

Dynamic safety and security mechanism for intelligent home environments

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ABSTRACT:

Dynamic safety and security mechanism is to connect real-world objects sensors and communication devices in resulting home automation, remote monitor, safety and security. This concept can be appropriately integrated into home, office or any other closed environment and it achieves smarter and more secure. The components namely zigbee module, finger print sensor, GSM module, arduino uno, gas sensor are used to implement this dynamic safety and security environment. The proposed system achieves better performance compared to other existing approaches and it is reliable. It can be adapted with any kind of soft, hard real time systems environment also.

Keywords: Arduino uno, zig bee pair, GSM, Relay, DC fan, Finger Print sensor, Gas sensor, Servo Motor.

INTRODUCTION

In the real world environment automation and smart exists in various places including home, industries, shopping malls. Various communication devices are involved to implement this automation and also it has to monitor remotely. Home Automation allows the doors to open automatically by detecting and recognizing the real world object, by switching on or off the security cameras, automatic adjustment of lights by switching on at the time of night and turning it off in the day time, remotely monitoring any devices including television, washing machine. The usage of power can be

minimized when it is automatically controlled without human intervention. Since human beings may forget to switch on or off the devices. If it is a soft real time operating system it may cause some minor issues. The scalability of this system may be adopted with large scale environments including chemical industries or air traffic control systems also. In these environment some hard real time operating system are involved and it may cause some huge destroy. Some machine leaning techniques or deep learning techniques or some artificial techniques can be adopted to achieve more accurate and better results.

Even some optimization techniques can be used to minimize the usage of energy and to maximize the throughput.

EXISTING AND PROPOSED SYSTEM:

EXISTING MODEL

Many existing systems were implemented and for security purpose device like camera only used to monitor remotely monitoring and gas leakage status can be manually monitored so that on time attention fails always. Manual operation may cause some severe effects.

PROPOSED MODEL

In the proposed model sensor replaces the camera which is automatically detect and perform some necessary action on time. In order to carry out dynamic security features finger print sensors and zig bee modules are used.

Advantages:

- All the operation do automatically.
- Reliable.
- More efficient

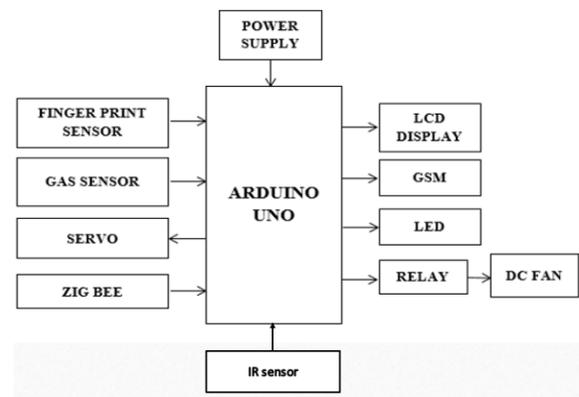
WORKING PROCEDURE:

In this system, Arduino Uno (ATmega328P) microcontroller is used to acts as a brain of the system, because the entire system program instruction stored within it. Here finger print and gas sensor checks are used to check the security status and gas leakage of home respectively. As the dynamic security feature, in case of any unknown person at the door the person is not recognized by the system and this problem can be solved by using ZIG BEE module which is controlled by the operator to control the door automatically using servo motor and the operator want to unlock even

if he or she is outside that can be done. Detection of gas triggers the power shut down and start evacuation using DC FAN. Multiple access of unmatched finger print triggers the GSM to give security alert by send message to the owner. All the data are displayed on the LCD display.

BLOCK DIAGRAM:

TRANSMITTER:



RECEIVER:



HARDWARE REQUIREMENTS:

- Arduino uno
- LCD display
- Zig bee pair
- GSM
- Led
- Relay
- IR sensor
- DC fan
- Finger print sensor

- Gas sensor and servo

HARDWARE DESCRIPTION:

MICROCONTROLLER:

Here ATMEGE328P is used to act as a main controller. It is also called as Arduino uno, ATMEGA328P is a controller Arduino uno is a development board. The recent version of boards are Arduino nano, MEGA, mini and lilly pad.

