

# Design and Performance of Portable Wi-Fi Repeater using Internet Of Things.

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## ABSTRACT

In today's world everything depends on Internet. The world needs information which we can access by using the Internet. Wireless Communication Systems constitute a basic component of the current and future Information Society. Today's complex signaling questions demand a depth of information beyond the capacity of conventional communication systems. In order to access any information we need the wi-fi connection which is not only helpful for information but also helps to run many devices by using Internet. But many of us facing the coverage problem in many areas. In view of this an attempt is made in this project to design hybrid wireless range extender using Node MCU within which we have inbuilt patch antenna is developed. Ultimately all these expectations is to implement to the extent of addressing seamless mobility, quality of service and maintaining low operational cost. The aim of this project is to solve out of coverage problem by using a broadband data source then transmits this data locally as Wi-Fi router using the 802.11ac protocol. The result is hotspot Wi-Fi.

**KEYWORDS:** Internet of Things , Wireless Communication Systems , Node MCU, Wi-fi, Repeater.

## 1. INTRODUCTION

Information and communication technologies (ICT) have completely changed the world in very short time. Today's the Internet is playing an important role in people's life. For eg: Instead of going to the bank for the services they can simply install an application related to the bank and they can get the required services through this Internet. In order to access the internet there was a computer desktop where Internet connectivity is available through wired. But after that there was wireless Connections i.e., Wireless Local Area Network and broadband. But what about the coverage problem. In order to overcome that we need to setup many access points for good coverage area. But why cannot we think about the wi-fi repeater which is budget friendly and power saving process. Here we came up with the solution of wi-fi repeater which is portable by using Internet of Things. The Internet of Things (IoT) describes the network of physical objects-“things” that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

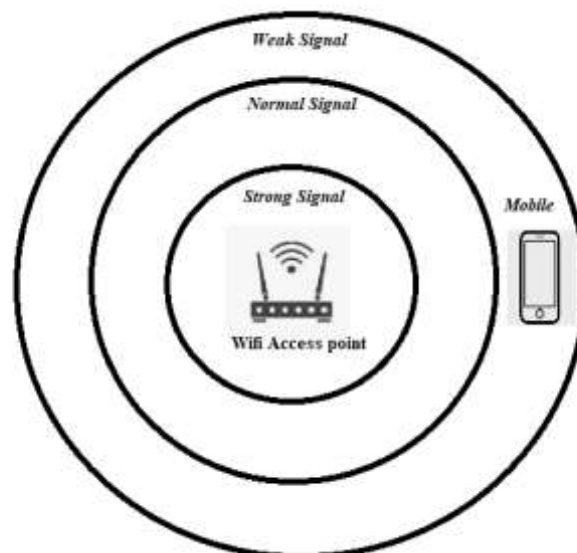
These devices Range from ordinary household objects to sophisticated industrial tools. With more than 7 billion connected IoT devices today, experts are expecting this number to grow to 10 billion by 2020 and 2022 billion

by 2025. Over the past few years, IoT has become one of the most important technologies of the 21st century. Now that we can connect everyday objects—kitchen appliances, cars, thermostats, baby monitors—to the internet via embedded devices, seamless communication is possible between people, processes, and things. By means of low-cost computing, the cloud, big data, analytics, and mobile technologies, physical things can share and collect data with minimal human intervention. In this hyperconnected world, digital systems can record, monitor, and adjust each interaction between connected things. The physical world meets the digital world and they cooperate.

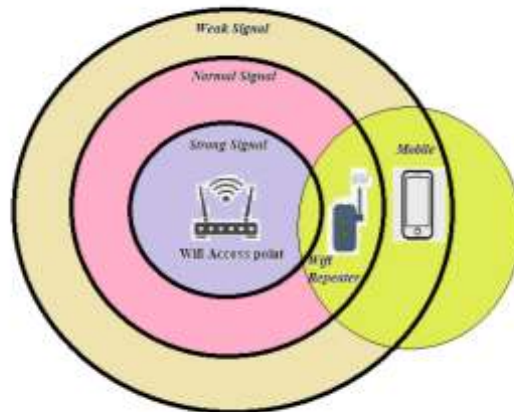
Wireless local area networks have become the worldwide preferred option to provide wireless Internet access to heterogeneous clients in homes, businesses, and public spaces due to their low cost and mobility support. The simplest WLAN contains only a basic service set (BSS), consisting of an access point (AP) connected to a wired infrastructure, and some wireless stations (STAs) associated to the AP. With this Portable wi-fi repeater we can increase the network range. IoT allows people and things to be connected Anytime, anywhere. With Anything and anybody, ideally using Any path/network and Any service. IoT is the interconnecting of devices and services that reduces human intervention to live a better life. The growth of the Internet of Things and the directions to deploy more sensors anywhere has led to search for cost effective ways to connect many devices to the Internet. In such aspect we came with an amazing solution.

