. A electronic device that acquisition the data over time or in relation to location either with a built in instrument or sensor or by using external instruments and sensors. One of the primary advantages of using this system is the ability to automatically and continuously monitor data on a 24-hour basis. The user can acquires these values continuously. Whenever the conditions are abnormally exceeded i.e., for example if fire occur then a SMS send via GSM given number. It can do this easily and conveniently using a GSM modem. A modem provides the communication interface. It transports device protocols transparently over the network through a serial interface. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. When the light intensity decreases then the light is automatically switch ON and this project can provide security for homes and industries.

Index-Terms:

ARM7 controller, IR sensor, LDR sensor, GSM module, fire sensor.

I. INTRODUCTION:

From last few years security is an essential requirement of households to keep safe from intruders to get rob and save power. So the researchers and companies tries to implement an algorithms and make some gradates that keep safe from intruders. This leads to advance technology that make your home intelligent or modern this called as home automation system also.

With this technology house owner can control other appliances as well like lighting system, electrical appliances and many more. Now a day's wireless technology is used to control home appliances instead of wired topological connection. GSM (Global System for Mobile Communication) technology makes used to communicate input signal from appliances to output message on device. That means after detection of any intrusion GSM Modem sends the appropriate message to owner's phone. The signals or data which is comes from sensors or other equipment digitize it by GSM module and send it to receiver. Security system offers many benefits. After so many researches I gave a mainly focused on GSM based security. It is very easy to install and having a very less cost. Basically it installed over the entry door and that door consist with magnet which is connected to relay, as relay detached from magnet, signals will generate via relay and sends it to 8051microcontroller and action takes place according to piece of code written in the chip and GSM module sends the message to owner's phone.

II. PROJECT IMPLEMENTATION:

2.1 BLOCK DIAGRAM:

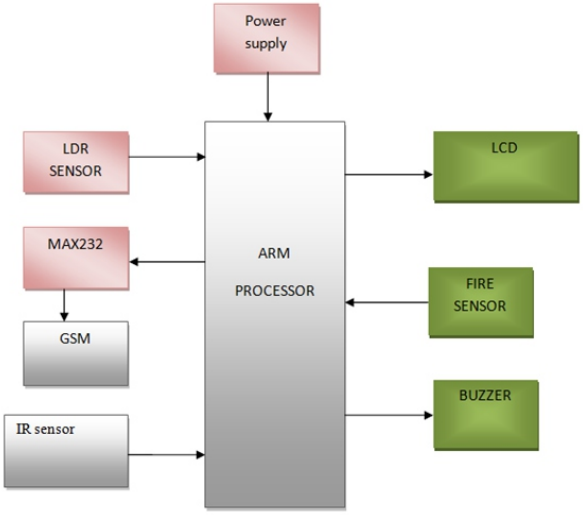

Figure-1: Block diagram

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2.2 ARM7 PROCESSOR:

ARM is a 32-bit RISC processor architecture developed by the ARM Corporation. ARM processors possess a unique combination of features that makes ARM the most popular embedded architecture today. First, ARM cores are very simple compared to most other general-purpose processors, which means that they can be manufactured using a comparatively small number of transistors, leaving plenty of space on the chip for application specific macro cells.

A typical ARM chip can contain several peripheral controllers, a digital signal processor, and some amount of on-chip memory, along with an ARM core. Second, both ARM ISA and pipeline design are aimed at minimizing energy consumption — a critical requirement in mobile embedded systems. Third, the ARM architecture is highly modular: the only mandatory component of an ARM processor is the integer pipeline.

III. HARDWARE COMPONENTS:

3.1 FIRE SENSOR:

This fire sensor circuit exploits the fire sensing property of an ordinary signal diode IN 34 to detect heat from fire. At the moment it senses heat, a loud alarm simulating that of Fire brigade will be produced. The circuit is too sensitive and can detect a rise in fire of 10 degree or more in its vicinity. Ordinary signal diodes like IN 34 exhibits this property and the internal resistance of these devices will decrease when fire rises.

3.2 LDR SENSOR:

A Light Dependent Resistor (LDR) or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells. They are made up of semiconductor materials having high resistance. There are many different symbols used to indicate a LDR, one of the most commonly used symbol is shown in the figure below.

A light dependent resistor works on the principle of photo conductivity. Photo conductivity is an optical phenomenon in which the materials conductivity (Hence resistivity) reduces when light is absorbed by the material.

