

IoT Based Home Automation using Computer Vision



Devendra Kumar, Rajesh Kumar Maurya, Kalpana Dwivedi

Abstract: In this paper we will demonstrate a flexible and dependable home security system with supplementary security using an Arduino microphone, with the ability to connect via Internet Protocol (IP) through local Wi-Fi for remote access and control by an approved user using the app smartphone.

IoT describes the impression of linking and analyzing real-world events using the Internet. The concept can be implemented in our home to create a smart, safe and automated environment.

The proposed service, based on IoT, is intended to create intelligent environments using computer vision and NFC computers, which send an online message to the owner in situation of any damage, if necessary raises alarm. Do not assume the power acquired as a result of this system and such an existing system is that warnings from a Wi-Fi-connected system can be accessed from any phone regardless of its eyes, regardless of whether connect phone and internet. The purpose of this model is to ensure a smart and secure environment using latest technology for our home.

Key Words: Home automation, Wi-Fi network, Computer Vision, Internet of Things.

I. INTRODUCTION

Homes of the present century need more autonomous and automated systems to ensure safety and comfort. This system is a way that allows users to control different types of electrical devices. The trend is also in favor of the use of national automation technology. The use of national automation systems draws our attention if we look around housing, shopping malls, and offices. The automation of the home network is in the sense that the devices are controllable from smartphones and other remote controlled devices.

Smart Home settings can help reduce costs and protect your privacy. The IoT is based on the inclusion of devices in the world of connected environments. Devices are built-in and connected based on a unique identification.

Smart home / office environment communicates in a consistent and secure way; Improve and monitor access anywhere in the world. This smart automation device is designed to be an interface with the IoT. The status of the system is displayed along with the LCD screen as well as the system data. This is a simple IoT-based automation system to control all your home appliances.

The application allows you to touch and control remotely. Look through your smartphone's camera and control the whole thing you touch on the screen. Now you can connect with your devices remotely and interactively.

You look at a device through your smartphone control like- home appliances (Fan, Light and TV etc.), open the door; or just turn on the light by touching it on the screen.

II. LITERATURE SURVEY

About Home Automation

This system gives you access to home control from mobile phones everywhere in the world. The term can be used for a diversity of programmable devices, such as regulators and irrigator systems, but home-based computerization better describes homes that have almost everything, electrical appliances, lights, cooling/heater systems to achieve networks.

In terms of home security, it has your alarm system and all cigarette sensors, surveillance cameras, locks and other sensors attached to it.

Figure 1 shows a smart-home with its several automatic useful units. Home automation is a model of monitoring and automating daily tasks as well as requirements. This approach includes the centralization of control logic for many household appliances and electro-mechanics, including a fan, lighting, and sophisticated appliances such as cooling / heating, windows and doors [18].



Figure 1 Functional units of smart home [19]

B. Home Automation Development

To a large extent, automated system management was found exclusively in large commercial and expensive homes, which usually consisted of lighting, heating and are still very distant, home networks are now able to increase the number of devices cooling systems. The automation of the building provided more than just management,

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control and timing and was only available to specific management positions within the building. The Internet of Things is a step towards home automation, providing each device with an IP address at which it can be accessed and controlled remotely.

"Smart" devices are the first and most users of this access and the devices that can connect to the LAN through WLAN or Wi-Fi. However, electrical systems and even personal items, such as light switches and electrical devices, were integrated into network automation and businesses were also likely to track IP based products. Although the days when a lost book could be tracked using a mobile browser

III. RELATED WORK

There are many studies in the field of smart home IoT. In recent years, wireless systems have become increasingly common in home networks. The use of wireless technology in domestic automated systems and buildings also offers many advantages that cannot be achieved by using a single wired network. Home Automation system uses Intel Galileo, which uses wireless communications and cloud integration to provide users with smart control of various devices in their home, as well as cloud data. Stores in the System automatically change based on sensory data. The system is designed to be costly and wide, enabling various devices to be operated.

i. Automated home networking with multi-cellular mobile phones, cloud systems and wireless communications integration. [1] This paper was written by Sirsayo N., Ole Folley P. SC, Leading NP, provides Nike SC automation systems at Ratnaparty NS's home that uses intelligence, wireless communication and mobile integration to provide users. With smart / remote control of several lights and appliances inside their home. The system uses a combination of mobile applications, wireless remote control and computer-targeted applications to provide user interface

for the user.

ii. Implement smart home management and control system. The main purpose of this paper [2] is to develop and implement a system of monitoring and management by Basil Hammed's. The Smart House Systems contains several systems managed by LabVIEW software as the main operating system. In addition, the intelligent housing system was retained as a subsystem by a remote control system. The system is connected to the Internet with LabVIEW to monitor and manage household appliances anywhere in the world.

iii. Help the disabled / elderly people [3]. The main purpose of this article by Deepali Javeli, Muhammad. Mohsin, Srirang Nandanwar is intended to assist / guide / assist disabled / elderly. Provides the basic idea of managing a number of appliances and providing security with smartphones. The user can connect the smartphone and send a control signal to Arduino, which will control the built-in devices / sensors.

iv. [4] In this article on home automation using a combination of the student's Internet of Things, Intel introduces a Home Automation System using Galileo that allows users to choose different lights, fans and accessories. Provides with. To store data inside their home and in the network/cloud. The system automatically changes based on sensory data. The system is designed to be costly and wide, enabling various devices to be operated.

IV. PROPOSED MODEL

There are already many different models on the market, in this research paper we are offering a user-friendly model. This method allows users to use their smartphone to scan and after processing the image, applications will now request that the image be viewed on the Visual Cloud API or LCD and authentication, the user will now control the devices connected to the Arduino processor.