## 2. METHODOLOGY

The purpose of this research paper is to build a portable wi-fi repeater using Internet of Things. In this we have used the Node MCU microcontroller board., Node MCU is an open source IoT platform. It includes both firmware which runs on the ESP8266 Wi-Fi SoC, and hardware which is based on the ESP-12 module. The applications in these samples that are running on Node MCU are written using Lua scripting language which is quite simple and easy to understand. Here we have used the patch antenna to receive the signals, the controller in it is used to amplify the signals to considerable signal strength and these signals have sent in such away to be detectable by the devices connected to each. Further we have also used the firmware for giving the user-id and password to the respective repeater. And the Pie charts given below show the difference with (fig 1) and without using repeater (fig 2).

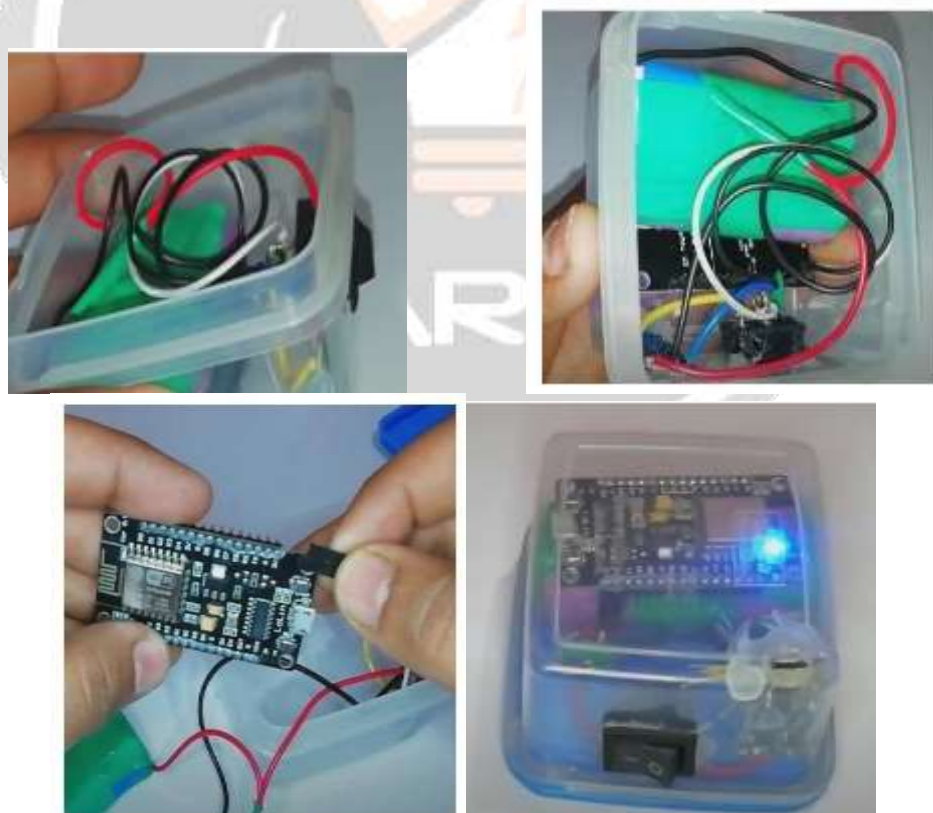


**Fig 1 :** Testing the signal without using wi-fi repeater.



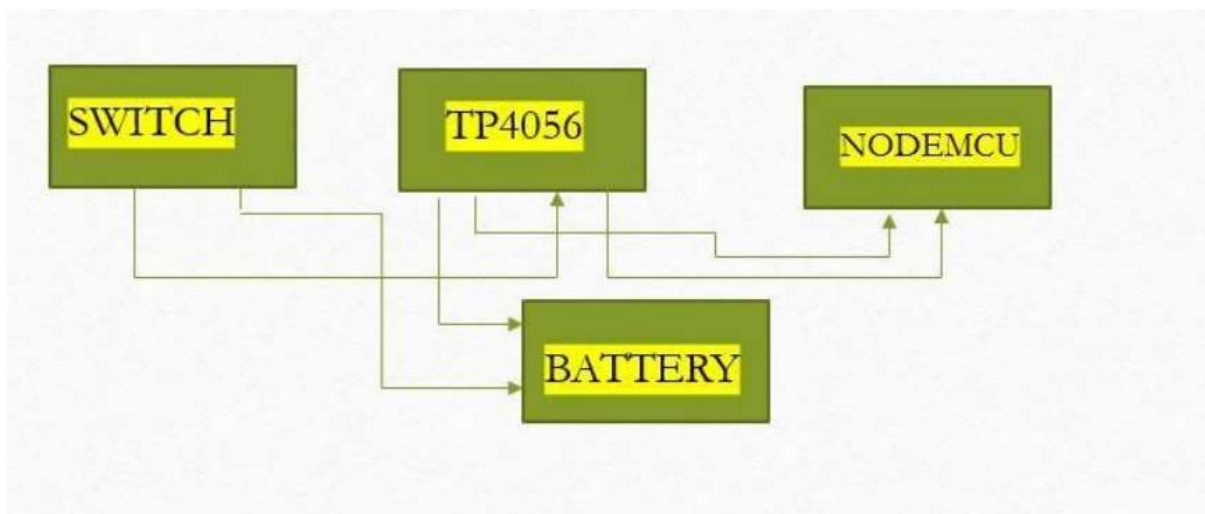
**Fig 2:** Testing the signal using Wi-fi repeater.

By utilizing the pie charts, we have observed that varying the signals are weakened as the distance increases. For which, repeaters have been used to strengthen the signal. we have also shown the pie-charts with and without repeaters, so that a clear distinction is ide



**Fig : 3** Pictures showing the Hardware implementation of portable wireless range extender.

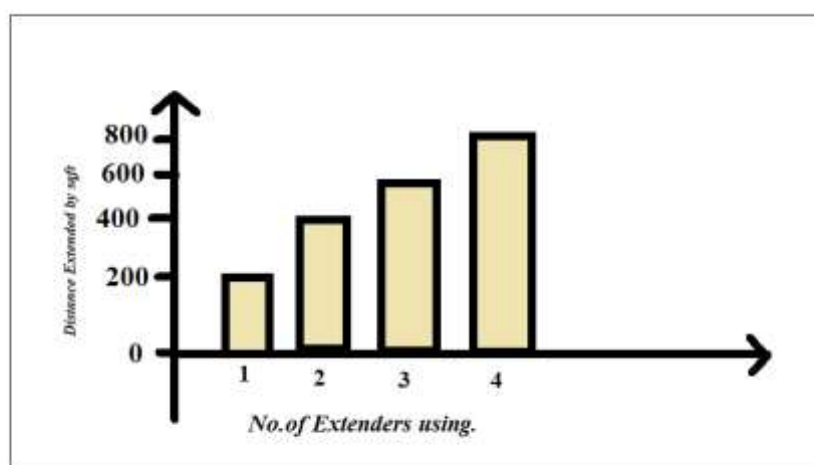
