**CHAPTER 1**

**INTRODUCTION**

The Internet of Things, or IOT, refers to the billions of physical devices around the world that are now connected to the internet, collecting and sharing data. Thanks to cheap processors and wireless networks, it's possible to turn anything, from a pill to an airplane to a self-driving car into part of the IOT. This adds a level of digital intelligence to devices that would be otherwise dumb, enabling them to communicate real-time data without a human being involved, effectively merging the digital and physical worlds.

**1.1 WHAT IS IOT**

A light bulb that can be switched on using a smartphone app is an IOT device, as is a motion sensor or a smart thermostat in your office or a connected streetlight. An IOT device could be as fluffy as a child's toy or as serious as a driverless truck, or as complicated as a jet engine that's now filled with thousands of sensors collecting and transmitting data back to make sure it is operating efficiently. At an even bigger scale, smart cities projects are filling entire regions with sensors to help us understand and control the environment.

The term IOT is mainly used for devices that wouldn't usually be generally expected to have an internet connection, and that can communicate with the network independently of human action. For this reason, a PC isn't generally considered an IOT device and neither is a smartphone -- even though the latter is crammed with sensors. A smart watch or a fitness band or other wearable device might be counted as an IOT device, however.



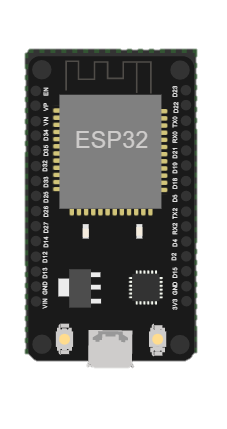


**Fig-1.1 – Block diagram**

**1.2 USES OF IOT**

IOT (Internet of Things) 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 concept has faced prominent criticism, especially in regards to privacy and security concerns related to these devices and their intention of pervasive presence. Embedded with electronics, Internet connectivity, and other forms of hardware, these devices can communicate and interact with others over the Internet, and they can be remote monitored and controlled. IOT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can range from blood pressure and heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers, Fitbit electronic wristbands, or advanced hearing aids.

**1.3 ESP-32**

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**Fig-1.2 – ESP32**

Espressif Systems created the ESP32, a system-on-a-chip (SoC) microcontroller that is inexpensive and low-power. Due to its incorporated Wi-Fi and Bluetooth capabilities, it is frequently utilised for Internet of Things (IoT) applications. A dual-core processor, up to 520KB of SRAM, and a number of interfaces, including UART, SPI, I2C, and ADC, are available in the ESP32. Additionally, it supports a variety of operating systems, including FreeRTOS, making it simple to create and deploy programmes on the platform. The ESP32 is widely utilised in many different applications, including as smart lighting, wearable electronics, and home automation.

The ESP32's integrated Bluetooth and Wi-Fi functions are among its most notable qualities. It is crucial for many IoT applications that connecting to the internet and other devices be simple. An ESP32-based smart thermostat, for instance, may quickly connect to a Wi-Fi network at home and interact with a smartphone app, enabling users to control their thermostat from a distance.

Additionally, the ESP32 supports a number of operating systems, such as FreeRTOS, making it simple to create and deploy applications on the platform. Popular real-time operating system FreeRTOS offers a straightforward and adaptable method for controlling numerous operations on a microcontroller. Since many IoT applications require complicated apps, this implies that developers may create them with ease.



1. **International Journal of Advanced Science and Technology, 2020; "IoT-Based Smart Security System Using ESP32 and Ultrasonic Sensor"**

This journal article shows how to create a smart security system using an ESP32 board and an ultrasonic sensor. Using the Blynk app, the system uses motion detection to deliver notifications to a user's smartphone. The ESP32 board offers an affordable, high-performing option for IoT applications, according to the authors.

**2. Journal of Electrical and Electronics Engineering, 2020) "Internet of Things (IoT) based Smart Home System using ESP32 NodeMCU"**

An ESP32 NodeMCU board is used in this journal paper to explain the design and implementation of a smart home system. The system enables users to remotely manage appliances using a mobile device and incorporates sensors for motion detection, temperature, and humidity.

**CHAPTER 3**

**SYSTEM DESIGN**

**3.1 ARCHITECTURE**

**3.2 MODULES DESCRIPTION**

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**CHAPTER 4**

**PROJECT REQUIREMENTS**

**HARDWARE REQUIREMENTS**

**SOFTWARE REQUIREMENTS**

**CHAPTER 5**

**IMPLEMENTATION**

**CHAPTER 6**

**CONCLUSION AND FUTURE WORK**

**CHAPTER 7**

**REFERENCE**

1. "Home automation system using IoT" by R. Naga Venkata Sai Krishna and S. Srikanth, International Journal of Engineering Research and Technology, 2019.
2. "Internet of Things (IoT) based smart home automation" by K. Adilakshmi, B. V. Raghavendra Rao, and K. Rajasekhara Rao, International Journal of Electrical and Computer Engineering (IJECE), 2017.
3. "Smart home automation and security system using Arduino and IoT" by S. Ghosal, M. K. Ghosh, and S. Dasgupta, 2018 2nd International Conference on Trends in Electronics and Informatics (ICOEI), 2018.

**CHAPTER 8**

**APPENDIX - CODE SNIPPETS**