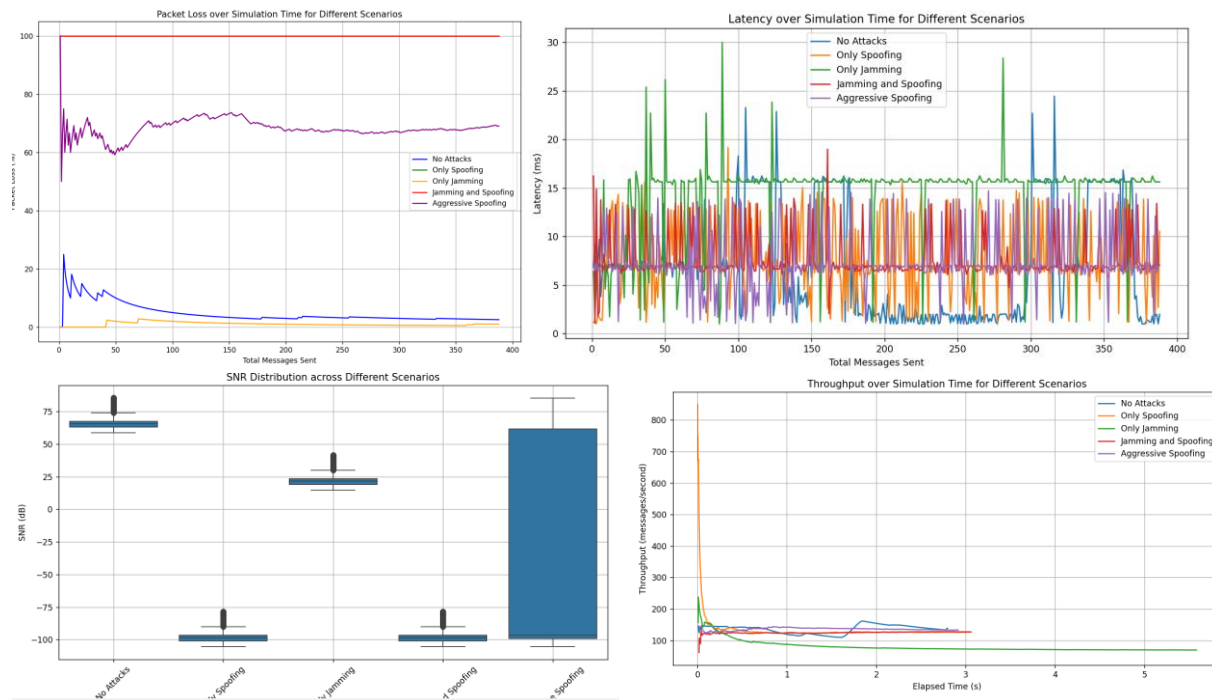


Case 1: SPOOFING Report

The full code of this spoofer is located on the CASE1-Spoofing branch of our LAB 1 repo.

<https://github.com/CYSE587/LAB1/tree/CASE1-Spoofing>



After implementation of gradual spoofing, the graphs remain largely unchanged as gradual spoofing will have no effect on the throughput, packet loss, SNR, or latency since this is looking at a positional improvement only. The only difference highlighted above was the implementation of using only spoofing probabilities and having the chance of jamming be null.

