

# WiFi Tools and Signal Strength Analysis

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## Abstract

WiFi Signal analysis is a project which involved analyzing the WiFi traffic in and around Vishwakarma Institute of Technology. We present the details of the analysis and the results of our experiment on the WiFi using analyzer tool called InSSIDer. We have collected information about the WiFi in the form of packets and we have analyzed the captured packets to understand the nature and performance of the WiFi at Vishwakarma Institute of Technology. As WiFi is used all over the world for connecting the devices and for data sharing. But the spectrum provided for its transmission is less. So sometimes channels are overlapped getting less signal strength.

**Keywords-** WIFI, IEEE 802.11, InSSIDer, Acrylic

## I. INTRODUCTION

Wi-Fi (Wireless Network LAN) has become one of the most prominent ways to connect all kinds of devices such as personal computers, audio players, tablets, smartphones and many kinds of digital devices. Any wireless local area network that follows IEEE 802.11 standard are considered as Wi-Fi.[1] Wi-Fi has become a common terminology used by everyone but not many know about the intricate performance factors of a Wi-Fi network and how all the devices are able to stay connected using relatively few access points. In this report, we present the results of our analysis which was done on the Wi-Fi traffic at Vishwakarma Institute of Technology. Which helped us shed light on various interesting insights about the connectivity, performance and general traffic patterns of a wireless network. We have used the tool InSSIDer. We have analyzed the WiFi traffic networks at different locations of Vishwakarma Institute of Technology. In this paper we present one of the first studies of a deployed 802.11 hotspot network. We collected a network activity trace lasting approximately 1-2 weeks from the VIT Campus WiFi network. We analyse the network in terms of users, Access Points (APs) and signal, and compare some of our findings with those for a college campus wireless network and a corporate wireless network. This work will be used for the campus authorities to install the access points such that all campus become a Wi-Fi hub.

## II. BACKGROUND AND RELATED WORK

At current period there were many research done for wireless network usage in a variety of environments. Tang and Baker studied a packet radio network composed of nearly 25,000 radios distributed across three major metropolitan areas [2]. Balachandran et al. analysed WLAN usage for some days in a conference setting [3]. Essien and Kotz examined a college campus wireless network when it was first installed in 2001[4]. Henderson et al. returned to the same network after it had matured in 2003/2004[5]. Two other campus WLANs that have been studied include the University of North Carolina and the University of Saskatchewan[6].Mikhail Afanasyev et al performed analysis on mixed usage of urban Wi-Fi network[7]. While Balazinska and Castro analysed usage of a corporate WLAN [8].

## III. SELECTING THE SOFTWARE

Few of the shortlisted software are as follows:

### A. Acrylic Wi-Fi

It provides the WiFi networks information (SSID/BSSID) and connected users, Signal quality charts for WiFi channels and detected devices. It also shows known Wi-Fi devices with the passwords and default WPS Keys (password testing). It have WiFi channel scanner and WiFi networks through channels in 2.4 GHz and 5 GHz. Also use for network authentication and security details for WEP, WPA, WPA2 and Enterprise (802.1X) WiFi networks. It have the Heatmapper tool which is useful to draw the Heatmap [9].

### **B. InSSIDer**

InSSIDer is a WiFi troubleshooter and optimization tool that takes small WiFi network management to a new level. Within a short time, you will get to know about poor signal, low signal strength, and RF interference in the 2.4 and 5 GHz bands. Data from this will help you make educated decisions about access point placement and channel selection, so you can create a more accessible network without being a professional WiFi expert [10].

### **C. XIRRUS**

Xirrus mainly provides high-performance wireless networks. Xirrus is one of the popular wireless network tool, it provides many solutions with superior coverage and security. It also support multi radio WiFi platform [11].

### **D. Homedale**

While using Homedale, it will list all of the wireless networks it has detected in your area along with some useful technical data. It displays are access point name (the SSID), MAC address of the wireless adapter, the vendor name, signal strength (in DBs), encryption method, frequency (the wireless) and other details that is useful. Support GPS and Geo Location support login. But it doesn't detect hidden SSID, though shows their other network details [12]

### **E. NetStumbler**

NetStumbler (also known as Network Stumbler) is a tool for Windows that facilitates detection of Wireless LANs using the 802.11b, 802.11a and 802.11g WLAN standards. Verifying network configurations. Finding locations with poor coverage in a WLAN [13].

### **F. WIRESHARK**

It is used for detailed study of hundreds of protocols, with more being added all the time and for live capture and offline analysis. Standard three-pane packet browser. Multi-platform: Runs on Windows, Linux, macOS, Solaris, FreeBSD, NetBSD, etc. Captured network data can be browsed via a GUI, or via the TTY-mode TShark utility. It have the most powerful display filters in the industry [14].

