



## AUTOMATION OF OFFICE USING IOT

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### Abstract

One of the most crucial aspects of a smart office is automation, which allows machines and appliances to be turned ON and OFF automatically without the involvement of a human. For controlling appliances, the majority of automation systems in use today combine hardware and wireless technology. In this project, we use the Arduino IDE to design and create an office automation system that can be controlled by Wi-Fi or a Web server. The programmed control of machines and other office equipment is the focus of this project. The user will speak with Nodemcu online via a Wi-Fi network. This system's lower cost makes it possible for more people to monitor and manage office equipment. It makes us feel safer. IOT, or the Internet of Things, is a new technology that enables internet-based hardware device control. Here, I suggested using IOT to automate a modern house or workplace by controlling devices and machines online.

Key phrases: IOT-based automation, automation in the home, and automation at work.

### 1. Introduction

In this project, we talk about the design and construction of office appliances and machines that can be activated and controlled using a web browser and Amica. A wiring-based programming language, similar to C++, was used in this project. Because of the popularity of the devices and the increased level of service that they give, the Internet of Things is connected through these networks. This system uses a few light loads to serve as an example of an office machine and appliance. A smart device control is a space that has lighting, heating, and electronic equipment that can be managed online or via a smartphone. Whether you are within or outside of your infrastructure, your office electronic equipment can be controlled using an internet-based smart device control system.

The use of technological devices is growing quickly in our modern world. Industries are also expanding quickly. Most people choose the largest sectors and IT firms only for employment. The use of electronics has rapidly increased as a result. Employees in all businesses typically desire to utilise technological devices around the clock. A good light, fan, and electricity for the system are essential when working under a cabinet. In order to use it, employees would go to the switch's location on the designated floor and flip it on or off. Every person wants to manually turn on and off every time, spending their time and energy in the process. The electrical devices that each employee has in their cabinets will now be turned on and off as part of this initiative.

In the twenty-first century, a quickening digital revolution is taking place. Internet of Things (IoT) is a relatively new idea that enables remote control of actual physical objects using the Internet. A physical item network that is connected with sensors, electronics, and software is part of the Internet of Things (IoT) architecture, and it enables these objects to collect and transmit data via an IoT network. Because they can perceive their surroundings and can be remotely controlled through the IoT network architecture by interfacing with the real environment, these things are also known as smart objects. IoT has a good effect on day-to-day activities since it offers fresh solutions for all facets of society. As a result, the Internet of Things (IoT) is a phenomenon that causes an interaction between a sensor, real-time network, and data.

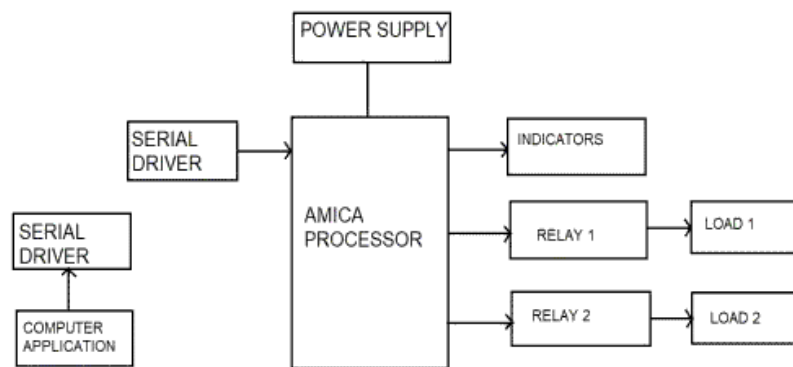


Figure 1: Block Diagram

The perception layer in an IoT application is made up of smart objects with sensors built in that gather and analyse real-time data from the physical and virtual worlds. These sensors assist in measuring physical resources and keeping track of environmental changes. The architecture of an IoT application is shown in Figure 1.

To store the sensor data that sensors send to gateways, memory is required in the gateway. These sensors can occasionally produce a significant volume of data, which requires a reliable and high-performance WSN to deliver the data to the target gateway on schedule. In order for an IoT application to be heterogeneous, multiple protocols and technologies are required. Moreover, a variety of IoT services or applications, such as speed.