The gradual implementation comes in the form of spoofer.py

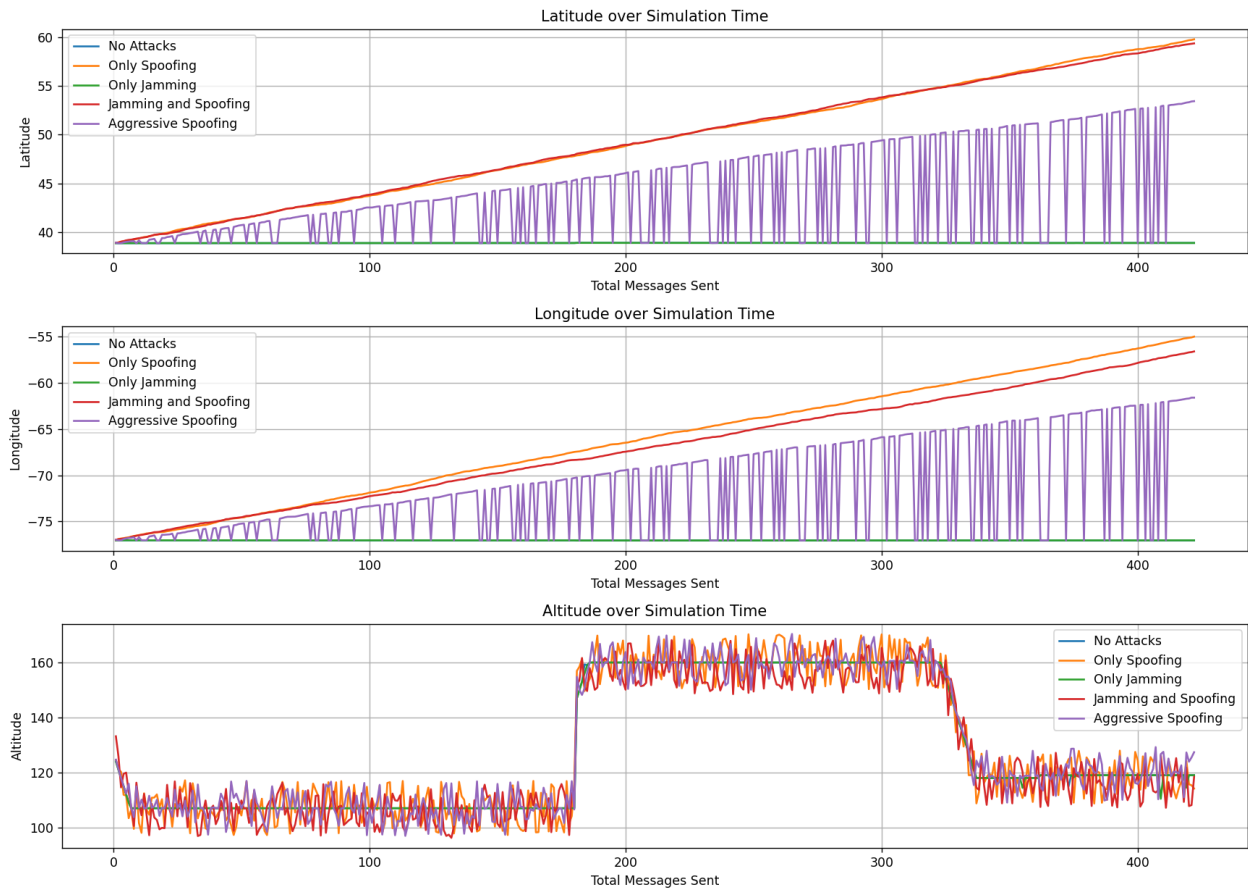
```
random.random() * self.spoof_probabilities)
self.lon_offset
# Update offsets gradually
self.lat_offset += random.uniform(0, 0.05)
self.lon_offset += random.uniform(0, 0.05)
self.alt_offset += random.uniform(-0.05, 0.05)
```

```
spoofed_message['latitude'] += self.lat_offset
print("Spoofed Lat: ",spoofed_message['latitude'])
spoofed_message['longitude'] += self.lon_offset
print("Spoofed Lon: ",spoofed_message['longitude'])
spoofed_message['altitude'] += self.alt_offset
print("Spoofed Alt: ",spoofed_message['altitude'])
```

Where the offset will gradually grow in lat/lon by 0.05 in the positive direction to slowly move it away from its original position and keep the altitude incrementally moving by -0.05 and 0.05 which may gradually move it away but uniformly will keep it near a 0 increment. I had to chose a direction in the lat/lon since if I chose -0.05 to 0.05 it would not have gradually grown it would have zeroed out.

These numbers are then added to the current lat/lon/alt which slowly increases them given every spoofed message.

I modified the `n_scen_stat` code to show these gradual spoofs within lat/lon and the differences with alt.



This is with a 1 probability of spoofing (hence the steady trend with only spoofing/spoofing and jamming) and a 0.7 probability within aggressive spoofing such that every 0.3 it will bottom to its original position. This trend can be made more gradual with a smaller increase. With altitude it proves my original theory that using a uniform distribution of a -0.05 and 0.05 it will never stray too far from the original creating no gradual nature.

To show maximum effect of this gradual nature, the GitHub has the changes where spoofing is probability 1 and jamming at 0. There is no modification to the nature of the tests, only the graph output in `n_scen_stat`.