### **G. Kismet Wireless**

It is use for 802.11 Wi-Fi sniffing and Standard PCAP logging (compatible with Wireshark, TCPDump, etc.). It contains the Client/Server modular architecture. We can Plug-in architecture to expand core features. Also have more than one capture source support. Live export of packets to other tools via tune/tap virtual interfaces [15]

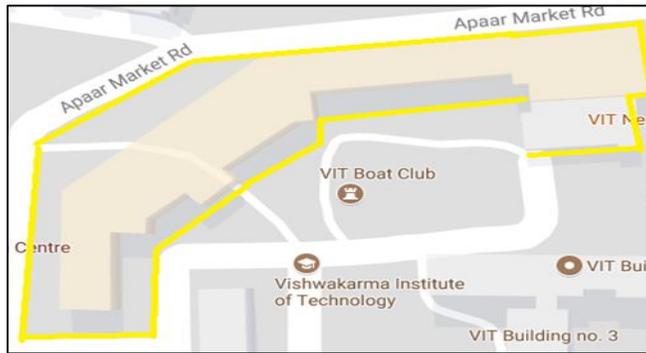
### **H. Wi-Fi Radar**

Live monitoring at your fingertips with all info at a glance. At short you will get to know about SSID's channel no. , Bandwidth etc. It provides Graphical charts for better visualization - all live! Easily connect to any network (Open, WEP, or WPA/WPA2) with just one click. It have Ultra-secure Password storage, to keep them safe. Status Item tool to replace the default OSX Wireless tool [16].

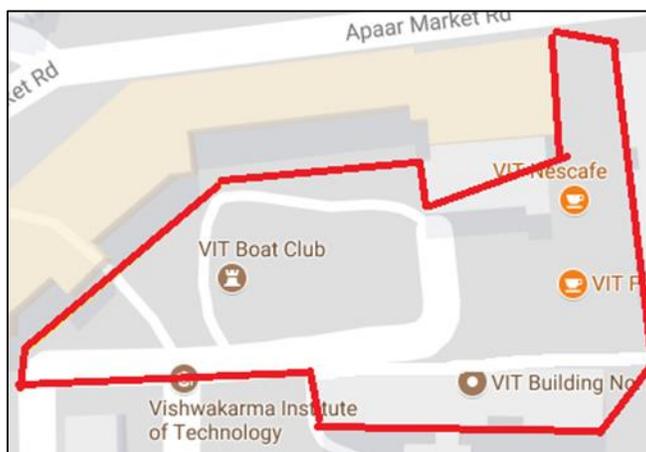
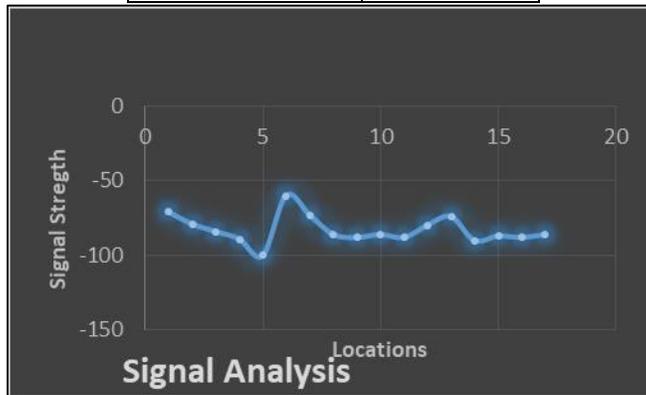
All the applications are used for analyzing the strength of WiFi. These can be used for getting SSID's, Channel no. Also it gives the information about minimum/maximum data rate, security type. [17] We also get filter tool for sorting specific channels or SSID's .Some of the Paid tools can be used to get password of that SSID .Tools can also be used for mapping the area for high signal strength using Heat mapper tools. Some tools gives information about connected user to a SSID (private) such that you take action on that unwanted user. Consider work has been done by many institute as well as smart city.[18] Such work are very useful for developed as well as developing country, to make WiFi Hub in cities that will cover each and every part of city. This evolve human race such all get connected to digital world. Also we get to know about Dead Zones, and ways to solve problems.