IoT is becoming more and more popular across the globe as it supports the existence of intelligent things all around us in various contexts of the enhanced wireless communications network. The world can change thanks to IoT. There has been a plethora of knowledge, and this cutting-edge technology has made it easier than ever to obtain it. The rise of IoT is changing every aspect of our life. IoT frameworks are heavily utilised in numerous applications, as shown below. The smart traffic system, smart environment, smart healthcare, smart home, smart agricultural, smart office, and supply chains logistics IoT are some of the basic fields and applications of IoT.

The most recent and future technology on the market, smart office automation, is simpler to use and easier to control.

IoT has a lot of benefits, but there are still some problems that need to be fixed if it is to continue growing. IoT device adaptability is a complicated amalgamation of numerous technologies that offers solutions based on the fusion of numerous heterogeneous technologies. IoT applications sometimes rely significantly on a network of interconnected parts that are embedded in real-world items, including appliances or devices. These physical devices' operation and functionality play a crucial role in connectedness and communication. Making a reliable Internet of Things application is difficult due to the intricacy of these equipment and technologies.

IoT faces a number of technological challenges, including the need to design systems that can conserve energy in real-world settings. IoT needs strategies to reduce the amount of energy used for compute and connectivity. Additionally, energy harvesting techniques are needed to help IoT devices overcome the constraints imposed by battery life, energy scarcity, and resource limitations that must be addressed in IoT applications. Therefore, solutions that optimise energy utilisation in IoT devices must be developed. Early failure prediction can also boost safety, lengthen the life of the equipment, and lower production costs. It is important to analyse fault prediction since it can be used to assess how fault-prone an IoT device is.

IoT is a rapidly evolving trend in the IT era. Innovation-driven information and technical applications are expanding because to IoT breakthroughs in a number of domains, including



manufacturing, agriculture, and home or office automation. A larger data collecting module procedure is made possible for industrial IoT by the rising demand for digital terminals outfitted with a wide array of reliable sensors. Although one of the safest ways of problem prevention, failure prediction poses a significant security challenge for Internet of Things (IoT) devices. Smart automation improves client satisfaction by providing solutions that are error-free. In terms of measuring quality, early fault prediction is critical. Due to classifiers' built-in learning capabilities, ML-based techniques.

With cloud computing, data and applications are managed by central remote servers online. Users can access their files at any time on any device with Internet connectivity and execute software without installing them. It offers on-demand computing services, including processing power, storage, and apps. Platform as a Service (PaaS), Software as a Service (SaaS), and Infrastructure as a Service (IaaS) are just a few of the services provided by the cloud to the client. The number of technologies that are available in cloud environments increases as a result of the combination of cloud and IoT. IoT technology uses applications and information that can be saved on the cloud. Figure 3 illustrates how cloud and IoT technology are combined. Users can obtain all necessary information using the cloud.

## II. Literature

A body of material called a "literature survey" tries to assess the key elements of current knowledge, including both substantive results and theoretical and methodological contributions to a given area. Reviews of the literature are secondary sources and as such do not present any brand-new or unique experimental work. books is typically used before a research proposal and results section, and is most frequently connected with academically focused books like these. Its main objective is to update the reader on the state of the literature on the subject, and it also serves as the foundation for additional objectives like potential future research in the field. The characteristics of a well-structured literature review include a logical flow of ideas, current and pertinent references, consistent, acceptable style.

Li Zhihao The design and research behind the office automation system are the main topics of this essay. This article focuses on the objective trend of the development of office automation system design technology, starting from the requirements of office automation system and functional module design through the analysis and comparison methods of numerous references. The comparison method of office automation system and function modules design are the database used in the system implementation of office automation system and hope to provide an effective reference for off First and foremost, this article presents ideas for the three-dimensional aspects of the function module, authority design, and interface design of office automation systems.

Office automation system and function module requirements number eight. Second, the article may be analysed as the conceptual design of the database used in the office automation system based on the two features of logic and database design. The paper is finally examined as the office automation system realisation from the two elements of the documental code, with the hope that this research will provide a specific theoretical framework for the design of the office automation system.

