**CEG5103 / EE5023 Assignment**

**Simulation of a Wireless Network using NetSim**

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| Group No. | X |
| Proposed Title | The performance of WLAN under different circumstances |
| Area of Study / Problem Formulation | WLAN has dramatically impacted our lives and study. Many of our classmates conduct research related to wireless communications or networks. So our group focuses on Wireless LAN and wonders how the network reacts when the scale of the network and the protocols in different layers change, the impact of topographical conditions on land and sea. |
| Specific Objectives | 1. How do the throughput, delay, and loss change when the number and the distance among nodes vary?  2. How does the network behave when changing the (protocols of) physical layer, data link layer, and transport layer?  3. Does the same network perform differently in the Grid background and Map background? |
| Literature Survey  2 or 3 related papers (list titles and authors, and attach the PDF files) | 1. Arpit Gupta, Jeongki Min, and Injong Rhee. 2012. WiFox: scaling WiFi performance for large audience environments.  2. Eng Hwee Ong, J. Kneckt, O. Alanen, Z. Chang, T. Huovinen and T. Nihtilä, "IEEE 802.11ac: Enhancements for very high throughput WLANs,"  3. Xiang-Yang Li, Peng-Jun Wan, Yu Wang, and O. Frieder, "Sparse power efficient topology for wireless networks,” |
| Describe:  a. Wireless network topologies or scenarios which will be simulated. Provide a diagram.  b. Wireless network protocols that will be used.  c. The different conditions that will be considered. | Figure 1:    Figure 1 is a schematic of the simulation scenario. The number of nodes, distances, and shape structure will be further adjusted during the experiment.  The overall architecture of our experiment is on the IEEE 802.11 (WiFi) family protocols. A router connects to some access points and some hosts.  The experiments will partly draw on the TCP/IP Model to discuss the various protocols in different layers, as shown in Figure 2.  Figure 2:    After the discussion of protocols and structure of nodes, the combinations with good performance will be selected for Map environment simulation. The impact of topographical conditions on land and sea is taken into consideration as an example in Figure 3.  Figure 3: |
| Planned Analysis (if any) | 1. Changing different standards in the physical layer to discover the effect of different transmission types on information transmission. 2. Changing transmitter power, referencing distance,... in the same standard to discover the effect on information transmission. 3. Changing the RTS threshold and retry limit, to discover the impact of RTS and maximum retry times on the conflicting nature of transmissions at the data link layer. 4. Exploring the impact of the number of nodes on network congestion. 5. Choose a proprietary protocol among TCP and UDP to study the impact of different transport protocols on network transmission. 6. Explore the impact of network topology on the network. 7. Explore the impact of topographical conditions on land and sea on the performance of the network. |
| Expected Results (a few sets) | Throughput decreases with delay and loss increasing when the number and distance increase.  The same network with the same setting has worse performance in Map than Grid. |

**Planned Contributions of each group member**

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| **Member** | **Contributions** |
|  | Explore the impact of network topology on the network. |
|  | Simulation and Analysis |
|  | Exploring the impact of the number of nodes on network congestion |
|  | Network design |
|  | Explore the impact of topographical conditions on land and sea |

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| **Group** | **Advising GA** | **Group** | **Advising GA** |
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