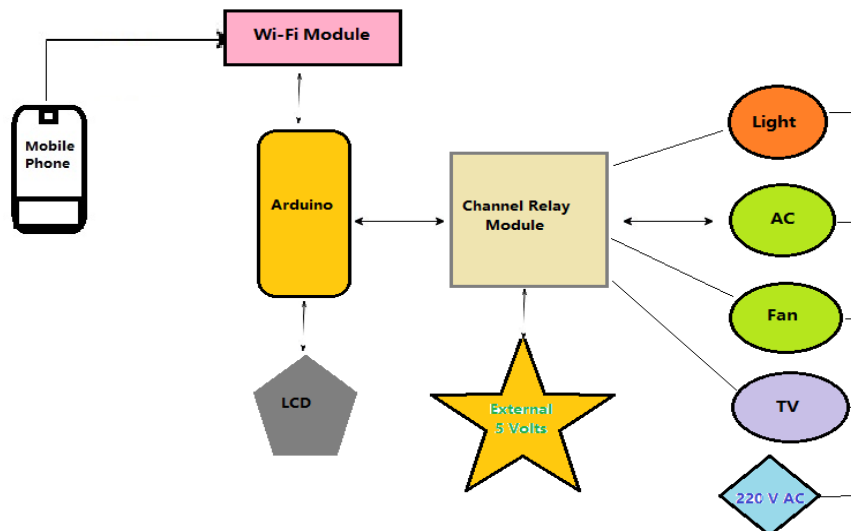


Figure 2: Proposed model diagram

Figure 2 shows an overview of the operation of the automated home system. Three different devices, such as a fan, light, and TV, feature a Wi-Fi remote control and run by apps installed on Android or a smartphone. These devices are linked to an Arduino with help of input/output pin. These devices are joint to the local area network using a

communication mode called Channel Relay module.

V. WORKING OF PURPOSED SYSTEM

Wi-fi Module is a wi-fi chip that offers TCP and IP. There are many different modules available in the market. In this paper we use the first model.

Arduino is a development board and it is perfect for this model because it provides a lot of pins for interface relay settings, L, LCD and Wi-Fi.

The channel relay unit is used to enable or disable low-voltage high-voltage equipment as indicated by the Arduino digital pin. In this model we have used four-channel exchange tournaments. L. It is easy to connect to Arduino instead of connecting each exchange individually. It can deliver up to 250VAC and up to 10 ampere current.

The LCD monitor is used to display up to 16 characters in two characters. Arduino makes it easy to connect to the library available. In this model, the LCD monitor is used to show the location of the device whether it is on or off.

VI. PROPOSED SYSTEM BLOCK DIAGRAM

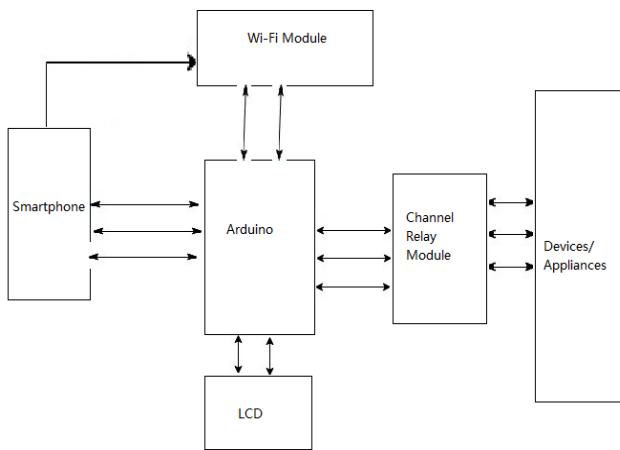


Figure 3 Proposed System block diagram

Our planned system is Arduino-based home automation connected to Arduino connected to Wi-Fi and controlled by smartphone, channel relay and LCD control. Wi-Fi smartphone connected to Arduino. This system deals with home security technology and smart home which is cost effective. The proposed system is shown in figure 3

VII. IMPLEMENTATION OF PROPOSED SYSTEM:

- i. The Wi-Fi option in your smartphone is able to establish a linking between the client and the server, the Wi-Fi chip that provides TCP and IP
- ii. Smart phone linked to the Wi-Fi module of the system.
- iii. Each device/electronic/electrical appliance in the system is associated to the digital pins on the Arduino.
- iv. An exchange rate is used to connect each device to an Arduino that helps convert high voltage to low voltage. The channel relay module is used to switch on or off high voltage equipment with low DC voltage
- v. Relays are used to connect each device to an Arduino, which helps convert a high voltage source to a low voltage source. The channel relay module is used to turn on or off high voltage devices with low DC voltage.

- vi. A program loads on Arduino with a microchip chip that specifies what action to take when receiving specific inputs.
- vii. Android applications have been developed that allow users to monitor and control devices from any remote location.
- viii. LCD is used to indicate the location of all equipment images, accessories, displayed on the LCD for supervisory purposes, whether it is on or off.
- ix. Successful Monitoring and controlling of appliances.

VIII. CONCLUSIONS

This paper highlights the various aspects of security, management, and maintenance found in the IoT-based home network automation. To make it easier for users to contact electrical appliances via their smartphones. As a widespread line on the web, a remote user will be able to scan the electric device with his or her camera and then process from the camera to select the fixed IP object which will then be sent to the Arduino connected to it. To do basic tasks such as turning it on and off. Because switches require fewer wires. It also consumes electricity inside the building when the load is in a closed state and provides 100 percent efficiency.

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Devendra Kumar has received the Ph.D. degree in CSE, M.Tech in CSE, MCA and B.Sc in PCM. He works as a Professor in the Department of Computer Applications at ABES Engineering College, Ghaziabad, INDIA. He has more than 15 years of Teaching and research Experience. He is member of Computer Society of India, International Association of Engineers,

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