Reshma Bhuyar.Ansari, Saniya Mukram In our life, automation is quite crucial. For simplified and easy living, a smart office automation system is built in this system since it makes the task easier and simpler. The foundation of this system is a subsystem like lighting or heating. There are also warning and security systems. Real-time data is extracted from the environment using sensors. The ARM 11 Controller is coupled to sensors. The data is processed, and the outcome is provided. When the system passes the threshold value, the fan, lamp, or buzzer attached to the controller will activate. Data from the sensor is continuously logged. For security purposes, fingerprint identification modules are utilised. The service room receives an emergency call and a fire alarm.



JunHua He The OA system, the workplace, and many other things can be integrated with the work in this paper thanks to workflow technology. For office business processes on the Internet or Intranet, it provides a digital office environment. as the supporting foundation for The OA system was designed and developed using the SQL Server 2003 database. System definition, flexible work flow management, office automation, and software design and development theory are all included in the study. The system design is a total fix for the initial office management's issues with low efficiency and high resource consumption. also lists the principal design codes.

Simran Jariwala, Miti Upadhyay, Mili M. Mehta, and Nishant Doshi Smart system implementations that are interactive, inventive, and automated are the outcome of contemporary IoT trends and breakthroughs. The study suggests a smart office automation system that uses the Internet of Things, connected sensor networks, and effective database systems to create a work environment that is friendly to employees. Employees don't need to physically mark each day that they are in the workplace at the entrance. Instead, it is completed using RTLS tags as soon as they enter the office, without touching anything or having to wait in queue like it is the norm in most offices. Using a variety of sensors and a linked network system, the AC units and other appliances are turned on automatically in response to the entry and occupancy of personnel.

Yao Ying This article suggests designing and implementing an office automation system based on Internet of Things technology to address the issue of office automation. This technique involves using smart phones to carry out mobile office tasks like business message exchange and real-time process approval business processing. To enable information interchange between the mobile system and the original system, the system utilises a b/s structure and a frontend machine form. The client can read the current user name as the sender by itself when users choose to send mail or reply to mail. The maximum number of submitted attachments is three, and the sum of all uploaded attachments is not to exceed 100 m.

Cheng He Smart mobile devices, the use of social network media, and information behaviour as a whole have resulted in these types of equipment, media and behaviour diversity, complex structure, a significant increase in the quantity of unstructured and semi-structured data, and the transformation of human data into a driving force for social development. In light of this, we investigate office automation systems based on data mining and web service frameworks. With the aid of machine learning algorithms and the web service architecture, we build and implement the system and arrive at a satisfying outcome that forms the basis of our future study.

Chen Xianghui The office automation system should enable: the sharing of diverse information resources throughout the company, improved staff communication, and increased overall job efficiency. The evolution of office automation system tools and technology, including ASP.net and SQL Server, is the initial topic of this paper's analysis. The study then analyses the state of office automation research and elaborates on system design, requirement analysis, and feasibility studies. The paper concludes by outlining the design and creation of an office automation management system based on ASP.net and SQL Server technology.

Wang Chen This paper introduces a collaborative office automation system and details the system's primary functional components in an effort to increase job productivity. It also discusses the collaborative office automation system's demand analysis and hierarchical system architecture design. The system operates in a consistent and reliable manner, which boosts team productivity and conserves resources.

## 2.1 Relay



Figure 2: Types of relay

I've received a lot of emails about this topic. For automation systems and load control, relays are crucial. Relays are also the greatest method for providing galvanic insulation between a circuit's high and low voltage sections. There are a huge variety of relay kinds. Let's start by learning how a relay functions.

### The Contacts

I will first describe what and how the fundamental relay functions before moving on to the various types of relays. Inside each relay are two mechanical components. The relay's contact(s) are the first. The contacts work in a manner similar to that of a straightforward switch or pushbutton. The contacts should be viewed as a pair of metals.