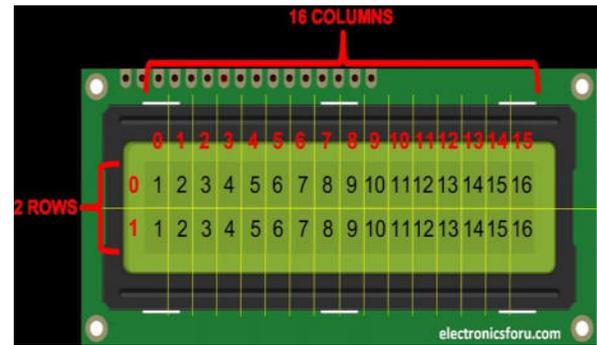
APPLICATIONS:

- Arduboy, a handheld game console based on Arduino.
- Arduino, a MIDI controller device that mimics the Monomer.
- Ardupilot, drone software and hardware.
- C-STEM Studio, a platform for hands-on integrated learning of computing, science, technology, engineering, and mathematics (C-STEM) with robotics.
- Data loggers for scientific research.
- Obtain, a trip computer that uses the on-board diagnostics interface found in most modern cars.
- Opens an open-source electric vehicle charger.
- XOD, a visual programming language for Arduino.

LIQUID CRYSTAL DISPLAY:

Plasma display a wide range of electronic carrots acquired. A basic module 16x2 LCD is too much and is commonly used in connection with various devices and circuits. These modules are the preferred seven-segment LED, crossovers, and others. A cause is a being, which are LCDs economic, Programmable an easy thing; no special characters and limited display and

personalized (unlike the seven segments), animation, etc.



BLOCK DIAGRAM:

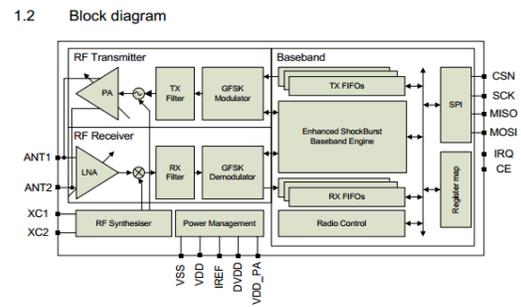
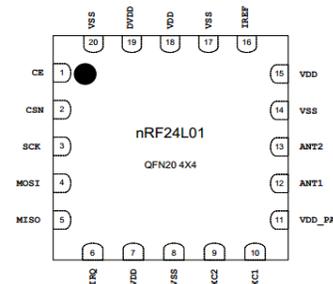


Figure 1. nRF24L01 block diagram



GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

DEFINITION:

A global system mobile communications (GSM) is a globally accepted standard of digital cellular communication. GSM is the common name of the European standardization group established in 1982 to create a pan-European standard for mobile is designed to make specifications for mobile

cellular radio operating system at 900 MHz. Many countries outside Europe. It is estimated that to join the fellowship, to the GSM.

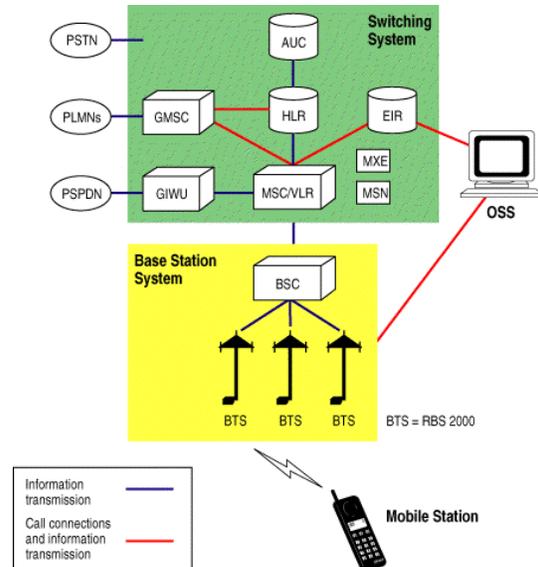
GSM

In cellular telecommunications to the unity of the essence, different systems have been developed without the benefit of the measures and specifications. This will cause many problems directly related to the agreement, especially with the radio of digital technology development. The intention is that the standard of these difficulties the GSM address. From 1985 to 1982, discussions were held in the building up of choose, from among the analog or digital system. The field, and a number of tests, the reason for the digital GSM for its erection. The next task is to choose between, or is too strait for the broadband solution. In May 1987, more access solution for Time Division Narrowband (TDMA) chose it. AMPS highest grade given in the table.

