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SMART HOME AUTOMATION BASED ON IOT USING ARDUINO NANO

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ABSTRACT—In the advancement of technologies controlling and monitoring electrical appliances using laptop, computer with the help of internet connection is possible. So it gives a more space at a home, university and industrial controlling electrical appliances anywhere in the world. By using Internet of Things we can control many devices such as light, power plug, Fan, computer, security system and etc. It reduces human efforts and power efficiency. The main objective of internet of things is used to help specially challenged people and old age people to control electrical appliances and security purpose. IoT is very useful for these people in crucial situations. There are two ways to access these process WIFI connectivity (or) it is connected to a router. This process is done in low cost & controlling many devices in a simple circuit.

I.INTRODUCTION

The Internet of Things (IoT) is the network of physical objects devices, vehicles, buildings and other items embedded with electronics software sensors, and network connectivity that enables these objects to collect and exchange data. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit; when IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such As smart environment grids, smarthomes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020IoT devices can be used to monitor and control the mechanical, electrical and electronic systems used in various types of buildings (e.g., public and private, industrial, institutions, or residential) in home automation.

II.ENABLING TECHNOLOGIES FOR IOT

1.RFID and near-field communication – In the 2000s, RFID was the dominant technology. Later, NFC became dominant (NFC). NFC has become common in smart phones during the early 2010s, with uses such as reading NFC tags or for access to public transportation. 2.Optical tags and quick response codes – This is used for low cost tagging. Phone cameras decode QR code using image-processing techniques. In reality QR advertisement campaigns gives less turnout as users need to have another application to read QR codes. 3.Bluetooth

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low energy – This is one of the latest tech. All newly releasing smart phones have BLE hardware in them. Tags based on BLE can signal their presence at a power budget that enables them to operate for up to one year on a lithium coin cell battery. 4.Low energy wireless IP networks – embedded radio in system-on-a-chip designs, lower power WiFi, sub-GHz radio in an ISM banda compressed version of IPv6 called 6LowPAN. 5.ZigBee – This communication technology is based on the IEEE 802.15.4 protocol to implement physical and MAC layer for low-rate wireless Private Area Networks. Some of its main characteristics like low power consumption, low data rate, low cost, and high message throughput make it an interesting IoT enabler technology. 6. Z-Wave – is a communication protocol that is mostly used in smart home applications. 7.LTE-Advanced – LTE-A is a high-speed communication specification for mobile networks. Compared to its original LTE, LTE-A has been improved to have extended coverage, higher throughput and lower latency. One important application of this technology is Vehicle-toVehicle (V2V) communications.

III. PROPOSED SYSTEM

Fig. 1 describes the various layers in IoT architecture of the designed system including the various technologies used in the prototype. The system consists of a computer server with a internet connection, a modem connecting the server to the external network, a Adriano microcontroller with a hardwired application connected to the devices. The prototype system supports two-level devices that only need to be switched on or off.

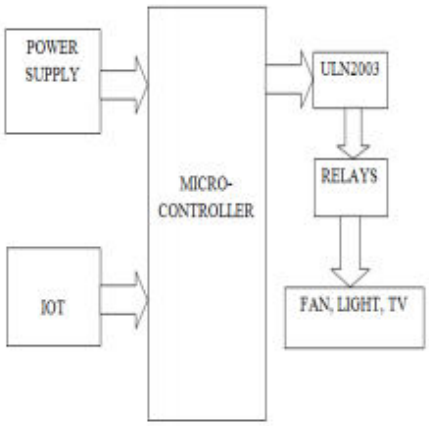

Figure 1.Block diagram of the Proposed System

The IoT-based architecture provides high-level flexibility at the communication and information. It is an approach which is relevant in many different environments such as patient monitoring system, security, traffic signal control or controlling various applications. The IoT project aims to bring out the various opportunities of using IPv6 and other related standards to overcome the disadvantages using of the Internet of Things. The IoT projects proves a dominant and thorough study of all sensible functionalities, mechanisms and various protocols that can be used for building IoT architectures however interconnections may occur between all totally different IoT applications. As in the networking field, where several solutions emerged at his infancy to leave place to a common model, the TCP/IP protocol suite, the emergence of a common reference model for the IoT domain and the identification of reference architectures can lead to a faster, more focused development and an exponential increase of IoT-related solutions. These

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solutions can provide a strategic advantage to mature economies, as new business models can leverage those technological solutions providing room for economic development.Some shields communicate with the Adriano board directly over various pins, but many shields are individually addressable via an I²C serial bus—so many shields can be stacked and used in parallel. Before 2015, Official Arduinos had used the Atmel megaAVR series of chips, specifically the ATmega8, ATmega168, ATmega328, ATmega1280, and ATmega2560. In 2015, units by other producers were added. Figure 2 shows the Microcontroller used in the proposed project.

