Project #3: Random Waypoint Mobility (RWP)

CS:5331 - Mobile Data Management and Privacy

Summer II 2025

Sahel Azzam

August 6th, 2025

COMPILATION:

./csim.gcc proj3\_azzam\_sahel.c -o proj3\_azzam\_sahel

EXECUTION:

./proj3\_azzam\_sahel

PARAMETERS:

- Number of nodes: 25

- Network size: 1,000 × 1,000 m²

- Simulation time: 5,000 seconds

- Time step: 1.0 second

- Snapshots at: 0, 2,000, and 4,000 seconds

SCENARIOS:

1. Speed: 1 m/s, Pause: 0 seconds

2. Speed: 1 m/s, Pause: 50 seconds

3. Speed: 2 m/s, Pause: 0 seconds

4. Speed: 2 m/s, Pause: 50 seconds

ASSUMPTIONS:

- Fixed random seed (12345) for consistent initial topology

- Uniform random distribution for initial positions

- Straight-line movement between destinations

- Nodes stay within network boundaries

Initial network topology:

A graph with blue dots

AI-generated content may be incorrect.

A graph with blue dots

AI-generated content may be incorrect.Scenario 1 (Speed 1 m/s, Pause 0 sec)

A graph with blue dots

AI-generated content may be incorrect.

Scenario 2 (Speed 1 m/s, Pause 50 sec):

A graph with blue dots and numbers

AI-generated content may be incorrect.

A graph with blue and red dots

AI-generated content may be incorrect.

Scenario 3 (Speed 2 m/s, Pause 0 sec):

A graph with blue dots

AI-generated content may be incorrect.

A graph with red and blue dots

AI-generated content may be incorrect.

A graph with blue and red dots

AI-generated content may be incorrect.Scenario 4 (Speed 2 m/s, Pause 50 sec)

A graph with red and blue dots

AI-generated content may be incorrect.

RESULTS

|  |  |  |  |
| --- | --- | --- | --- |
| Scenario | Speed (m/s) | Pause (s) | Avg Distance (m) |
| 1 | 1.0 | 0 | 4,986.81 |
| 2 | 1.0 | 50 | 4,577.10 |
| 3 | 2.0 | 0 | 9,945.08 |
| 4 | 2.0 | 50 | 8,464.02 |

ANALYSIS:

When we doubled the speed from 1 m/s to 2 m/s, the distance almost doubled. When there is no pause, there is a 2x increase from 4987m to 9945m. When there is a pause, there is a 1.8x increase from 4577m to 8464m.

When you pause for 50 seconds, there is a reduction in mobility. At speed 1m/s, there is a 8.2% reduction from 4987m to 4577m. At speed 2m/s, there is a 14.9% reduction from 9945 to 8464m.

We started with the same initial topology by having a fixed seed, and it became apparent that at higher speed, there is a greater effect from the pause.