

Modified Explanation

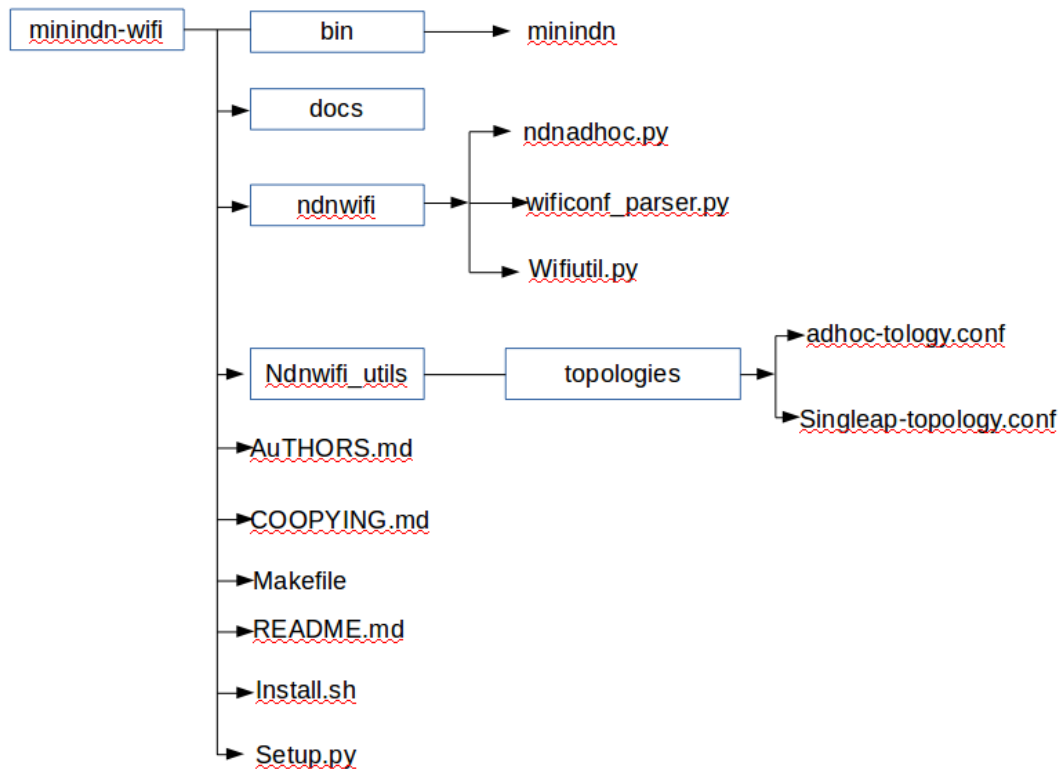


Figure 1. The Directory Structure of Program

1. Modified the installation file install.sh to install miniNDN-WiFi and other dependencies.
 - ◆ Modified the module for installing mini-ndn
 - ◆ Added a module for installing mininet-wifi
 - ◆ Added a module for installing minindn-wifi
2. Added two default configure file of topology for wifi networks, and they are put in a folder 'topologies' under a new directory 'ndnwifi_utils/'. When installing of miniNDN-WiFi, these files will be copied to the directory '/usr/local/etc/mini-ndn/wifi'
3. Copied conf_parser.py as wificonf_parser.py. Added two classes confNdnStation(), confNdnAccessPoint() and two functions parse_stations() and parse_accessPoint() in this wificonf_parser.py. And this modified file is put in a new directory 'ndnwifi'. These classes and functions are used to create topology objects according to a configure file of topology.

4. Wrote a new file `ndnadhoc.py` and put it in new directory “`ndnwifi`”. This program is used to emulate ad hoc network. The function *propagationModel()* for the propagation model must be called just before the function *configureWifiNodes()* in `net.py`, so this method is used. The function *build_adhocnet()* in this file is similar with *buildFromTopo()* in `net.py`. This function is used to build net objects according to topology objects.

Encounter the main problemes:

- ◆ To emulate ad hoc communication mode, must enable `wmediumd` and interference .
- ◆ NFD by default treats UDP multicast and Ethernet multicast faces as broadcast. To make them recognized as ad-hoc, modify `/usr/local/etc/ndn/nfd.conf` and set `face_system.udp.mcast_ad_hoc` and `face_system.ether.mcast_ad_hoc` keys to “yes”.

5. Copied `ndn/util.py` as `wifiutil.py`, add a class *MiniNdnWifiCLI*(CLI). The class is used to display the prompt of miniNDN-WiFi.

6. Modified the file `minindn`. The structure of MiniNDN-WiFi is shown in Figure 2.

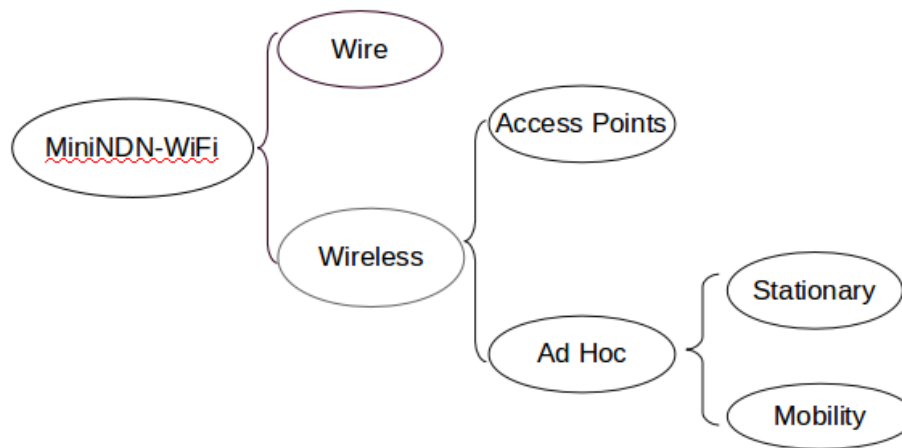


Figure 2. The structure of MiniNDN-WiFi

- ◆ Added a new class *NdnWifiTopo()* in this program. This new class is used to generate topology objects by calling the two methods *parse_stations()* and *parse_accessPoint()* in `wificonf_parser.py`.

- ◆ Modified the function `execute()` so that it can emulate wire/wireless network according user's selecting in CLI parametes. For examples:
`sudo minindn # emulate a wire network.`
`sudo minindn - -wifi # emulate a wifi network with AP`
`sudo minindn - - wifi - - adhoc # emulate a stationary ad hoc network`
`sudo minindn - - wifi - - manet # emulate mobile ad hoc network`

This is to say, perform the corresponding module according to CLI options -
-wifi/- -adhoc/- -manet.