Figure 2: Microcontroller used in the proposed

IV. INTERCONNECTED HARDWARE

The interconnected system consists of Arduino microcontroller connected with Ethernet shield which is also connected to a modem with internet connection and it is shown in figure 3.

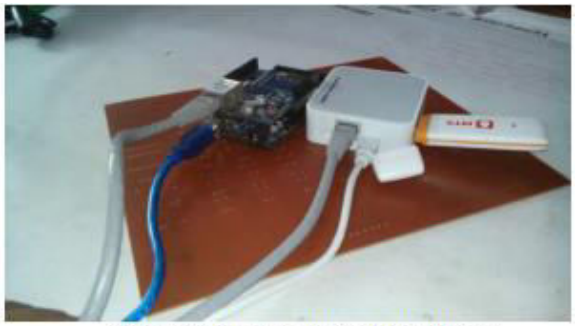

Figure 3 Interconnected Hardware

Figure 4 shows the relay connected with the devices output and at the other end it is connected with html page with the assigned IP address

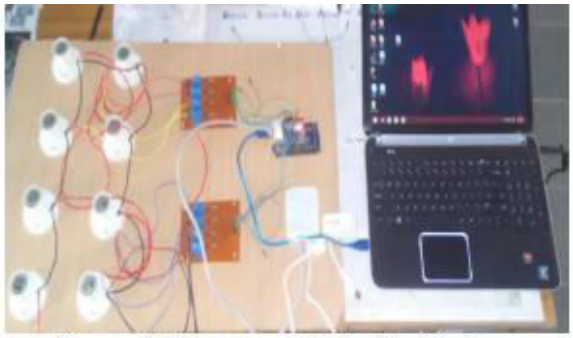

Figure 4 Relay connected with Devices

V.OUTPUT

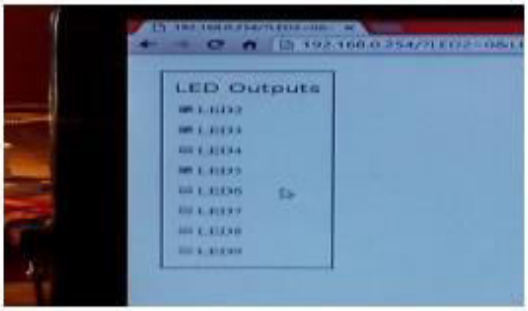

Figure 5 Output Checked in webpage Checkbox

Appropriate checkbox is selected from the 192.168.0.254/led# and Figure 5.4 shows the screenshots of led2, led3 and led5 checked in the webpage and the corresponding hardware device gets turn on/off according to the checked boxes as in the webpage. Figure 6 shows the associated output for the boxes checked in in Figure 5

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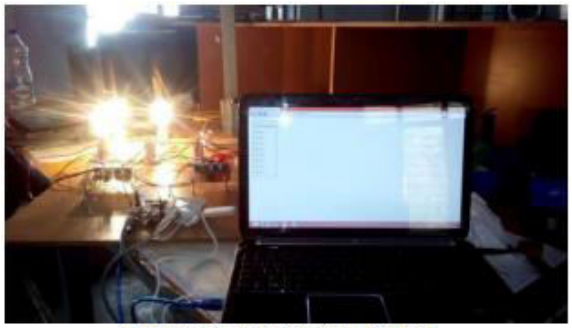

Figure 6: Associated Output

VI. CONCLUSION AND FUTURE WORKS

This paper described the various components and technologies used in a prototype system to monitor and control home appliances and devices remotely using a mobile phone. This project is intended to bring us a step closer toward a smart home where all appliances and devices are efficiently controlled and monitored remotely. It integrates a number of technologies to build the complete hardware and software system. There are a number of possible extensions to this work such as: support multimedia devices and services through MMS (Multimedia Message Service); extend wireless coverage within the home through a mix of Bluetooth and WiFi technologies. Many of the issues are being incorporated in the prototype system. Figure 4 Relay connected with Devices

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