## **IV. RESULT**

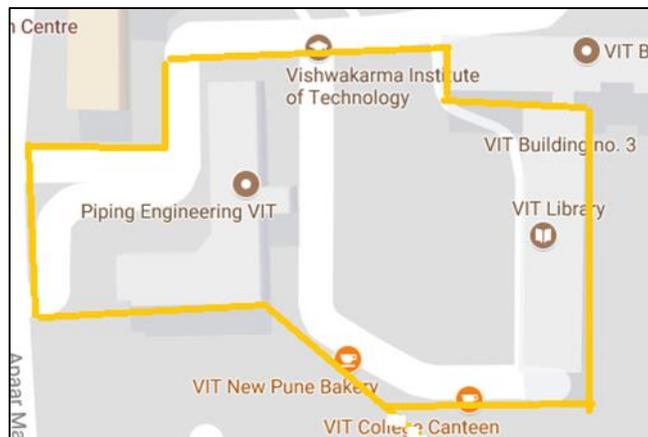
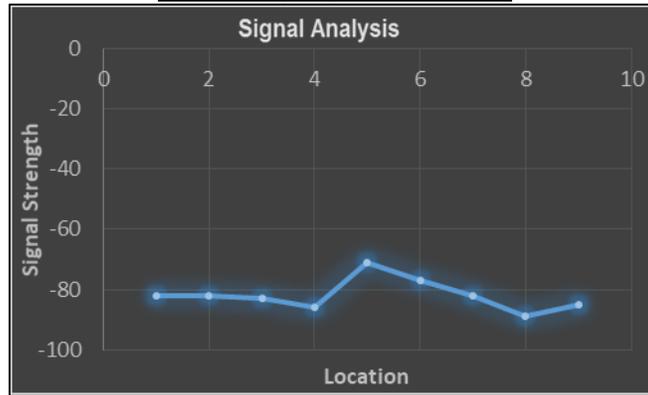
We get varying signal strength at different location in VIT campus. This data which we have collected is only for the VIT Campus WiFi. College had already installed many routers Of CISCO Company at different places i.e. Buildings, Floors. This analysis gave useful information as many locations in VIT campus don't have WiFi Network. Location Such as Robocon Lab, Nescafe, Electrical Buildings, Terraces, College entry points have less Wi-Fi strength which is below -80 dbs. During analysis we have observed some deflection in Wi-Fi strength at same location. Max data speed don't changes over the location. WiFi signals are lost as soon as we enter in the Labs.



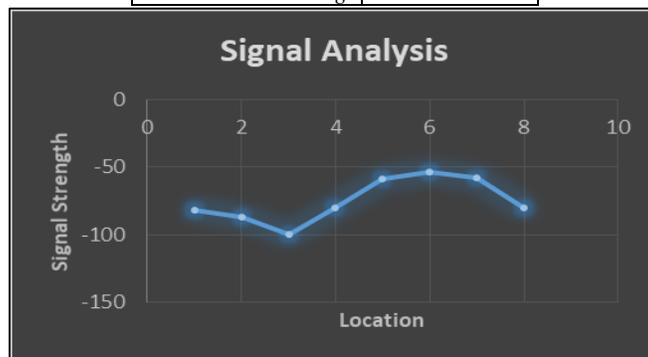
<i>Location</i>	<i>Signal Strength</i>
<i>Boat Club</i>	<b>-71 DB</b>
<i>Eg Lab</i>	-79 dB
<i>Student Section</i>	-84 dB
<i>VIT Gym</i>	-89 dB
<i>SuvarnYug</i>	-100 dB
<i>Audi</i>	-60 dB
<i>1st floor</i>	-73 dB
<i>1st SS</i>	-86 dB
<i>2nd Lunch Space</i>	-88 dB
<i>Computer Vision Lab</i>	-86 dB
<i>VLSI Lab</i>	-88 dB
<i>Session Hall</i>	-80 dB
<i>1322</i>	-74 dB
<i>Comp Staff room</i>	-90 dB
<i>Terrace</i>	-87 dB
<i>1401</i>	-88 dB
<i>1408 Staff room</i>	-86 dB



Location	Signal Strength
Chemical Road	-82 dB
Fruit Centre	-82 dB
Nescafe	-83 dB
Robocon	-86 dB
Boat Club	-71 dB
Reading Hall	-77 dB
Prod Building	-82 dB
Electric Lab	-89 dB
Workshop	-85 dB



Location	Signal Strength
Chemical Road	-82 dB
Chemical 1st floor	-87 dB
Chemical Except 1st	-100 dB
Poona Bakery	-80 dB
Canteen	-59 dB
Parking	-54 dB
Central Library	-58 dB
Mechanical Building	-80 dB



## V. CONCLUSION

Considered to be Dead Zone (Red Spot) as the WiFi strength is very weak, so these dead zones can be covered by installing new Routers. WiFi Signal are lost as we enter in the Labs this means signals are obstructed by wooden as well as glass materials Concrete walls have large effect on the signal strength. At same location we are getting variation in the signal strength, it is because of many strong signal present in that location which deflect the signals. Also there is the effect of environmental changes.

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