COMP4336/9336 Mobile Data Networking

Lab 4: WiFi API

Objectives

- To access th OS from your program/code

Prerequisites

You need to have acc vs/Linux laptop/desktop

Introduction

While Wireshark allows you to collect detailed data about the WiFi networking interface of your computer, it does so in an off-line manner. To develop a piece of software that would read and act on WiFi interface data in real-time, you will need to access the WiFi API. In this lab, you will learn how to access the WiFi API of your OS.

Your Tasks

Task 1: WiFi API information extraction [1 mark]

Try to run the following commands to output the WiFi information:

macOS:

You can simply use this command to fetch AP information:

lists all the visible APs individually:

```
/System/Library/PrivateFrameworks/Apple80211.framework/Versions/A/Resources/airport -s
```

Show current AP:

```
/System/Library/PrivateFrameworks/Apple80211.framework/Versions/Current/Resources/airport -I
```

Try to run this short shell script in your terminal to show the signal strength:

```
while i=1; do echo -ne 'Wifi signal strength:' $(/System/Library/PrivateFrameworks/Apple80211.framework/Versions/Current/Resources/airport -I | grep CtlRSSI | awk {'print $2'}) '\r'; sleep 0.3; done
```

sample output:

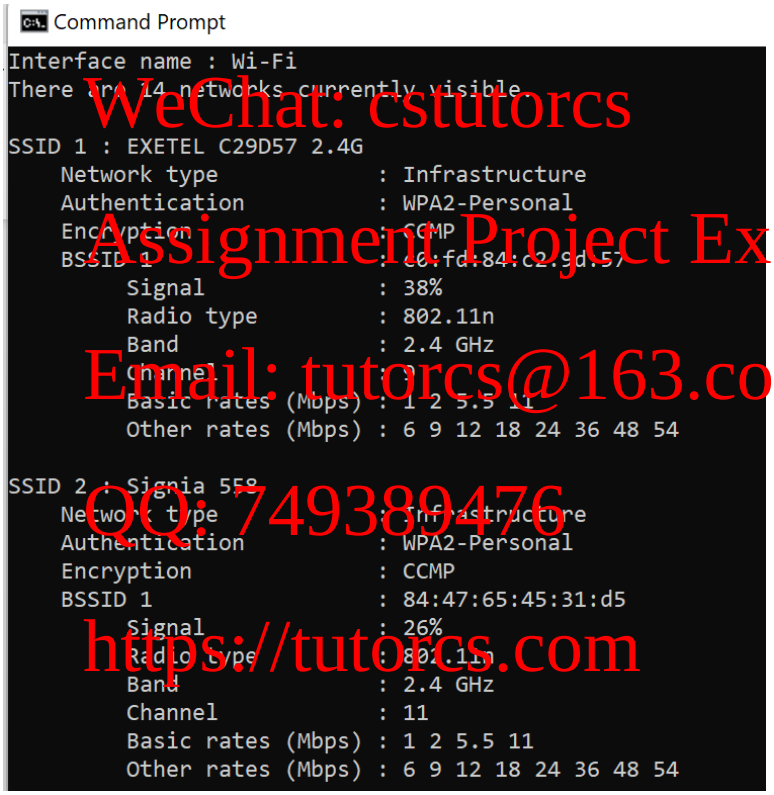

```
Wifi signal strength: -18
```

Windows:

Run the follo ur terminal to print out the interface information:

```
netsh  mode=Bssid
```

sample output



Linux:

You can get the rssi value of your current link when using WiFi station as follows (wlan0 is the usual default wi-fi device, but depends on the driver and configuration):

```
$ iw dev wlan0 link
Connected to 9c:4e:20:c8:ee:9e (on wlan0)
    SSID: CORP1
    freq: 5240
    RX: 7306266 bytes (6124 packets)
```

```
TX: 776491 bytes (4117 packets)
signal: -75 dBm
tx bitrate: 39.0 MBit/s MCS 4
```

To list availat

```
$ ip li
$ iw d
...
BSS 9c:4e:20:c8:ee:9d(on wlan0)
TSF: 0 usec (0d, 00:00:00)
freq: 5240
beacon interval: 102 TUs
capability: ESS Privacy RadioMeasure (0x1011)
signal: -75.00 dBm
last seen: 765 ms ago
SSID: CORP1
...
```


Task 2: Counting surrounding devices and distance estimation [3 marks]

Python programming with system API

You are required to plot the table showing the surrounding WiFi AP at real-time in your program. The table should display the SSID, signal strength, also show other information(e.g. frequency, channel, rate …) if applicable. And use the Free space path loss equation to calculate the estimate distance.

distance = 10 ^ ((27.55 - (20 * log10(frequency)) + signalLevel)/20)

Please note that your program should have the environment check before running or you can provide a readme documentation about the working environment (i.e. which OS and the version).

A sample of application:

```
$ python3 wifi_distance.py
```

```
There are 3 devices visible:

SSID | Frequency | Channel |Signal strength| Est. distance
-----+-----------+-----------+---------------+-------------
UNSW | 5 GHz     | 36        | -57 dbm       | 7m
-----+-----------+-----------+---------------+-------------
Home | 2.4 GHz   | 1         | -60 dbm       | 4.73m
-----+-----------+-----------+---------------+-------------
Mall | 5 GHz     | 60        | -75 dbm       | 25.3m
```


What to submit?

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1. Submit a ZIP file containing the program file.
2. Submit a PDF report containing the following:
   a. Your observations of Task 1: What do you get from the command? **[1 mark]**
   b. A brief document about how to run your program and a screenshot of sample output **[3 mark]**

Penalty at the rate of 5% for each day late will be strictly enforced for all lab submissions.

All submissions will be subject to strict UNSW plagiarism rules.

End of Lab 4 – Hope you enjoyed this lab
