

Lab 1: Mobility Models – part 2

CSE 4215/5431: Mobile Communications

January 14, 2011

We will conclude our investigation of mobility models this week. There are many that have been used. Please refer to [1] for a survey of many of these models.

In this laboratory assignment, you will explore another simple mobility model, the *Gauss-Markov* model. This is defined formally in equation 15 in [1]. There is a typo in the second equation – σ^y is typed as σ^x .

1 Questions to be addressed

Use the metrics that were defined in Lab 1.

2 Details of your simulation

You can work in Java or C/C++, or you can use MatLab. The latter makes it easier to plot data, and provides built in random number generators for many probability distributions.

Assume a field of size 100×100 and $n = 10000$ nodes. Note that there was a typo in the field size specification in lab 1 that is now fixed. Assume radio range $r = 10$. For the new parameters in this model, repeat your experiments with $\nu^x = \nu^y = 5$ and $\sigma^x = \sigma^y = 1, 2, 3$. Do the same for $\alpha = 0, 0.25, 0.5, 0.75, 1.0$. Let the simulation run for 1000 time steps in each case. If this is too time-consuming on your platform then you can use a smaller number.

Make a 3-d plot for the density after 1000 time steps over the field. Plot the other 2 criteria against time.

Repeat the experiments for when all nodes start at the center of the field and again for when all nodes are uniformly spaced (at fixed intervals).

3 Report and code

You will submit a report and all your code using the submit command (a submit directory will be created before the deadline). The deadline is 5 pm on January 20.

You should have a lot of data to plot – present your results in a way that the reader can easily see the strengths and weaknesses of each model. Data visualization is a creative activity; put some thought towards creating meaningful, attractive plots. In the report, write a brief (a few paragraphs) description of what you did, design choices or assumptions you made (if any) and what you could infer from your results.

Document your code so that the grader can easily follow what you are doing.

References

- [1] A Survey of Mobility Models, *Fan Bai and Ahmed Helmy*, Chapter 1 in *Wireless Adhoc Networks*, Kluwer Academic Publishers, Can be downloaded from http://www.ece.ncsu.edu/netwis/mobility_model.php