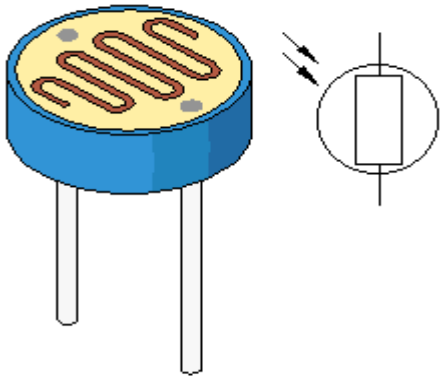

Figure-2: LDR sensor

3.3 IR SENSOR:

IR wireless is the use of wireless technology in devices or systems that convey data through infrared (IR) radiation. Infrared is electromagnetic energy at a wavelength or wavelengths somewhat longer than those of red light. The shortest-wavelength IR borders visible red in the spectrum. The longest-wavelength IR borders radio waves. Infra-Red is interesting, because it is easily generated and doesn't suffer electromagnetic interference, so it is nicely used to communication and control, but it is not perfect, some other light emissions could contains infra-red as well, and that can interfere in this communication. The sun is an example, since it emits a wide spectrum or radiation. The adventure of using lots of infra-red in TV/VCR remote controls and other applications, brought infra-red diodes (emitter and receivers) at very low cost at the market.

3.4 GSM (GLOBAL SYSTEM FOR MOBILE COMMUNICATION):

GSM (GLOPAL SYSTEM FOR MOBILE COMMUNICATION) is the most popular standard for mobile telephony systems in the world. The GSM Association, its promoting industry trade organization of mobile phone carriers and manufacturers, estimates that 80% of the global mobile market uses the standard. GSM is used by over 1.5 billion people across more than 212 countries and territories. This ubiquity means that subscribers can use their phones throughout the world, enabled by international roaming arrangements between mobile network operators. GSM differs from its predecessor technologies in that both signaling and speech channels are digital, and thus GSM is considered a second generation (2G) mobile phone system.

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This also facilitates the wide-spread implementation of data communication applications into the system.

IV. RESULTS:

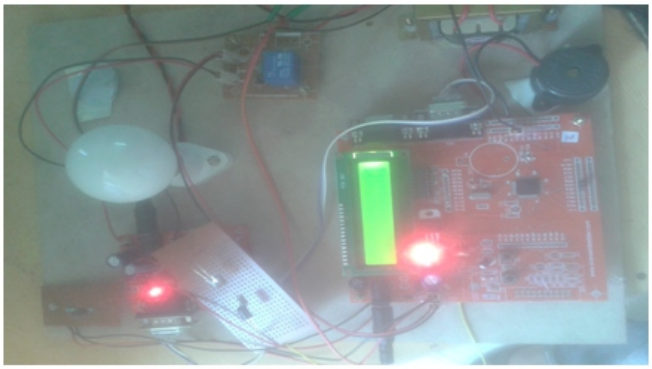

Figure-3: Hardware output of project

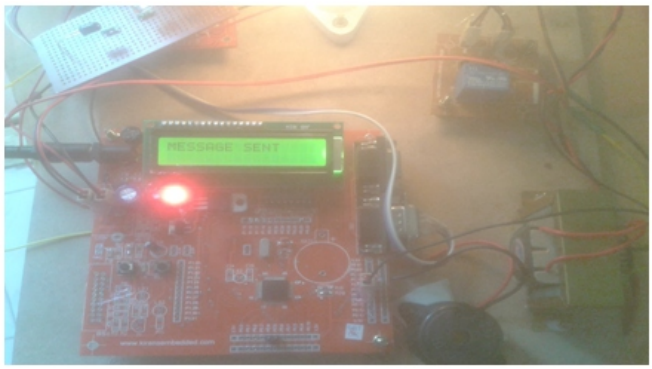

Figure-4: Output of the project

V. FUTURE SCOPE:

» As the storage space is also less in future we can also record these live streaming data by connecting external memory storage.
» We can complete our project using wireless technology.
» In future we can provide more security to data by using encryption, decryption techniques.

VI. CONCLUSION:

The project "GSM BASED AUTONOMOUS LAMPS ILLUMINATION SYSTEM FOR EFFICIENT POWER MANAGEMENT AND SECURITY USING ARM" has been successfully designed and tested. It has been developed by integrating features of all the hardware components and software used and tested.

Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using advanced ARM Processor board and with the help of growing technology the project has been successfully implemented.

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