THE GSM NETWORK:

GSM provides recommendations no problem. GSM specifications used to define functions and interface, but does not affect the matter in detail. How little reason to restrict the purchase of various instruments pregnant workers mainstream acceptance. It is divided into three main GSM network is no reason to change the system (SS), base station system (BSS) and the operating system support (OSS). The basic elements are shown below GSM network.

GSM NETWORK ELEMENTS:



RS232 INTERFACE FINGERPRINT READER WITH BOARD



FEATURES

- Input voltage: 5v
- Interface: RS232.
- Matching Mode: 1:1 and 1:N.
- Baud rate: 9600 – 115200.
- Storage Capacity: 256.

APPLICATIONS

- Attendance system.
- Safety deposit box system.
- Car door locking system.

Gas Sensor:



Construction

The two sensors that are in contact with the electrolyte. The electrodes are generally manufactured from inanimate metal is rarely large area of the hydrophobic membrane. Working electrode is in contact with the electrolyte and ambient air, and to pull it usually rarely through the membrane. The most commonly used electrolyte is a mineral acid. The housing and the electrodes are usually in a plastic housing contains a gas, and the gas inlet, and electrical contacts.

Theory of operation

The Electrode porous membrane diffuses the sound back porch where it is oxidized or reduced. This is an electrochemical reaction results in electric current through the external circuit. In addition to measuring, enhancing the signal processing and other functions maintains the voltage between the electrodes to the external circuit through the sensor electrodes to work with and against each sensor electrodes for two or three electrodes and at work, the cell electrode. Electrode on an equal and opposite reaction takes place if it is necessary to reduce the

oxidized Electrode.

SPECIFICATION:

Power supply Voltage	: 5 volts
Output voltage Range	: 0-0.9 Volts.
Gain in %	: 3 %



IR SENSOR:

IR sensor is used to detect the objects. Here the IR sensor is used to detects the any objects are present at the in front of the door, if the any object is detect automatically send a signal to the controller. The controller get reaction on that. Like open the door using the servo motor.

SERVO MOTOR:

Not a special type of engine, act is a word often used to denote a motor control system for use in a closed loop. Engine situation with certain kind's encoder to provide feedback speed. In the simplest case, the only child is beyond measure. The site by a local output control of the external input to the decision.

He asked for the error of the output if the place is a sign of the thing generated is the mover of the other rotor and insofar as it was necessary for both sides, as in its proper place of the output of the arrow. The

approach is no sign of the error of the motor to the place in which to stop.

A rotary motion of a line or a movement of an act is an act permitted by the act of which the angular precise or, instead of a line, the angular speed and the acceleration of the. It is well suited to see if the sound is coupled to a motor. It also requires a relatively sophisticated controller, a module specifically dedicated server are often designed for use with motors.

A servomotor is shut up a servant, that he makes use of his own motion control to a loop in place of it, and the feedback from the situation of the very last ones. In place of the sign of the order of the person or in an analogous manner the digital output of the threshold of the chosen people's control.

FEATURES:

- Supply voltage: 5VDC
- Control signal: Analog or Digital
- High-precision positioning.

APPLICATIONS:

- Conveyors
- Solar Tracking System
- Antenna Positioning
- Camera Auto Focus
- It is used to measure the speed of the output shaft.

SOFTWARE REQUIREMENTS:

- Embedded c
- Arduino ide

EMBEDDED SYSTEM TOOLS AND PERIPHERALS:

Compilers and Assemblers:

Compiler:

The compiler is used to convert a source code of a high level programming language for low-level programming language.

Converts code written in high level programming language or machine code TRDOS. The main reason is to develop an executable file conversion program.

Let's see the operations performed by compiler are:

- Code generation
- Code optimization
- Parsing
- Syntax direct translation
- Preprocessing

Cross-Compiler:

If the program is compiled to run on the operating system of the computer hardware and computer system configuration different from those mentioned in the bill in order compiler, cross-compiler this is called compiler.

Decompile:

A tool used to translate from one language to program high level to low-level language called Decompiler. It is used for the conversion machine assembly code or in high-level programming language.

Assembler:

Integrated assembler is a tool used to translate written in assembly computer instruction in the language bit data processing model, which is used to perform the basic things. TRDOS to the instructions he makes the sign language versions represent a set signal to each operation Wind machine.

MICROCONTROLLER STARTER KIT:

According to project to develop a system embedded in a complete microcontroller starter kit is required. The major advantage of this kit in a simulator, which will work in the real operating time. Therefore, it allows for a functional check / easy out.