**3.BLOCK DIAGRAM :**



**Fig 4 :** Showing the Hardware implementation of the proposed idea in the form of a block diagram.

**4.RESULTS AND DISCUSSIONS :**

We collected the data and thereby subjected to testing with and without repeaters. In this process, a smartphone is directly connected to the main access point of Wi-fi. At this junction it has been noted and observed in the scenarios that the signal strength received by the mobile phone seems to be very low, as the distance increases and at the same time it is observed that the range of Wi-fi also decreases. In the case of second scenario we have tested with wi-fi repeaters, it is observed that the corresponding signal strength seems to be gained by the mobile phone is much greater than the previous scenario. As shown in fig 3 , a graph is depicted by considering the number of extenders using in x-axis and the distance extended in square feet on y-axis. It has been observed that there is a clear change in the number of extenders as the distance between them increases, and is directly proportional to the number of extenders used.



**Fig 5 :** Shows the graph between the number of extenders using and the distance increased by increasing the extenders.

## 5. CONCLUSION :

The proposed Portable Wi-fi repeater using Internet of Things. helps in overcoming the coverage problem and also the devices used are readily available and this makes the project inexpensive and readily accessible to everyone. Although there are some cons and limitations for this project but we achieved the final outcome.

Based on the test result and analysis in the creation and completion of this project, it proves that this project is designed to benefit the users when it comes to wireless signal problems. With the lower cost development and some improvements, everybody can freely use this product. Besides that, the main tool Node MCU has its own ability to works for any project development.

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