The switch-like function of the two terminals. When the contacts are "in contact," current travels from Terminal 1 to Terminal 2 when that is the case. The NO and the NC are the two different kinds of contacts. Normal Closed contact is denoted by NC, while Normal Open contact is denoted by NO. A contact similar to the one in the previous figure is known as the Normal Open. Because it is an OPEN circuit, no current passes through the contact when it is still. A Normal Closed contact, on the other hand, permits current to flow even while the contact is idle. I've shown both of these contacts below:

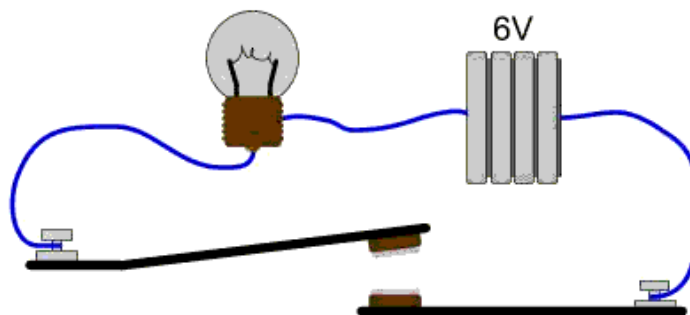


Figure 3: Relay in OFF state

As opposed to the NO contact, the NC contact appears to be upside-down. This action is deliberate. In this manner, if a force is given to the left metal travelling from UP to DOWN, both contacts (NO and NC) will change state. The animation that follows demonstrates how a NO contact works by turning on a lightbulb.

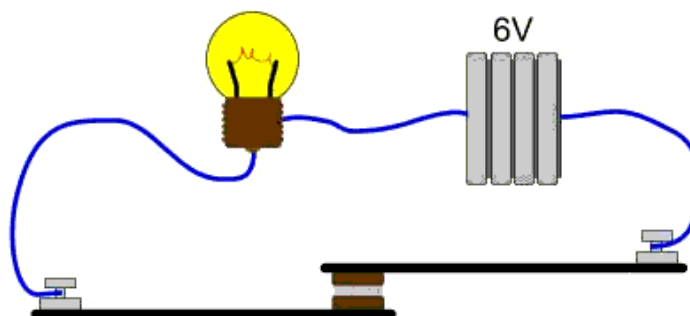


Figure 4: NC contact relay ON

### A Combination fo contacts

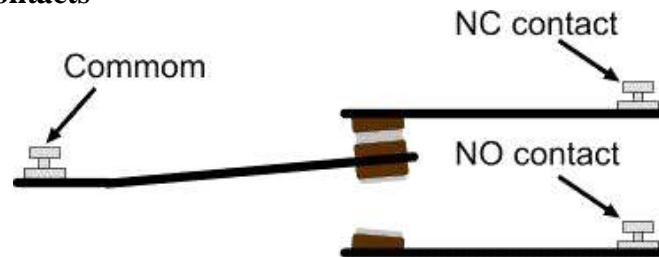


Figure 5: Both contacts in common

In this instance, a third terminal with the name "COMMON" exists. The COMMON terminal is the destination for the NO and NC contacts. There is never any touch between the NC and the NO contact! The behaviour of this pair is demonstrated in the animation below.

### 2.2. Arduino IDE

Open source software called Arduino IDE is mostly used for authoring and compiling code into Arduino Modules.

Because it is an official Arduino programme, code compilation is so simple that even the average individual with no prior technical expertise may get started learning.

It is conveniently accessible for operating systems like MAC, Windows, and Linux and operates on the Java Platform, which has built-in functions and commands that are essential for debugging, modifying, and compiling the code in the environment.

Several Arduino modules are available, including the Uno, Mega, Leonardo, Micro, and many others.

Although the Arduino IDE is relatively simple, it offers a nearly perfect environment for the majority of Arduino-based applications. Standard menu items such as "File" (new, load, save, etc.), "Edit" (font, copy, paste, etc.), "Sketch" (for compiling and programming), "Tools" (helpful choices for testing projects) and "Help" are available in the top menu bar. You can enter programme code in the straightforward text editor located in the centre of the IDE. The output window, which is located at the bottom of the IDE, is used to view information such as the compilation status, memory use, programme faults, and several other helpful notifications.

### III. Conclusion

We can't draw a conclusion about the project's benefits without testing it, but we can be sure that it will perform better based on the provided flow charts, diagrams, and pictures. As a result, we can say that the proposed smart office appliance and machinery control system has many advantages when compared to the existing systems. As a result, we can potentially save a huge amount of money. Additionally, this system stops the needless loss of electricity caused by manually switching on and off lights, fans, and other devices, which is made possible by the wireless ON/OFF system. Both urban and rural locations are eligible for the installation of this office automation control system.

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