Considering the microcontroller starter kit consisting of: -

- Maps equipment printed circuit board
- Integrated Programming (ISP) Some
- Integrated system tools such as compiler, assembler, linker, etc.
- Sometimes, an integrated development mainstream (IDE) is required. The part of the microcontroller starter kit available is the cheapest option available to develop a simple and inadequate microcontroller projects.

PERIPHERAL DEVICES IN EMBEDDED SYSTEMS:

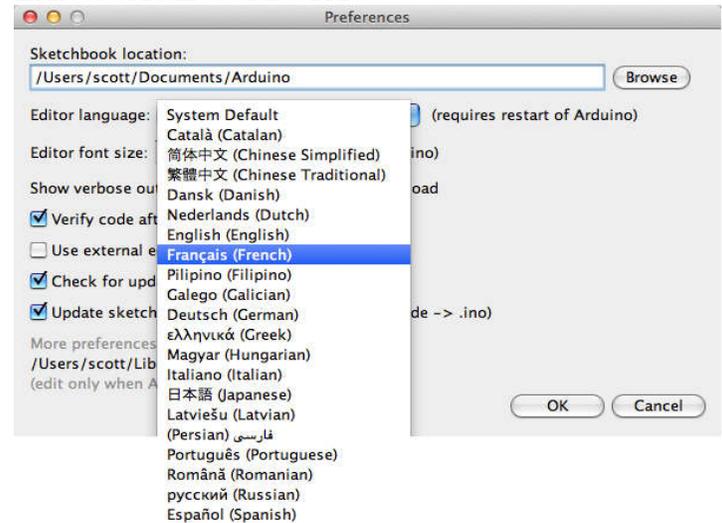
Embedded into the system without any communication takes place through various tricks and Microcontroller qualification. Come and look different devices embedded system: -

- Universal Serial Bus (USB)
- Ethernet Networks such as local area network (LAN), etc.
- Multimedia cards (SD cards, flash memory, etc.)
- Serial communication interface (SCI), RS-485, RS-232 reason, RS-422, etc.
- Be sure to include synchronous communication interface, SPI, and FC, essi
- Digital to Analog / Digital to Analog (DAC / ADC)
- FEMA / general to the output (GPIO)
- Debugging in the system programming (ISP), the series circuit programming (ICSP) for the BDM port, etc.

PREFERENCES:

Some preferences can be set in the preferences dialog box (in the Arduino menu on the Mac or Linux and Windows File). The rest of your preferences file, which place has been done for preferences dialog.

LANGUAGE SUPPORT:



With version 1.0.1, the software Arduino (FDI) have been translated into different languages through 30. By default, the IDE loads in your language graduated operating system. (Note: If Windows and Linux, this is determined by the local government as the currency formats, and the day is not the language of the operating system is displayed.)

If you want to change the language manually, starting in Arduino software (FDI) and open the Preferences window. According to the language editor, the drop is currently received from the language menu. Select your preferred language from the menu and use the software from a restart message. If the language is not valid operating system, the software Arduino (FDI) English and faded.

You can restore the default settings of the software by choosing the language of the operating system by selecting the default system language from the dropdown list editor. This setting will take effect when you restart the Arduino software (FDI). And after a change in the operating system settings that you must restart the Arduino

software (IDE) to upgrade to the new default language.

CONCLUSION:

Home Automation through Motion Sensors conclusively is a technology that can adopted by homes, organizations, institutions and even the government agencies. Some of its unique advantages includes;

Safety:In this system we can control the small appliances like bulb, fan and AC by nearby the home around the few meters like 10 to 30 meters long. If we want off or on the appliances using the wireless module, here we are using zig bee module.

Security:The ability to open the door steps of this system is one of the biggest advantages. I know that both of them will give you peace of mind if you are carrying a lot of luggage, you can save yourself the stress from the outside of the door opening. Moreover, the fact as it can become an influx of charity, when a man goeth into the house of thy hand, and will not allow me to monitor who enters into your house, to the possession of all of the times, especially when there is no sin.

Saves time: When you live in an environment very rapidly, there is no worry to our home. On the way home automation motion sensors that can save time by returning home and make sure everything is in order, as the school gate was closed in the dark and the children turn on the lights when you come home (systems).

Save Money:This is the reason the highest office in the home. And the ability to control light, either by reducing or turning on / off time for the property owner will save a lot of money. Even if the gas and do not come back home if you forgot to turn off devices inside and shut the door.

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